



# Project Information Document (PID)

Appraisal Stage | Date Prepared/Updated: 23-Apr-2021 | Report No: PIDA30987

**BASIC INFORMATION****A. Basic Project Data**

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|--|---|---|--|
| Country<br>China                                     | Project ID<br>P174267                     | Project Name<br>China Plastic Waste Reduction Project   | Parent Project ID (if any)                         |
| Region<br>EAST ASIA AND PACIFIC                      | Estimated Appraisal Date<br>21-Apr-2021   | Estimated Board Date<br>24-Jun-2021   | Practice Area (Lead)<br>Urban, Resilience and Land |
| Financing Instrument<br>Investment Project Financing | Borrower(s)<br>People's Republic of China | Implementing Agency<br>National Development and Reform Commission, Ningbo Comprehensive Law Enforcement Bureau, Chongqing Development and Reform Commission |  |

## Proposed Development Objective(s)

The project development objective is to improve plastic waste management at the national and sub-national level, and to reduce plastics pollution from municipal solid waste.

## Components

- Component 1 National Policies and Institution Strengthening
- Component 2 Sub National and Local Technical Assistance and Capacity Building
- Component 3 Improvements to Municipal Solid Waste Management and Plastic Recycling
- Component 4 Project Management, Monitoring and Evaluation

**PROJECT FINANCING DATA (US\$, Millions)****SUMMARY**

|                           |        |
|---------------------------|--------|
| <b>Total Project Cost</b> | 650.00 |
| <b>Total Financing</b>    | 650.00 |
| <b>of which IBRD/IDA</b>  | 440.00 |
| <b>Financing Gap</b>      | 0.00   |

**DETAILS**



**World Bank Group Financing**

|  |        |
|--|--------|
| International Bank for Reconstruction and Development (IBRD) | 440.00 |
|--|--------|

**Non-World Bank Group Financing**

|                     |        |
|---------------------|--------|
| Counterpart Funding | 210.00 |
| Borrower/Recipient  | 210.00 |

Environmental and Social Risk Classification

High

Decision

The review did authorize the team to appraise and negotiate

Other Decision (as needed)

**B. Introduction and Context**

Country Context

- Global municipal solid waste (MSW) generation is projected to increase by 58% between 2018 and 2050.** The amount of plastics in the waste is also expected to increase, driven by the growth in prosperity, urbanization and consumption. Today, some 33% of all MSW is openly dumped and plastics are found in every type of natural environment. An estimated 8 million tons of plastics per annum accumulate in the world’s oceans. In a business-as-usual scenario, the global flow of plastics to the oceans will nearly double between 2015 and 2025 and will continue to increase exponentially along with increasing waste generation.
- Marine plastic pollution has serious consequences for marine eco-system, human health and livelihood. Over 80% of ocean plastics is estimated to come from unmanaged or poorly managed municipal solid waste due to improper waste management operations, infrastructure and systems.** Approximately two-thirds of this amount comes from uncollected waste and the remainder leaks after the waste had entered the waste management systems. Remaining land-based sources include plastic from agriculture and micro-plastics from, for example, tire dust, and cloth washing. Marine plastic pollution has serious consequences for marine eco-systems, human health and livelihood. Plastics can stay in the ocean for hundreds of years and most of it descends to the sea bottom before it breaks into smaller pieces. Microplastics circulate freely, threatening the health of the ocean and have entered the food chain. Damages caused by plastics to the marine environment are estimated at USD 13 billion per year, and upwards of USD 75 billion when considering the total natural capital cost of plastics used in consumer goods.
- Municipal solid waste is a contributor to greenhouse gas (GHG) emissions.** An estimated 1.6 billion tons of CO<sub>2</sub>-equivalent of GHG emissions were generated from solid waste in 2016, some 5 percent of global emissions. This reflects downstream effects from open dumping and unmanaged landfill gas. Without improvements in the sector, solid waste directly related emissions are anticipated to increase to 2.6 billion tons of CO<sub>2</sub>- equivalent by 2050. If upstream impacts of MSW such as embodied energy is considered overall emissions are significantly higher: about 8% of the world’s oil



production is used to make plastics and if plastics use continues to grow as projected, this number will rise to 20% by 2050.

4. **Reintroducing plastics into the economy versus disposing them or recovering energy from them improves resource efficiency and contributes to lower GHG emissions.** It is estimated that recycling 1 ton of plastics reduced emissions by 1.1-1.3 tons of CO<sub>2</sub> compared to producing the same ton of plastics from virgin fossil feedstock. Globally only around 14% of plastic waste is currently recycled, with the vast majority ending up in landfills, waterways and oceans, or being incinerated. Recycling at scale requires high quality waste management systems with separate waste collection, transportation and handling, as well as enabling legal and regulatory environment and financial and economic incentives. Most high-income countries have therefore prioritized the development of their waste systems as a core and foundational element in the process of transitioning towards circular economy and lower associated GHG emissions.

5. **Internationally, a consensus has emerged that a combination of policies and system investments are needed to address the ocean plastic debris challenge.** That will include: (i) improved waste management systems to reduce and eliminate leakages of plastic waste into the environment and to establish separate waste collection systems that capture recyclables; (ii) upstream solutions to reduce unnecessary use of plastics and promote the use of more recycled and recyclable materials; and (iii) clean-up operations of already accumulated debris:

6. First, upgrading waste management systems is key to controlling and reducing the plastic debris challenge. By improving the waste systems' functionality and eliminating leakage outlets (capturing the waste), the sources of plastic pollution will diminish. Beyond physical infrastructure to collect, treat and dispose of the waste, capable institutions and proactive policies, engaged citizenry and adequate financial resources are required for investments and operations. Second, economic instruments and stimuli are needed to increase recycling. Increased recycling on its turn has a 'pull-effect' on waste plastic by adding value, transforming it from waste to commodity; this creates conditions to reduce the overall volumes of plastics in the waste stream. Economic instruments (e.g. landfill taxes, minimum recycling targets, minimum recycling content in new products, extended producer responsibility schemes, fiscal incentives, other product taxes) have been sought by many countries with varying level of success, mostly due to the missing precondition of a well-performing basic waste management system (universal collection, treatment and disposal) and an enabling environment. Low collection, treatment and disposal rates, illegal dumping and lack of financial sustainability makes the practical implementation of more advanced economic instruments and measures difficult. Strengthening MSW systems will therefore not only reduce direct leakages of waste to waterways and the ocean but will also create necessary conditions for a gradual transition towards a circular economy. Finally, clean-up operations of already accumulated waste could be important in specific locations (e.g. river deltas, beaches) and are as such relevant for certain environments. However, large-scale clean-ups make little sense if the leakage of fresh plastic debris continues.

