Circular Economy Training 2024, Q2, Session 2: Policies

Case Study: Circular Economy Zero Waste Cities in the People's Republic of China

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Why CE in PRC?: Rising Waste and Resource Scarcity

Increasing Waste Generation

- 2016: 2.01 billion tons of MSW globally
- 2030: 2.6 billion tons, projected
- 2050: 3.4 billion tons, projected
- East Asia and the Pacific has the highest contribution among the world's regions generating 468 million tons or 23% (2016)
- PRC largest waste generator.

Resources, water and land scarcity

- accelerated by climate change
- rare earth, metals, minerals, sand, fossil fuels, food, animal feed, clean water, agricultural land - all more scarce

Wasted economic resource

- 80 per cent of $ 3.2 trillion of global consumer goods lost each year due to wasteful take-make-waste model. (World Economic Forum, 2014)

CE Policies in the PRC

Circular Economy Promotion Law of the People's Republic of China, enacted 1.1.2009
(a comprehensive law, first focus on industrial synergies in circular economy industrial parks to address challenge of industrial waste)

12th, 13th FYPs included objectives of CE and pilot program for CE projects and pilot cities (from the 2013 CE action plan by State Council)

Ministry of Ecology and Environment: Pilot Zero Waste Cities Program (2019)

14th FYP: "Fully implement the concept of circular economy and build a multi-level resource efficient recycling system."

- Circular industrial parks and circular production chains
- standardize remanufacturing
- circular agriculture and organic agriculture
- "reverse recycling" model of production enterprises
- extended producer responsibility system
- reduction, standardization and recycling of express packaging
- waste materials recycling and sorting system of urban waste
- resource recycling system that integrates online and offline and has a controllable flow

(PRC's 14FYP, CHAPTER 11: Promote green development and promote harmonious coexistence between man and nature; Chapter 39: Accelerating the Green Transformation of Development Mode; Section 2: Build a resource recycling system)

Basics: Circularize Four Linear Activity Areas

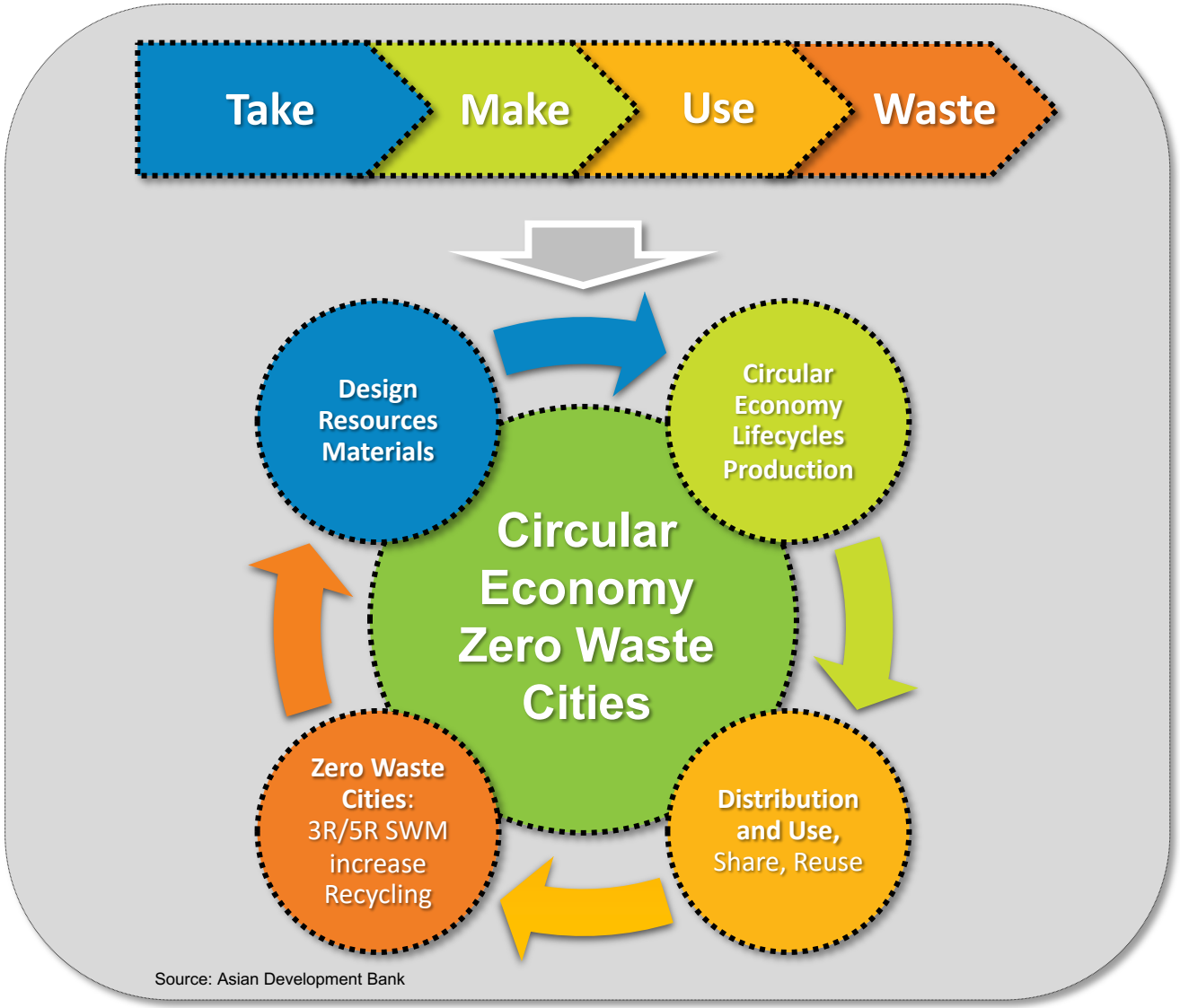
In the PRC we are preparing a roadmap for circular economy as one of five frameworks to guide implementation of the recently approved country partnership strategy and we have a TA under implementation.