7. **The Government of China has increasingly recognized and responded to the severe environmental consequences of the rapid economic growth.** China was in the 120<sup>th</sup> place out of 180 countries for environmental performance across 24 environmental indicators in ten categories in a 2020 research, including: air quality, water and sanitation, heavy metals, biodiversity and habitat, forests, fisheries, climate and energy, air pollution, water resources and agriculture. This is below that of other upper middle incomes countries such as Turkey, Brazil, Mexico and Russia. The cost of environmental degradation and resource depletion in China has been estimated at around 9% of GDP, ten times higher than corresponding levels in Korea and Japan. A 2015 scientific study estimated that China is a significant contributor to ocean plastic debris and that its rivers are a main conduit of such debris reaching the ocean. While there is a need for more research to identify contributing sources and volumes, given the low safe disposal rate for rural waste and prevalence of agricultural plastic that remains uncollected, it could be assumed that a significant volume of mishandled rural waste is a main source of plastics pollution. Urban areas are also contributing to plastic pollution: fringe,



peri-urban areas have lower service levels than city centers; cities produce large quantities of construction and demolition debris; and microplastics are present in the outflow from wastewater treatment plants.

8. **Recognizing these challenges, China is aiming to transition towards a more balanced and sustainable economic growth model.** The 14<sup>th</sup> Five Year Plan (2021-2025) which was launched in March 2021 continues the focus of the previous two five-year plans on improved resource, energy and emissions efficiency, and on pollution abatement and the preservation and restoration of China’s eco-systems. In September 2020, President Xi Jinping committed China to a zero net carbon emissions target by 2060 and in December 2020 China announced a moderate increase in its National Determined Contribution. Nonetheless, specific actions are still being elaborated in a Climate Action Plan expected to be completed later in 2021.

9. **China’s economy has weathered the Coronavirus Pandemic (COVID-19) relatively well.** After an initial spike in early 2020, domestic outbreaks of COVID-19 have been limited and rapidly brought under control, which together with a significant investment-focused economic stimulus package, has allowed China to record positive growth of 2.3% in 2020, with a further recovery by around 8.1% expected in 2021. However, growth remains imbalanced in favor of investment and production, with consumption and services lagging behind. China’s stimulus has been weighted towards “brown” rather than “green” investments, with a focus on infrastructure and GHG emissions are estimated to have increased. Households continue to be cautious in the face of sharp income losses early during the pandemic, lingering economic uncertainty, and occasional local outbreaks. Vaccination roll-out has been increasing in recent weeks, but China lags the advanced economies in Europe and the US and is unlikely to reach a level of vaccination that would allow the economy to reopen to international travel in 2021.

10. **Against this background, the authorities are therefore likely to continue to seek a balance between environmental targets and maintaining growth and employment.** Unlike in previous FYP, the 14<sup>th</sup> FYP does not include a growth target and the 2021 target has been set conservatively at “above 6%”, allowing the authorities to focus on other priorities, including financial de-risking and improving the “quality” of growth, including potentially an increased focus on pollution abatement. Implementation and enforcement of environmental targets will however depend on provincial and sector specific plans still under elaboration. Solid waste management policies have been significantly enhanced at the end of the 13th FYP and provide a solid basis for implementation support through this project.

#### Sectoral and Institutional Context

9. **Several ministries have responsibility for MSW management in China.** At the national level, MSW management is under the purview of the Ministry of Housing Urban and Rural Development (MOHURD), while material recycling management is overseen by the Ministry of Commerce (MOC). At the same time, the development of the circular economy and supporting policies is administered by NDRC, while environmental monitoring and supervision of all waste management and material recycling facilities is the responsibility of the Ministry of Ecology and Environment (MEE). The data for MSW generation, collection, and disposal is recorded and released by MOHURD, while the data for recyclable waste collection and recycling is recorded and released by MOC. At the municipal level, the City Management Bureau (CMB) or Bureau of Housing and Urban-Rural Development are responsible for MSW collection, transportation, and disposal. UMB is also responsible for construction and operation of disposal facilities, including landfills and incineration plants.

10. **The waste management sector and efforts towards circular economy in China are under transition and evolving quickly.** Sector developments are driven by efforts to reduce pollution and transition to more sustainable practices. Since July 2017, China started to ban the import of various types of waste recycling materials including most waste plastics. Other recent initiatives include (i) the Waste-free City Initiative (Dec 2018) where more than 10 cities participate to pilot



comprehensive programs for improving the management of all types of solid wastes; (ii) the policy document titled Further Strengthening Plastic Pollution Control (Jan 2020) that envisages measures to ban the use of certain single-use plastic items, substitute many other single-use plastics with biodegradable materials, regulate better the use of agricultural plastic mulch, improve monitoring, reporting and supervision, and promote eco-design and material recycling; (iii) the new Law on Solid Wastes (April 2020) introducing sustainability measures; (iv) the Guiding Opinions on Accelerating the Development of a Green and Low-Carbon Circular Economy issued by the State Council of China (Feb 2021) that further emphasize recycling and utilization of renewable resources, as well as a number of other current central government reports that continue to prioritize waste as a key sector and subject to reform.

**11. Collectively, these recent policy and legal documents create a framework for further actions towards improved management of wastes, reduced pollution, increased material recycling and utilization of resources.** Authorities have recognized that both ‘downstream’ solutions (post-consumer, such as waste collection, recycling and disposal) and ‘upstream’ solutions (pre-consumer, such as plastic substitution, plastic waste prevention and reduction) must be applied in parallel. In rural areas efforts are therefore concentrated on extending municipal waste collection services and increasing the safe disposal rates; as well as pilots to find a scalable model for agricultural film handling. In urban areas, efforts are focused on increasing the recycling rate and improving source separation. At the central level, policy directions to reduce pollution control, increase recycling, enhance prevention are in place although much of the downstream regulatory frameworks that would allow to achieve these objectives are yet to be developed.

**12. China is estimated to produce more than 400 million tons of MSW per year, of which approximately 12% is plastic waste.** With urbanization and improvement of living standards, waste generation is expected to increase. Consumption of single-use plastic is also increasing rapidly, most notably in the food delivery industry but also as part of other packaging. Going forward, as GDP per capita continues to rise and people consume more, the packaging materials and plastic content in the MSW will continue to grow, even relative to the growth in overall waste volumes produced per capita. For East Asia as a whole, SWM generation is expected to increase by around 44% by 2050.

**13. In China only half of the rural MSW is disposed safely.** As with other municipal services, waste service levels tend to decrease geographically from the eastern coastal cities to the west; and rural areas lag significantly compared to their urban counterparts, where collection of MSW (excluding waste categories such as construction waste) is near universal. In 2017, according to the China’s Statistical Yearbook, 215 million tons of MSW were collected and transported from the 660 Chinese cities, of which 98% were treated and disposed of in facilities that meet Chinese national standards. For rural areas, official statistics are scarce since the collection, transportation and treatment services are not well-established, and reliable data is hardly available. On average, rural households generate 0.76 kg/capita/day, of which 18% are recyclable materials including 7.1% plastic waste. Estimates based on rural population and the average MSW generation rate indicate that China’s rural domestic waste generation in 2017 was around 175 million tons, of which at least 70 million tons were illegally dumped or burnt. Overall, it was estimated that only approximately 47% of rural waste is disposed according to national standards.

**14. Rural solid waste is considered a major source of environmental pollution. A series of policies and programs to improve the environment and livability of rural areas have been launched, including efforts to enhance the coverage and performance of rural solid waste management systems.** In 2015, the Opinions on Comprehensive Implementation of Rural Solid Waste Management issued by MOHURD and ten other ministries required areas with available resources to establish rural waste management systems that follow the organizational approach of “waste collection by village, transfer by township, and treatment by county”, and increase the effective waste management service delivery rate to 90% of villages country-wide. In 2018, the State Council issued a Three-Year Action Plan for Rural Living Environment Improvement, pushing for the establishment of a comprehensive and diverse rural solid waste management system



centered around waste separation, minimization and recycling. Despite these efforts, as of now, rural waste management remains underdeveloped in terms of service coverage, infrastructure and systems, and performance.

15. **China has been transitioning from disposing its waste in landfills to waste treatment through incineration and composting/anaerobic digestion.** Currently, landfilling and incineration remain the main waste disposal methods. There are a total of 1,013 treatment and disposal facilities with a total capacity of 680,000 tons per day: 360,000 tons for sanitary landfill, 300,000 tons for incineration, and 20,000 tons for others. Notably, incineration accounted for 40% of the total in 2018, which is double the share it was in 2011. Incineration has been adopted as the major solution for MSW management. According to the 13th Five-Year Program, the capacity of MSW for disposal will be increased from 758.300 tons per day to 1.1049 million tons per day, while the capacity for incineration is to be more than 50% of the MSW disposal mix in cities of China and more than 60% in cities in the east of China.

16. **The current material recycling rate of about 16% is expected to increase going forward. Plastics recycling is of importance given the challenges with plastics marine pollution and GHG emission reduction potential.** The primary plastic resins production in China raised to 85.6 million tons in 2018 compared to 52.6 million tons in 2012. The production of plastic products in 2018 was 78.8 million tons. According to national statistical sources, China produced 63 million tons of waste plastics in 2019, of which 18.9 million tons were recycled, a plastics recycling rate of about 30%. Following the ban for waste imports the quantities of recycled plastics declined from a baseline of 28.3 million tons in 2017. There is a tendency for a slow increase in recycled plastic waste quantities collected from domestic market that amount to 16.9 million tons in 2017 and 18.3 million tons in 2018. Following the import ban, there is no capacity shortage for recycling.

17. **The recycling rate is expected to increase as a result of the promotion of MSW source separation, with a national target MSW recycling rate of 35% by 2025.** The national target of 35% recycling rate compares to 60% and 65% of municipal waste by weight recycling targets in the European Union by 2030 and 2035 respectively. Currently, a considerable part of plastic waste is collected through a semi-formal system functioning in parallel to collection of municipal waste and operated on commercial basis. Such collection practices are focused on high value plastic waste commodities like PET bottles, certain foils and rigid plastics. The public system has been left collecting residual plastics and other materials that have either low-value or are too contaminated to be commercially viable. Combining these parallel systems – or at minimum integrating material recycling into MSW management systems, is part of an ongoing institutional reform. By doing so the waste system in China will be comparable to how waste systems are organized in most other medium and high-income countries where the responsibility for waste collection including recyclables belongs to municipal authorities who then may choose to involve private operators or producer organizations for actual operations, e.g. on a concession basis. Integrating the two parallel systems for municipal waste management and collection of secondary raw materials will be a key driver for transition towards increased recycling rate while lowering the cost burden on the public system currently left with low-value materials.

18. **China has the largest agricultural area under plastic films in the world because of its rapid expansion into fruit and vegetable production – a response to dietary diversification locally and abroad.** The area under plastic cover in China grew more than 150-fold between 1982 and 2018 and reached over 18 million ha, more than four times the size of the Netherlands, and in total amount of 2.5 million tons. This plastic mulch film has played an important role in Chinese agriculture due to its soil warming, moisture conservation and pesticide reducing effects, accounting for cash crop yields to be increased. Despite benefits, its widespread use generates large amounts of plastic mulch residue accumulating over the years and altering the soil characteristics conducive for healthy plant growth. The management of agricultural non-point source pollution and solid waste in rural areas of China is a major environmental challenge, as suboptimal farming practices and application of fertilizers and pesticides, together with improper treatment and disposal of solid waste contributes to air, water, and soil pollution, as well as basin-wide ecosystem degradation. Since 2017, the Ministry of Agriculture and Rural Affairs (MARA) has launched a series of pilot programs for mulch film recycling, which include a



demonstration program in 100 counties in west China, establishment of 500 mulch film pollution monitoring points, and pilot of eco-compensation mechanism in selected regions.