We conceptualize this through four areas of activity we support as transformation from the linear take-make-use-waste model into a circular system.

Arrows in this simplified diagram should go both ways.

We are building on the original work by, among others, Michael Braungart with biological and technical cycles and the cradle-to-cradle concept and on international best practice cases from Asia, Europe, Oceania and US.

And we build on the fundamental work by UNEP, UNIDO, OECD, European Union (i.e. CE Action Plan) Ellen MacArthur Foundation, and the PRC government, and others.



Source: Asian Development Bank

Integrate Top-Down and Grass-Roots Approach

Circular Economy Zero Waste Cities (CEZWC)

Institutions, Policies, Standards, Governance, Taxes, Incentives, Disincentives, Education and Capacity Development, R&D, IT Platform, Engage Private Sector, Develop business models, Promote Behavior Change in Community

Design, Resources and Materials Input

Lifecycle design of products and processes

Component reuse from disassembly

Materials from renewable sources and from urban mining and recycling

Input from sustainable extraction as still needed

Source: Asian Development Bank

Circular Economy Lifecycles Production

Bio-economy agriculture

Circular urban planning, infrastructure, buildings

Circular industrial parks with industrial synergies and lifecycles production

Circular economy in energy

Circular economy in transport, vehicles

Distribution and Use, Share, Reuse

Reusable packaging and circular logistics

EPR (extended producer responsibility), repair, reuse, replacement

Sharing economy pilots and mainstreaming

Products as service pilots

Business Models

Zero Waste Cities

Improved household waste management 3R/5R

Increased recycling rates and local materials reuse

Construction and demolition waste management

Kitchen/organic waste management

Medical waste management

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Recent Policies of CE in the PRC

“14th Five-Year” Plan of Actions for Plastic Pollution Control (2021 - 2025)

- Establish basic principles and national strategies

Law on the Prevention and Control of Environment Pollution Caused by Solid Waste

Law on Promotion of Sustainable Economy

- restriction of excessive packaging,
- recycled use of packaging,
- restriction of non-degradable plastics (plastic bag ban)
- development of sustainable economy

Upstream Policies of CE in the PRC: EPR

Extended Producer Responsibility Implementation Plan (2016)

- Lead in 4 product categories: electrical, electronics, automobiles, lead-acid batteries and packages
- By 2020 EPR policy system initiated and framework established, and significant progress in product ecological design Standard recycling and recycling efficiency of discarded products averaged 40%.
- By 2025, EPR laws formalized, and product ecological design widely implemented.
- targets for recycling should reach 50% (by 2025)
- proportion of recycled raw materials used in key products should reach 20% (by 2025)

Notice on Joint Cleaning and Recertification the Recycling Industries of Electronic Waste, Waste Tires, Waste Plastics, Waste Clothing and Waste Household Appliances (2017)

- illegal recycling enterprises (electronic waste, waste electrical appliances, …) were banned
- Focus on electronic waste and waste electrical appliances processing and utilization
- Standardize and guide recycling enterprises in electronic waste and waste electrical appliances

Law on the Prevention and Control of Environment Pollution Caused by Solid Wastes (under revision 2018)

- Government to establish an EPR system for products, including electrical and electronic products,
- encourage producers to ecological design and establish collection scheme

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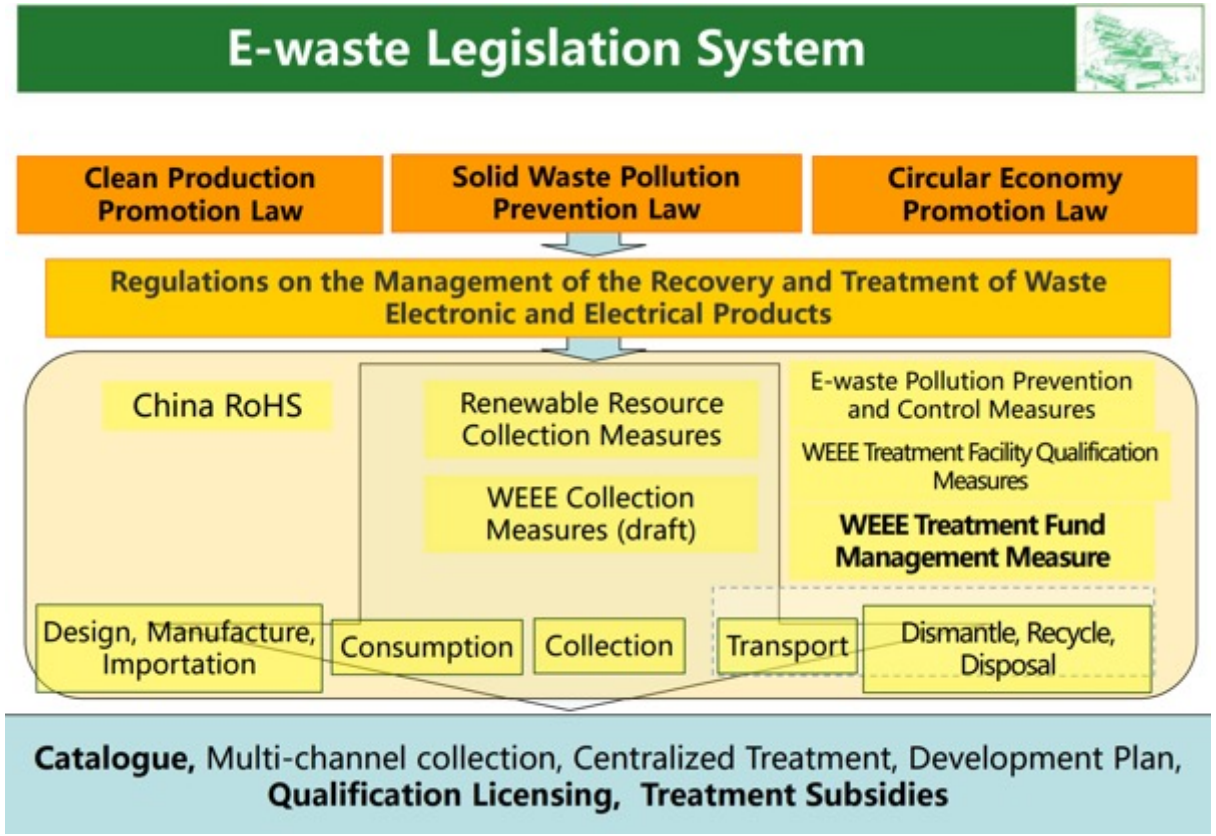
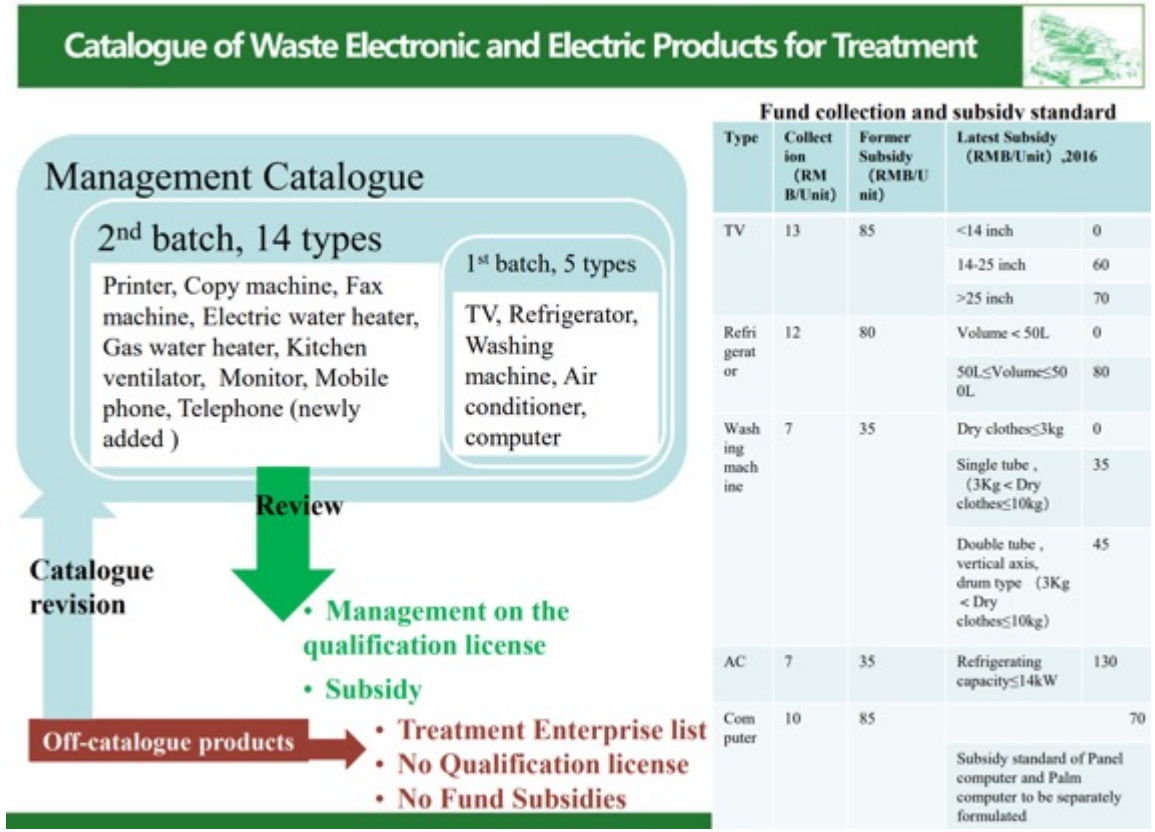
EPR for Electric and Electronic Waste