19. **Despite progress so far and the clear ambition to advance policies and implementation practices towards reduced pollution and plastic leakage, increased recycling, and prevention, a lot remains to be done.** There is institutional fragmentation in service planning and delivery and lack of well-articulated performance systems linked to actual waste volumes produced and handled. Significant operational and financial difficulties remain in rural areas to organize the system such that all waste is collected and safely handled. Rural areas also experience large gaps in data availability and reliability; and successful models there are needed for scale up across rural China. In urban China, the rolling out of separate waste collection has proved challenging too. Where separation at source is not in place or with insufficient quality, the recycling rate and quality of kitchen waste treatment processes suffer. At the policy level, the specific policy implementation drivers, such as economic and financial incentives and regulatory mechanisms that would underpin prevention and plastic waste reduction are not yet in place. Central government authorities (such as NDRC and MEE) have made plans for significant research, analytical, technical efforts expected to start to fill the regulatory and implementation mechanism gaps.

### C. Proposed Development Objective(s)

Development Objective(s) (From PAD)

20. **PDO:** The project development objective is to improve plastic waste management at the national and sub-national level, and to reduce plastics pollution from municipal solid waste.

21. **Project Beneficiaries:** The project will be implemented at the national level, and local level in Chongqing and Ningbo. At local level, direct beneficiaries of the project will be 10.2 million population in the project area (urban and rural) of Chongqing, and 4.6 million residents in the urban districts of Ningbo, who will enjoy better SWM services, cleaner living environment, and lower risk of plastic waste pollution. At the national level, the project will benefit cities in China from strengthening the national waste management regime, market/technical/administrative mechanisms, and peer-to-peer learning potential. Government officials, city administrative staff, and SWM entities and enterprises will gain expertise and capacity from the TA and training activities of the project. The project will help China, in direct and indirect ways, to fulfill its climate and pollution reduction commitments internationally and contribute to the generation of global public goods in terms of plastic marine debris control and climate change mitigation.

### Key Results

22. The project will have the following key monitoring indicators:

- (a) Strengthened plastic waste management
- (b) Strengthened local plastic waste management (Chongqing, Ningbo)
- (c) Increase in waste collection coverage (in pilot rural districts of Chongqing)
- (d) Reduced leakage of plastics to the environment from improved waste management operations
- (e) Improved resource utilization (percent of MSW diverted from incineration/landfills)
- (f) GHG emissions abatement from improved waste management systems and resource recycling

Proposed intermediate indicators are presented in the Result Framework and will be further elaborated preparing for project appraisal.





23. The project is the first in a program of two Bank operations in China for plastic waste reduction – the phase two project will focus on plastics in rural waste streams. Both are an integral part the Bank’s broader EAP marine plastic agenda. This project combines policy and regulatory work at the national level with investments and technical assistance at the subnational and local level. The national level work will help develop policy and implementation mechanisms to reduce pollution, improve resource utilization through recycling, and achieve waste minimization and prevention. The national level support will both be operationalized in the two project cities and be informed by lessons learned there. Policies, regulations and mechanisms supported under the project are expected to be eventually rolled out nationally and impact all provinces in China. The project cities are representative: Ningbo represents cities on the east coast that are already started to adopt advanced waste management, recycling and prevention measures; Chongqing represents the majority of cities in China that are in very early stages of waste separation at source in urban areas; rural districts in Chongqing are typical examples of incomplete waste collection and safe handling and high pollution load. Experiences gained and lessons learned through this project are expected to be replicated and inform other provinces and further policy work at the national level and regulatory mechanisms at provincial level.

#### D. Project Description

24. **Project Components and Estimated Costs.** The project’s objectives will be achieved through systemic interventions financed by a Bank loan of USD440 million in four areas: (i) a central component (Component 1, IBRD USD20.0 million) to focus on policy framework and institutional strengthening at the national level, and to be implemented by the National Development and Reform Commission (NDRC), China’s highest policy-making body, including concerning the plastics value chain; (ii) a sub-national and local institutional development component (Component 2, IBRD USD40.0 million) to support policy enforcement, central-local government coordination, capacity building and public engagement in Chongqing municipality and Ningbo city; (iii) an investment component (Component 3, IBRD USD370.0 million) to improve municipal waste management systems, reduce plastic leakages from waste streams, and increase resource recycling, which will be implemented by Chongqing Municipality (provincial-level) and Ningbo City (sub-provincial level); and (iv) project management, monitoring and evaluation (Component 4, IBRD USD10.0 million).

25. Being critical in connecting policy and investment activities of the project, and central and local level work for greater synergy and impact, Component 2 will be implemented by Chongqing and Ningbo in close coordination with NDRC. Component 4 covers all project management activities at the three implementation levels. Activities under each component are further described below:

#### **Component 1 – National Policies and Institution Strengthening (Total: USD20.0 million, IBRD: USD20.0 million)**

26. Implemented by NDRC at the central level, this component will support China develop forward-looking policy directions provisioned under the policy note of Further Strengthening Plastic Pollution Control (Jan 2020), the Guiding Opinions on Accelerating the Development of a Green and Low-Carbon Circular Economy (Feb 2021), in line with the new Law on Solid Wastes (April 2020), and in alignment with China’s 14th Five Year Program. The referenced policy note from January 2020 envisages concrete measures to ban the use of certain single-use plastic items; substitute other single-use plastics with biologically degradable plastics (which remain to be defined and standardized in terms of polymer characteristics, performance and suitability and require scientific research); improve standards for waste and plastic management, monitoring, reporting and supervision; and finally – promote eco-design and material recycling with the aim to reduce plastic consumption. The policy note issued in February 2021 places further emphasis on recycling and utilization of renewable resources.