Fund collection and subsidy standard

Type	Collection (RMB/Unit)	Former Subsidy (RMB/Unit)	Latest Subsidy (RMB/Unit) ,2016	
TV	13	85	<14 inch	0
			14-25 inch	60
			>25 inch	70
Refrigerator	12	80	Volume < 50L	0
			50L≤Volume≤500L	80
Washing machine	7	35	Dry clothes≤3kg	0
			Single tube , (3Kg < Dry clothes≤10kg)	35
			Double tube , vertical axis, drum type (3Kg < Dry clothes≤10kg)	45
AC	7	35	Refrigerating capacity≤14kW	130
Computer	10	85		70
			Subsidy standard of Panel computer and Palm computer to be separately formulated	

Source: Quanyin Tan, Tsinghua University Beijing

EPR for Electric and Electronic Waste

Current Practice of WEEE treatment fund

- *By the end of 2018, 109 qualified enterprises have been authorized to be funded, with total treatment capacity of about 152 million units WEEE per year.*

Process of Collecting System

Source: Quanyin Tan, Tsinghua University Beijing

Midstream Policies of CE in the PRC: Plastics and Packaging

Law on the Prevention and Control of Environmental Pollution Caused by Solid Waste

- legally forbids and restricts production, sale and use of non-degradable plastic bags and other disposable plastic products
- violations subject to corrections and fines
- enterprises using plastic bags and other disposable plastic products requested to report their use of disposable plastic products to authorities

Catalogue of Prohibited and Restricted Production, Sale, and Use of Plastic Products (Draft Catalogue issued by NDRC in 2020)

- lists specific plastic products including single-use plastics and categorised them into two types of prohibition and/or restriction: (i) prohibition of production and sales of plastic products; and (ii) prohibition and restriction of use of plastic products
- Draft Catalogue will be finalized and adopted

Guiding Catalogue for Industrial Restructuring (2024 Edition)

- daily commodities containing plastic microbeads are classified as outdated products
- ordered to phase out by existing national industrial policies, or to be phased out immediately

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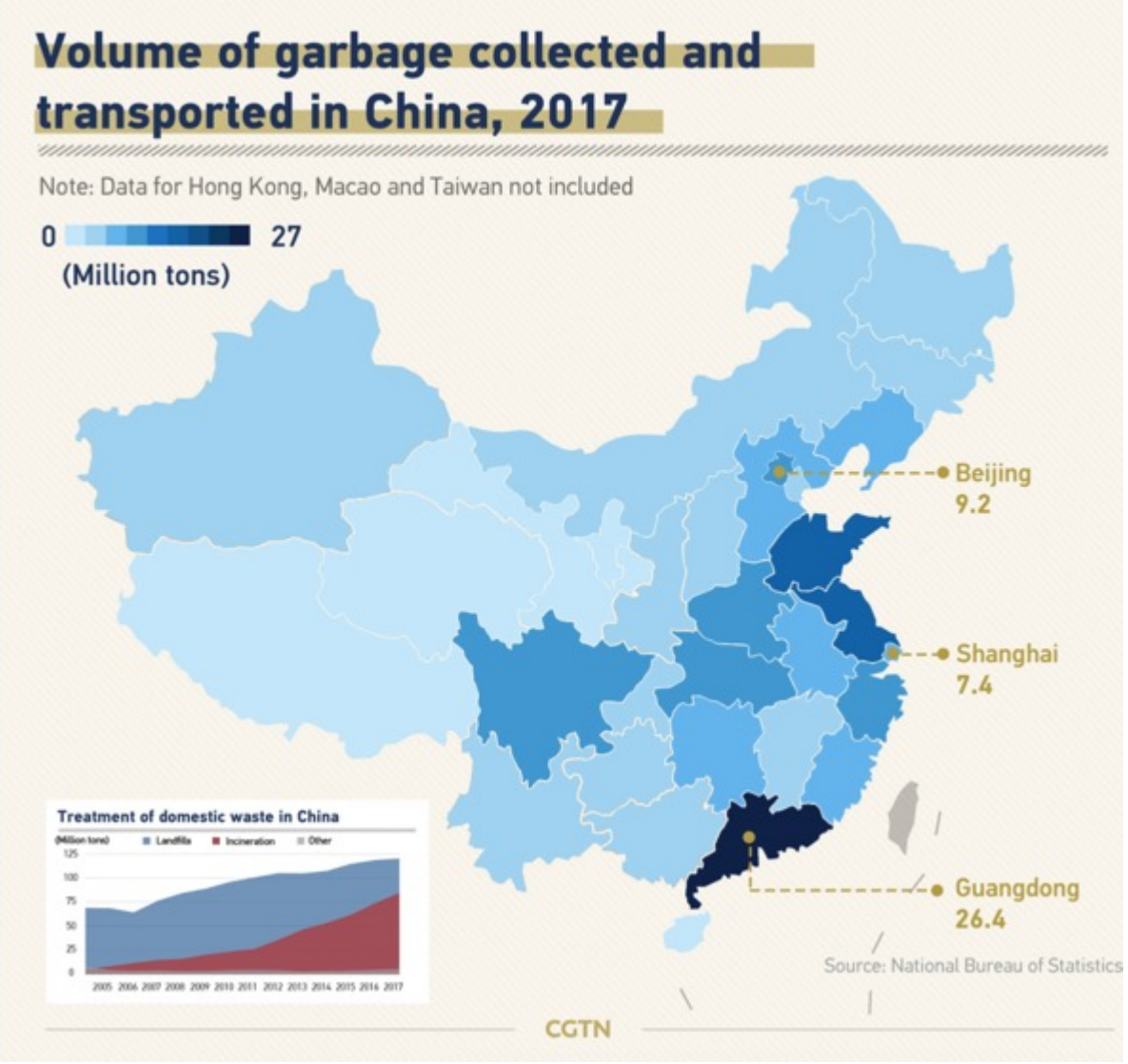
Downstream Policies on Solid Waste Management in the PRC



Solid Waste Segregation in the PRC

Challenges of Solid Waste Segregation in the PRC

ADB Operations in CE in the PRC

Clean and Sustainable Ocean Initiative and Plastic Pollution Reduction
Circular economy industrial parks supporting industrial symbiosis
Circular agriculture and bio-economy
Solid Waste Management: improvements **with 3R/5R principles and increased segregation, and recycling rates and decreased landfilling, and optimized waste-to-energy** inclusive of collection, management and treatment with characterization and segregation, mining of old dumpsites, kitchen-waste management pilot, construction and demolition waste management. Also waste-to-energy investment support to private sector.
Water supply and Wastewater management: water efficiency improvements inclusive of non-revenue-water reduction, treated wastewater reuse, sludge treatment and use in many urban and rural projects
River pollution reduction, river rehabilitation and flood risk management: water quality improvement increases higher level of water usability and retaining value of otherwise damaged areas, infrastructure and assets, and river greenways increases land value and enables local recreation and reduces the urge for travel
Sponge city projects: local rainwater recovery and reuse (in addition to river works above)
Mining and land remediation and wetland rehabilitation: follows principle of bringing back land to higher value uses as brownfield redevelopment
Sustainable urban mobility, public transport, non-motorized transport, road safety and road maintenance
Energy efficiency, local energy cycles and renewable energy generation

Circular Economy Zero Waste Cities (CEZWC)

Avenue 1: ADB Roadmap and TA promote Circular Economy Zero Waste Cities – initiate policies and pilots

Avenue 2: Institutions, Policies, Standards, Governance, Taxes, Incentives, Disincentives

Avenue 3: Education and Capacity Development, R&D, IT Platform

Avenue 4: Engage Private Sector, Develop business model

Avenue 5: Promote Behavior Change in Community

Avenue 1: ADB Roadmap and TA promote Circular Economy Zero Waste Cities – initiate policies and pilots

Avenue 1, Step 1: Develop ADB CE Roadmap with NDRC and MOF and define objectives, knowledge activities and lending pipeline

Avenue 1, Step 2: Implement TA on Circular Economy Zero Waste Cities in the PRC and initiate policies and pilots

ADB Technical Assistance Circular Economy Zero Waste Cities in the PRC, approved in 2020
The TA will conceptually and programmatically link into biological and technical cycles current linear upstream, midstream, and downstream processes.