27. To facilitate the reforms, China needs to develop specific policy enforcement drivers, economic and financial incentives, and regulatory mechanisms to reduce pollution from waste (focus of sub-components 1A and 1B), improve resource utilization through source separation and recycling (focus of sub-component 1C), enhance plastic waste prevention (focus of sub-components 1D and 1E).

- 1) **Activity 1A – Institutional setup and responsibilities for waste management (Amount TBD in appraisal stage).** This subcomponent underpins welding the institutional fragmentation in waste management service planning and delivery across tiers of administration, with establishment of performance evaluation systems with linkage to the actual volumes of waste generated and managed. It will support gap analysis and recommendations to improve institutional structure, functional roles and financing arrangements for solid waste management system across the 5-tier government at central, provincial, municipal, county and township levels in China. It will also support the development of a framework for recycling agricultural plastic waste, possibly through an extended producer responsibility system for agricultural plastics. The activity will seek to integrate better rural systems into the waste flow chain from waste generation to final handling, and lead to improved performance in rural areas including reduced leakage of plastic waste and management of agricultural plastic mulch.
- 2) **Activity 1B – Policy and mechanisms for plastic pollution control (Amount TBD in appraisal stage).** Support the development of a comprehensive system for plastic pollution control. This will include developing performance evaluation mechanisms and indicators for provinces, municipalities, cities, and rural county/township level, that could measure reduction in plastic pollution; plastic waste pollution reduction plans for Yangtze and Yellow River Basins with specific focus on these water basins; and guidance on agricultural plastic waste monitoring and control mechanisms.
- 3) **Activity 1C – Recycling of conventional plastics (Amount TBD in appraisal stage).** Support the development of market mechanisms to increase the use of recycled plastics and promote eco-design; a labeling system and standardization for recycling processes and products; and a traceability management system from production, circulation, consumption through treatment of plastics. The activity is intended to help create conditions that stimulate demand for recycled content (e.g. flakes/pellets) and may include deposit schemes or extended producer responsibility arrangements, minimum recycling content requirement for new products or product taxes.
- 4) **Activity 1D – Alternative materials and substitutes (Amount TBD in appraisal stage).** The subcomponent will support the review and analysis of alternatives to single-use plastics through multi-use or biodegradable materials in key areas (e.g. e-commerce, express delivery, take-out industry). The activity will also support the development of economic mechanisms as options (green procurement, fiscal instruments) to promote the transition from single-use plastics. In areas where the transition to biodegradable materials has already started, including biodegradable plastics, the subcomponent will support benchmarking of policy approaches internationally as well as technical review and benchmarking of biodegradability standards.
- 5) **Activity 1E – International exchanges on plastic pollution prevention (Amount TBD in appraisal stage).** Support international exchange and coordination on pollution prevention policies and mechanisms. This will include international exchanges on efforts to systematize the labelling of plastic material used in products; on policies and mechanisms to stimulate waste prevention and minimization; on repurpose, repair and re-use strategies; and on sharing China's experience and lessons learned in advancing its waste management sector over the past decade.



**Component 2 – Sub National and Local Technical Assistance and Capacity Building (Total: USD40.0 million, IBRD: USD 40.0 million)**

28. This component will help increase the synergy of the waste management regime at national, sub-national and local levels in China, through better coordinated policy development and enforcement, pilots and demonstration, and institutional capacity building across administrative layers. The integrated system improvements of SWM being supported by this project in Chongqing and Ningbo (under Component 3) need to follow national policies, which are by and large generic in nature and set targets with limited specifics about how to operationalize national policies. Guidance is therefore needed from responsible national institutions, particularly NDRC (and MEE). Close engagement between central and local departments will better ‘translate’ national policies and guidelines into practical approaches for the planning of system improvements and implementation; and reversely local good practices, lessons learned, and innovations would inform policy making at the national level. This Component supports the establishment of such a dialogue mechanism between national and local government, as well as specific institutional strengthening and capacity building activities at city level, in three key areas as below:

29. **Sub-component 2A – National policy operationalization at local level and cross-tier coordination (tentatively USD10.0 million).** This activity applies to the national framework and waste management capacity in Chongqing and Ningbo, regardless of local focuses of loan investments. TA activities would include support for integrating plastic waste management priorities in planning and financing of system improvements, operational and regulatory oversight capacity strengthening, establishment of waste management and resource recycling statistics platforms at city level, and development and testing of data monitoring and collection protocols linked to the national waste information data platform. Under this sub-component, a methodology will be developed to detect the hot spots of plastic waste “leakages” based on mass balance of quantities among the system segments. TA under this sub-component will complement activities under 2B or 2C, which are more tailored to the types of investments to be implemented in the respective cities. Capacity building programs will be developed as needed accordingly.

30. **Sub-component 2B – Policy, TA and capacity building for Chongqing to strengthen solid waste management in rural and peri-urban areas aiming at reducing plastic waste pollution (tentatively USD10.0 million).** Nationally, approximately 50% of rural waste is disposed in ‘unsafe’ areas causing environmental pollution including from plastics. Rural waste is considered the largest source of plastic waste leaking to the environment and waterways; at the same time, rural waste management is significantly more complicated than in urban areas and has higher costs (transport distances, low generation density) paired with lower financial capacity of local authorities. TA, research and capacity building activities under this sub-component will support Chongqing with implementation of rural waste management systems investments under Component 3, with the objective of integrating urban-rural SWM systems to minimize and subsequently eliminate ‘leakages’ of waste before and after entry into the public waste streams. AT the same time, the experiences and lessons learned will be used and replicated beyond this area and is expected to inform possible future support by the Bank in China. Special attention will be given to operational finance and cost recovery given the high incremental cost after the rural SWM system is upgraded, and system integration and institutional cooperation across jurisdiction boundaries between urban and rural areas. Also, Chongqing will explore technically feasible and economically viable models to collect and recycle agricultural mulch film after use and contribute local experience to the national mulch circularity programs.

31. **Sub-component 2C – Incentive Program, TA and capacity building for Ningbo to promote advanced waste recycling (tentatively USD 20.0 million).** (1) Building on the experience and lessons learned from the previous Bank-financed MSWM project in Ningbo, the loan will support a novel phase of *Output-Based Incentives Scheme* (OBIS) to increase community-based waste separation, and the quality of waste separation by households. The new OBIS will employ AI technologies in smart trash bins for monitoring of residents’ waste separation performances and waste quality



verification, and blockchain technology for data processing, performance rating, and incentives matching. (2) Advanced waste separation at source (beyond levels that can be achieved by informal collection of recyclables) are relatively new to China. Policy development, TA and capacity building activities under this sub-component will support Ningbo, a relatively advanced city in China to enhance waste separation and recycling, by further propelling law enforcement and citizens' engagement in waste separation. (3) The project will also facilitate know-how exchanges between Ningbo and other cities in China and in the world, to bring in international good practices and replicate Ningbo's experience in solid waste separation and resource circularity wherever viable.

**Component 3 – Improvements to Municipal Solid Waste Management and Plastic Recycling (Total: USD580.0 million, IBRD: USD370.0 million)**

32. This component will support Chongqing and Ningbo to improve the functionality of respective solid waste management systems, addressing plastic leakage hotspots in waste flows and pushing recycling to a higher level. In addition, this component will support Chongqing demonstrate urban-rural integration in terms of solid waste management and plastic pollution control, and Ningbo to pilot enhanced separation of wastes and increased recycling rates and resource utilization.

33. **Sub-component 3A – Improvements to solid waste management systems in urban and rural Chongqing (Total: USD350.0 million, IBRD: USD 250.0 million).** Project investments will be implemented in 9 urban districts of Chongqing (Yuzhong, Nan'an, Shapingba, Jiulongpo, Dadukou, Jiangbei, Yubei, Beipei and Banan) and 2 peri-urban/rural districts (Wulong and Qijiang). Given that Chongqing is in an early stage to roll out waste separation in urban districts, this sub-component will support:

- **3A.1 – Improvements to Urban Solid Waste Management System.** To meet growing demand of segregated waste to be handled by the urban system, the project will invest in waste sorting, transfer and recycling infrastructure and facilities in urban districts that runs across the city proper of Chongqing, and establish a waste management system targeting waste leakages (including from plastics and waste from shipping) to the Yangtze River.
- **3A.2 – Integrated Urban-Rural Waste Segregation and Management Pilot.** In peri-urban and rural areas where SWM coverage is as low as 20% and plastic waste leakage is universally visible, this sub-component will support the two districts of Wulong and Qijiang to strengthen rural waste management systems with integration with Chongqing's urban system, in terms of service coverage, operational efficiency and sustainability. The Bank loan will fund construction of waste collection and transfer facilities, kitchen waste and bulky waste treatment facilities, and landfill closure in selected rural areas. This is the first Bank operation in China to address plastics pollution in rural waste streams, and through systemic upgrading of rural waste management to urban service levels. The project will broadly contribute to the achievement of Chongqing's ambition to, by 2025, roll out waste segregation in the entire city proper and 50% of rural areas, with over 40% of waste recycled in city proper and 30% in rural areas. Under this sub-component, Wulong and Qijiang will also identify bottlenecks in agricultural mulch plastic collection and recycling, and pilot economically viable and sustainable models to stop agro-plastic waste leakages to the environment.

34. **Sub-component 3B – Improvements to municipal solid waste management systems in Ningbo (Total: USD230.0 million, IBRD: USD120.0 million).** This component will be implemented in 6 urban districts of Ningbo (Yinzhou, Haishu, Zhenhai, Beilun, Jiangbei and Fenghua). It supports the city to showcase high-quality waste separation at source, reduce plastic waste leakage to the environment (e.g. from co-mingled food waste, construction waste and other mixed waste streams that may currently end up in soil or water), and push recycling rates of plastics and other materials to levels seen in high-income countries with leading performances in this sector (e.g. Germany, Korea).



- *3B.1 – Intelligent Segregated Waste Management System.* This component will help Ningbo achieve its objective of 80% (of households) accurate waste separation at drop-off in all 6 urban districts (Yinzhou, Haishu, Zhenhai, Beilun, Jiangbei and Fenghua), and increase the rate of plastics collection and recycling among all recyclables
- *3B.2 – Advanced Resource Recycling System.* This component will support Ningbo build up waste recycling capacities in three ways – first, increase recycling capacity of plastic waste from various waste streams; second, improve resource recycling out of bulky waste (e.g. furniture and home appliances) and decoration debris; and third, reduce the negative environmental externality of recycling with improved wastewater treatment and capturing of microplastics from SWM facilities.

**Component 4 – Project Management, Monitoring and Evaluation (Total: USD10.0 million, IBRD: USD10.0)**

35. This component will support the operation of project management/implementing agencies in NDRC, Chongqing and Ningbo, to ensure smooth project implementation and compliance to Bank and domestic policies and procedures. Activities to be financed include project management related training and capacity building, consultancy services, establishment and maintenance of FM, procurement, environment and social, publicity, and knowledge management systems.

**Project Cost and Financing**

| Project Components  | Project Cost (USD mln) | IBRD Financing (USD mln) | Borrower's co-financing (USD mln) |
|---|------------------------|--------------------------|-----------------------------------|
| Component 1: National Policy and Institutional Strengthening                        | 20.0                   | 20.0                     | 0                                 |
| Component 2: Sub-National and Local Technical Assistance and Capacity Building      | 40.0                   | 40.0                     | 0                                 |
| Component 3: Improvements to Municipal Solid Waste Management and Plastic Recycling | 580.0                  | 370.0                    | 210.0                             |
| <i>Sub-component 3.1: Chongqing</i>   | 350.0                  | 250.0                    | 100.0                             |
| <i>Sub-component 3.2: Ningbo</i>  | 230.0                  | 120.0                    | 110.0                             |
| Component 4: Project Management, Monitoring & Evaluation                            | 10.0                   | 10.0                     | 0                                 |
| <b>Total</b>  | <b>650.0</b>           | <b>440.0</b>             | <b>210.0</b>                      |

Legal Operational Policies

|   | Triggered? |
|---|------------|
| Projects on International Waterways OP 7.50 | No         |
| Projects in Disputed Areas OP 7.60          | No         |

Summary of Assessment of Environmental and Social Risks and Impacts



36. The project is expected to generate substantial positive environmental and social (E&S) outcomes in terms of improvement to people's living environment, lower health risk, reduction of plastic leakage into the environment, and savings in energy and raw materials.