(i) **Green circular industrial production plan of Qinghai Province advanced -** targeting upstream heavy industrial production with raw material processing.
(ii) **Zero municipal waste action plan for Guangdong Province developed -** targeting downstream waste management, increase recycling and resource recovery in highly developed urban centers with state-of-the-art light industry manufacturing and services, and less-developed rural towns displaying differentiated levels and patterns of consumption and waste generation.
(iii) **Green circular e-commerce packaging and logistics pilot program for the People's Republic of China developed.** pilot cities of different sizes and development levels will be working together with industry partners to circularize midstream e-commerce packaging and logistics
(iv) **Capacity and institutions to implement green circular economy in the People's Republic of China enhanced -** above three outputs will be linked and lessons drawn for policies, technical guidance, and business models aiming at green circular economy zero waste cities.

Avenue 2: Institutions, Policies, Standards, Governance, Taxes, Incentives, Disincentives

Avenue 2, Step 1: Engage national, provincial and local governments

Avenue 2, Step 2: Support development of policies, standards, and market-based instruments like incentives and disincentives

Avenue 3: Education and Capacity Development, R&D, IT Platform

Avenue 3, Step 1: Engage national, provincial and local governments

Avenue 4: Engage Private Sector, Develop business model

Avenue 4, Step 1: Engage national, provincial and local governments

Avenue 5: Promote Behavior Change in Community

Avenue 5, Step 1: Engage communities and people and raise awareness and showcase and promote positive behavior

Top-Stream: Design, Resources, Materials Input

Avenue 1: Promote Lifecycle design of products and processes product longevity, “disassemblability”, repairability

Avenue 2: Component reuse from disassembly

Avenue 3: Materials input from renewable sources and from urban mining and recycling

Avenue 4: Material input from sustainable extraction as still needed

Ave. 3, Past: TA Policy on Circular Economy Qinghai

ADB Technical Assistance approved in 2011

The provincial economy is heavily dependent on mineral and natural resource exploitation to produce iron and steel, oil and natural gas, and nonferrous and rare earth metals. These damaged natural environment, causing soil and vegetation degradation, desertification, increased salinization, and decline in available underground and surface water. Qinghai promotes circular economic as strategy to mitigate environment degradation and fundamentally transform economic development.

The TA's 3 outputs:

(i) comprehensive review of Chaidamu Circular Economy Pilot Zone conducted and strategy and action plan developed;
(ii) monitoring and evaluation system for circular economy development in Qinghai Province established; and
(iii) policy recommendations on promoting circular economic development in Qinghai Province proposed.

Policy recommendations included:

(i) optimizing industrial policies and organization, promoting synergetic development of industrial parks, prioritizing SMEs, and accelerating development of a new industrial system;
(ii) optimizing economic policies, including finance, investment policies, pricing policies, government procurement policies, and waste reuse policies;
(iii) optimizing talent policies, empowering human capital and allocation, talent development and promotion, institutionalizing talent clustering;
(iv) optimizing science and technology policies and innovation capacity especially in priority fields, reinforcing commercialization of science and technology outcomes, innovation platforms, and opening and exchange; and
(v) optimizing social policies, including developing multiple incentives, promoting sharing economy, encouraging green consumption, promoting green buildings, advocating green travelling, developing a recycling system, and establishing circular economy communities.

Ave. 3: TA Circular Economy Zero Waste Cities in PRC

ADB Technical Assistance for the People's Republic of China, approved in 2020

Output 1: Green circular industrial production plan of Qinghai Province advanced. This output will help Qinghai Province develop its circular economy by advancing a plan for green, low-carbon circular economy development in industrial parks, focusing on heavy industry and mining processing. Under this output, the TA team will research challenges, opportunities, and market failures and design advanced technical guidelines, policies, and pilots. Concepts to be considered will include life cycles of products and materials; natural resource use; linking industrial processes, energy efficiency, and renewable energy production and consumption; and missing upstream and downstream relationships.

Output 2: Zero municipal waste action plan for Guangdong Province developed. This output will focus on designing and prioritizing actions to significantly reducing household waste in Guangdong Province, with a goal of nearly full recovery of household waste. This output will include research on and policy design for household waste classification and recommendations to efficiently manage segregation and recycling technologies in both highly developed urban centers and lesser developed towns and villages. The 3R principle will be applied in capacity development and in the action plan, and pilots will be designed to improve waste management and resource recovery.

Output 3: Green circular e-commerce packaging and logistics pilot program for the People's Republic of China developed. This output will focus on the important emerging challenge of reducing plastic pollution caused by significantly increasing e-commerce and food delivery, and associated packaging and logistics. It will support the development of a national pilot program customized for cities of various types, sizes, and development levels, engaging market players in e-commerce and logistics.

Output 4: Capacity and institutions to implement green circular economy in the People's Republic of China enhanced. This output will develop the capacity of and provide policy and technical guidance for cities, institutions, and companies to promote and implement green circular economy zero waste cities. The TA expert team will link into biological and technical cycles improved upstream, midstream, and downstream processes, integrating the findings and recommendations from outputs 1, 2, and 3, offering policy recommendations and technical and business model options.