37. At project appraisal, most of the project activities will not have been fully detailed with design work etc. Based on the available information, the environmental and social screening have been conducted. The environmental risk rating for the project is High. It is expected that the physical activities will cause wide-range significant adverse risks and impacts on environment and human populations, such as use of toxic chemicals and hazardous materials, storage and treatment of hazardous pollutants, and impact on natural habitats. However, these potential impacts can be avoided, minimized or mitigated by study of alternative site locations and adoption of the state-of-art technologies/good engineering design as a first step.

38. The project social risk is classified as Substantial. For the overall project, substantial social risks and impacts anticipated are: (a) land acquisition and resettlement; (b) workplace OHS issues; (c) community exposure to safety and health risks (both real and perceived); (d) potential conflicts with communities who may not agree with the construction of solid waste treatment facilities (not-in-my-backyard (NIMBY) objection); and (e) exclusion risks to vulnerable groups. The waste facilities are fully secured and fenced and waste-pickers that are typical of some other developing country cities do not exist. Instead potential economic impacts primarily relate to front-end recyclable waste collectors who are mainly community cleaners. The project designs have included inclusive measures to support waste collectors to adapt to the new collection and transportation system. The ESA does not identify particular concerns on child labor or forced labor because China's labor law is strictly enforced and there is no track record of violations of these in the past. Most of the project workers would be mobilized locally and gender-based violence (GBV) is deemed low risk. ESS7 is not relevant to the Ningbo part and the first batch of subprojects of the Chongqing part because there are no ethnic communities. ESS7 applies to national-wide TA and is potentially relevant to the future investment in Wulong District of the Chongqing part (associated with the installation of dustbins). ESS8 is relevant due to some civil works involved and the possibility of encountering chance finds of physical cultural heritage.

39. The non-physical activities to be supported by the TAs will have nation-wide downstream E&S implications. However, the project will not finance the development and implementation of the policies, plans, protocols, and guidelines. For TA activities, the PMOs will hire E&S experts to support the implementation of the TAs to ensure E&S consideration will be integrated into the TA outputs and guided by the environmental and social management framework (ESMF) and relevant ESSs. The project lawyer and/or LEGEN should be consulted when advising government in developing regulatory instruments.

40. The framework approach is adopted for the overall project, while a site-specific plan approach is for the activities confirmed before appraisal. Chongqing and Ningbo have confirmed their first batch of physical investments respectively before appraisal. Chongqing will carry out renovations of three large transfer stations; construction of a recyclable processing base in Luoqi to produce granular plastic, fuel, glass materials and textiles; as well as a pier with two berths at a combined capacity of 600 tones on the Yangtze River to collect ship wastes and floating wastes. The first batch investment of Chongqing will have substantial environmental risks and impacts. Ningbo will establish 4,500 smart dust bins in 2,300 communities and operational vehicles, establish a data platform and an Output-Based Incentives Scheme (TA). The first batch investments of Ningbo will have low environmental risks and impacts.

41. The central PMO, the Ningbo and Chongqing PMOs have contracted experienced EA Consultants to prepare E&S instruments, including an ESMF, the Stakeholder Engagement Plan (SEP), and Environmental and Social Commitment Plan (ESCP). Before appraisal, site-specific E&S documents for the first batch investments in Chongqing and Ningbo have been prepared, including: Environmental Impact Assessments (EIA) with ESMP incorporated, Social Audit Report, Social Impact Assessments (SIA) (including labor management plan, LMP), SEP, for Chongqing; and ECOP, SIA and SEP for Ningbo. During



implementation, specific locations for future physical activities will be determined. Relevant subproject specific E&S documents will be prepared per the ESMF and submitted to the Bank for clearance. WBG Environmental, Health, and Safety Guidelines (EHSBs) relevant to the project will be incorporated into E&S documents where applicable. The E&S documents will be disclosed locally and on the World Bank website before the approval of specific subprojects.

42. The ESMFs include a study of E&S baselines, an assessment of potential E&S impacts and also covers procedures for subproject exclusion that excludes any physical activities involving international waterways, critical habitats and legally protected physical cultural heritages, screening, categorization, E&S document preparation including TORs for the ES documents, stakeholder engagement, and review and approval, which follow the Bank's ESF and domestic requirements. The GHG estimation will be made per the ESS3.

43. The environmental impacts of the first batch investments in Chongqing are related to wastewater, noise, soil erosion, traffic safety, solid waste, risk of involving natural habitats, and occupational health and safety. In construction stage in particular, environmental risks are related to wastewater, noise, bad odor, solid waste and risk of fire and explosion. In addition, through consultation and alternative analysis, the terminal on the Yangtze River is located on the section of Jiguanshi which is deemed as modified habitat with low biodiversity value. Fire and explosion risk of fuel products was assessed in line with technical guideline of China and the risk is found low. The energy consumption and water demand have been estimated and it is found that the energy use and water demand is small. The first batch investments are a minor source of GHG as the direct GHG emission is largely from operational vehicles at limited size (161 vehicles to be procured under the project). Mitigation measures including ECOP and site-specific measures, OHS measures, emergency preparedness plan, and monitoring plan, as well as the institutional arrangement and capacity building plan have been designed and incorporated into the ESMP. Specific management plans, e.g. labor camp management plan and traffic management plan have been developed under the ESMP to deal with influx of workers and traffic safety risk. All relevant off-site facilities have been identified and screened against the criteria for Associated Facilities, and no such Associated Facilities are found. SEP has been developed and conducted in early stage of the EA.