Upstream: Circular Economy Lifecycles Production

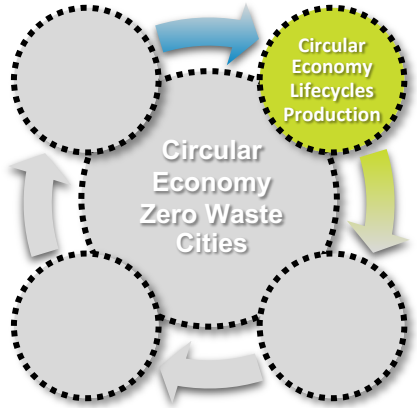
Avenue 1: Bio-economy agriculture

Avenue 2: Circular urban planning (brownfield redevelopment), infrastructure, buildings (adaptive reuse, disassembly)

Avenue 3: Circular industrial parks with industrial synergies and lifecycles production

Avenue 4: Circular economy in energy

Avenue 5: Circular economy in transport, vehicles



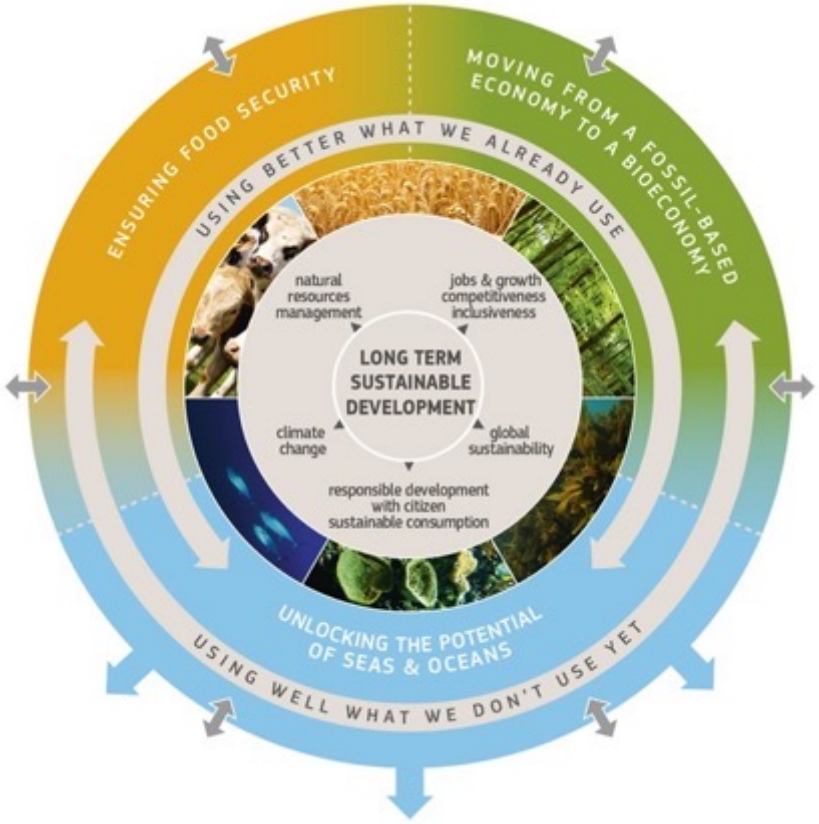
Ave. 1, Step 1: Circular Bio-Economy for Rural Vitalization

Circular bioeconomy in primary industry
agriculture, forestry and fisheries as key rural vitalization initiative aiming at: food security, climate resilience, environmental sustainability and rural prosperity.

Production of renewable biological resources and use as value-added products and conversion of waste stream back into the value chain, such as food, feed, bio-based products, and bioenergy; organic waste composting registration and licensing of firms, brands, and products.

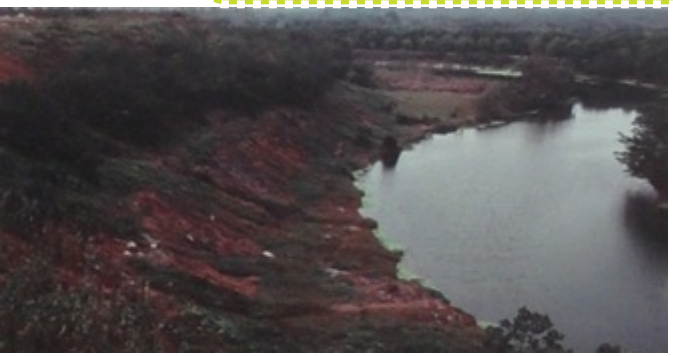
TA: Agriculture Green Production and Waste Management is scaling up comprehensive use of rural biological resources

~~**Jilin Songhua Lake** project is composting organic waste, livestock and human feces, and uses straw comprehensively.~~



Source: EU (2018) Updated Bioeconomy Strategy

Ave. 2, Step 1: Anhui Hefei Rehabilitation of Former Landfill Site



Anhui Hefei Urban Environment Improvement Project (ADB loan completed)

Landfill remediation and closure along a river: before and after…

Ave. 2, Step 2: Heilongjiang Green Urban Economic Revitalization

- ADB loan projects catalyze **economic transformation towards a non-coal economic future** of four coal-based cities in East Heilongjiang and urban transformation from dirty coal-mining cities to livable, green and clean and attractive cities.
- **Mining remediation** strategies and pilot projects cleaning up and make available for reuse environment polluted from more than 60 years of coal-mining.