44. The SIA concluded Ningbo 1st batch of subprojects would not induce significant social risks. Some moderate social risks would include OHS risks related to contracted workers and community workers, road safety risk by the project vehicles, and exclusion risks to vulnerable groups. The Ningbo 1st batch subproject creates an opportunity to transform community cleaners into project workers (community workers) to share the project benefits. Chongqing 1st batch subprojects would result in substantial social risks, such as OHS risks to workers, NIMBY objection to waste facilities, community health risk, exclusion risk to contracted workers and senior people in local communities. The five subprojects in 1st batch have finished land acquisition and resettlement without remaining court or complaint cases. The Chongqing 1st batch has minor outstanding resettlement issues related to transferring collective-owned funds from two village committees to individuals and allocating the remaining floor areas of replacement apartments for four affected households. The actions and timelines to resolve the outstanding issues have been confirmed with relevant parties and included in the ESCP.

45. The E&S documents were locally disclosed on December 2 in Ningbo and December 7, 2020 in Chongqing for feedback from stakeholders. The national PMO disclosed the E&S documents for the national component locally on January 19, 2021. The revised E&S documents were re-disclosed domestically on February 8, 2021, and at the World Bank website on February 13 (for environmental documents) and February 17 (for social documents).

## E. Implementation

### Institutional and Implementation Arrangements



46. **Project Management Office at National Development and Reform Commission (Component 1).** A Project Management Office (PMO) for the central policy component will be established in the National Development and Reform Commission (NDRC), led by a Division Director from the Environment and Resources Conservation Department and responsible for the overall planning and oversight of implementation. To ensure greater efficiency and impact of the policy and institutional aspects of this project, a key task for the central component PMO is to coordinate and guide local Development and Reform Commissions (DRCs) in Chongqing and Ningbo, in the course of development, enforcement and demonstration of policies and regulations under the project.

47. NDRC will designate the National Energy Conservation Center (NECC), its policy research, outreach and consulting arm, as Project Implementing Agency (PIU). Led by a Division Chief of the Center, the PIU will be responsible for annual work planning, facilitating and/or undertaking all planned activities, (semi) annual progress reporting, and implementation completion reporting. The PIU will be supported by a panel of national-level experts specialized in related areas.

48. **Cross-tier and cross-jurisdiction coordination mechanisms (Component 2).** The institutional arrangements of the project enable and align policy initiatives across government levels and coordination of actions across jurisdictions. Yet, this is a relatively new and challenging area for Bank engagement for which the project will experiment several mechanisms, including (a) operationalize national policies through pilots in Ningbo and/or Chongqing to test practicality and collect feedback; (b) convene annual work program discussion among NDRC, Chongqing and Ningbo PMOs to identify priorities for policy/institutional work in MSWM and plastic pollution control under the project, and agree on a coordinated annual work plan to better link central and local work; and (c) organize (bi-) annual seminars with NDRC, Chongqing and Ningbo during project implementation to share project experience with other cities.

49. **Project Management in Chongqing (Component 3A).** Chongqing Municipal Joint Chiefs for Plastic Pollution Reduction (MJC) established in 2018 will serve as the municipal coordinating body of this project. The mechanism convenes heads of Chongqing DRC and the Ecology and Environmental Protection Department to meet twice a year, on matters related to plastic pollution management and coordination with stakeholder agencies including the municipal finance, urban management, commerce, and supply and marketing cooperatives, etc. District-level project leading groups (PLGs) have been established in Wulong and Qijiang.

50. *Chongqing Municipal Project Management Office (PMO)* for foreign capital financed projects housed in Chongqing Development and Reform Commission (DRC), is responsible for the overall project management (procurement, FM, loan disbursement and safeguards), cross-departmental coordination and communication with the World Bank. The municipal PMO has handled multiple Bank lending projects in Chongqing over the past twenty years and has adequate Bank operation experience. Given the complex project design and cross-departmental nature of plastic waste management, the PMO will work closely with other key stakeholder departments and agencies, e.g. the Ecology and Environment Division of DRC, Ecology and Environment Bureau, and Urban Management Bureau, etc. District-level PMOs will be established in district DRCs accordingly.

51. *Project Implementing Unit (PIUs)* are established in three SOEs that make up the project implementation agencies in Chongqing. A PIU will be created in Chongqing Municipal Environmental Sanitation Group (ESG) which is the implementing entity for project activities in six urban districts. Similarly, implementing capacity will be created within Wulong District Development and Investment Group (Wulong PIU) for project activities in Wulong District, and in Qijiang District Nanzhou City Management Service Company (Qijiang PIU) to implement activities in Qijiang District (see Figure 3). The ESG and two designated companies in Wulong and Qijiang districts are SOEs, with mandates to develop public infrastructure and provide (or procure) public services. The three PIUs will also service Bank loan repayments. The policy work, TAs and capacity building activities will be handled in coordination with relevant government agencies including





the finance, development and reform commission, city management and commerce commission, etc., given their policymaking and enforcement roles.

52. **Project Management in Ningbo (Component 3B).** A Project Leading Group (PLG) is established in the municipal government of Ningbo, headed by the Mayor and with Vice Mayors for urban development and environmental sanitation as deputies. The PLG members include heads of 38 related government agencies and 8 implementing districts/zones. The PLG will provide overall guidance on policies, key decisions and coordination among departments concerning project implementation.

53. *Ningbo Municipal Project Management Office (PMO).* Similar to the previous Bank project, a municipal Project Management Office (PMO) has been established in Ningbo Urban Management Bureau, the focal government agency for solid waste management in Ningbo. The PMO will be responsible for overseeing project implementation, and will handle procurement, FM, loan disbursement, safeguards, and daily communication with the Bank.

54. *Five Project Implementing Units (PIUs) will be established in Ningbo.* These include PIUs in four special purpose vehicle (SPV) joint ventures established with public and private investments at various ratios, which will be the implementing agencies for the loan financed SWM and recycling system improvements, and serve loan repayments. The Municipal Waste Separation Guiding Center affiliated to the Urban Management Bureau will house the PIU for managing policy work, TAs and publicity activities together with district level guiding offices.

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