Ave. 2, Step 3: Treated Wastewater Reuse: ADB TA and Loan

Urban Wastewater Reuse and Sludge Utilization Policy Study (TA 7083-PRC)

The TA focused on the development of:

- policy recommendations related to planning procedures and regulations, technology applications, and institutional capacity for promoting wastewater reuse; and
- a national policy framework for the promotion of beneficial sludge utilization.

The policy study has played a catalytic role in promoting policy innovation to regulate and promote beneficial sludge utilization and wastewater reuse. Consistent with the recommendations of the policy study, MOHURD and the National Development and Reform Commission have published the National Technical Guideline for Urban Sewage Sludge Treatment and Disposal (Trial) in March 2011.

This TA also enabled private sector engagement.

Beijing Enterprises Water Group Limited and BEWG Environmental Group Company Limited Wastewater Treatment and Reuse Project

ADB Private Sector Operations loan. A-loan $120 million and B-loan $288 million.

Loans supported acquisition and operation of wastewater treatment plants, which treated 760 million tons of wastewater to grade 1A standard annually and reused 40 million tons, helping to reduce water pollution and increase water use efficiency. Project also helped improve energy efficiency in wastewater treatment and reuse. In 2015, BEWG conducted 96 technological transformation projects, which saved in total 12.69 million kilowatt-hours of electricity and about 6% in chemicals used for treatment.

ADB enabled BEWG secure a large credit facility on its own and become more independent from its parent, enhancing market confidence in BEWG's capacity.

Ave. 2, Step 1: Nanjing Qinhuai River Environment Improvement

ADB loan project improves urban environment, public health, quality of life of residents and businesses and management of surface water resources in Nanjing.

Mid-Stream Distribution and Use, Share, Reuse

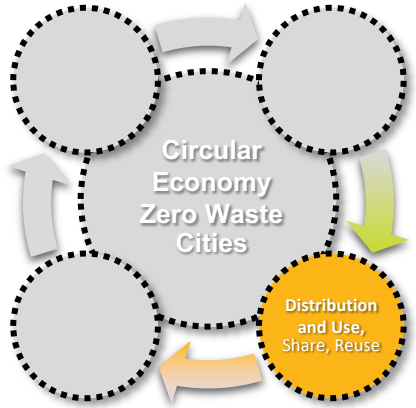
Avenue 1: Reusable packaging and circular logistics

Avenue 2: EPR (extended producer responsibility), repair, reuse, replacement

Avenue 3: Sharing economy pilots and mainstreaming

Avenue 4: Products as service pilots

Avenue 5: Business Models to ensure private investments in CE



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Ave 2, Step 1: midstream (upstream – downstream): Plastics

RETA: Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific

Activities:

- Government led national and city action plans
- National Financing Roadmaps and task forces
- Policy and regulatory reforms to stimulate circular economy and promote 3R
- Plastic pollution reduction investments and pilot demonstrations (e.g. Integrated SWM, behavior change, support for local circular business models and women's economic empowerment)
- Studies on investment needs; technology solutions; circular economy and green jobs potential; sustainable and innovative financing solutions
- Circular business hub and test facility in Indonesia
- Knowledge-sharing workshops, regional cooperation, cross-country site visits, city twinning.

Status: TA Cluster and Subproject 1 approved, Subproject 2 proposed for 2021
Amount: $13 million total ($8 million Indonesia project)
Duration: December 2019 – June 2023
Participating countries: Indonesia, Myanmar, Philippines, Thailand, Viet Nam, with regional knowledge sharing
Key partners: Governments of Japan and Korea; Global Environment Facility; Global Plastics Action Partnership; WWF, ADB sub-regional cooperation programs

Down-Stream Zero Waste Cities: 3R/5R SWM increase

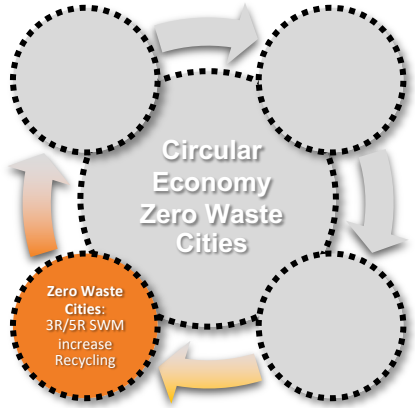
Avenue 1: Improved household waste management 3R/5R

Avenue 2: Increased recycling rates and local materials reuse

Avenue 3: Construction and demolition waste management

Avenue 4: Kitchen/organic waste management

Avenue 5: Medical waste management



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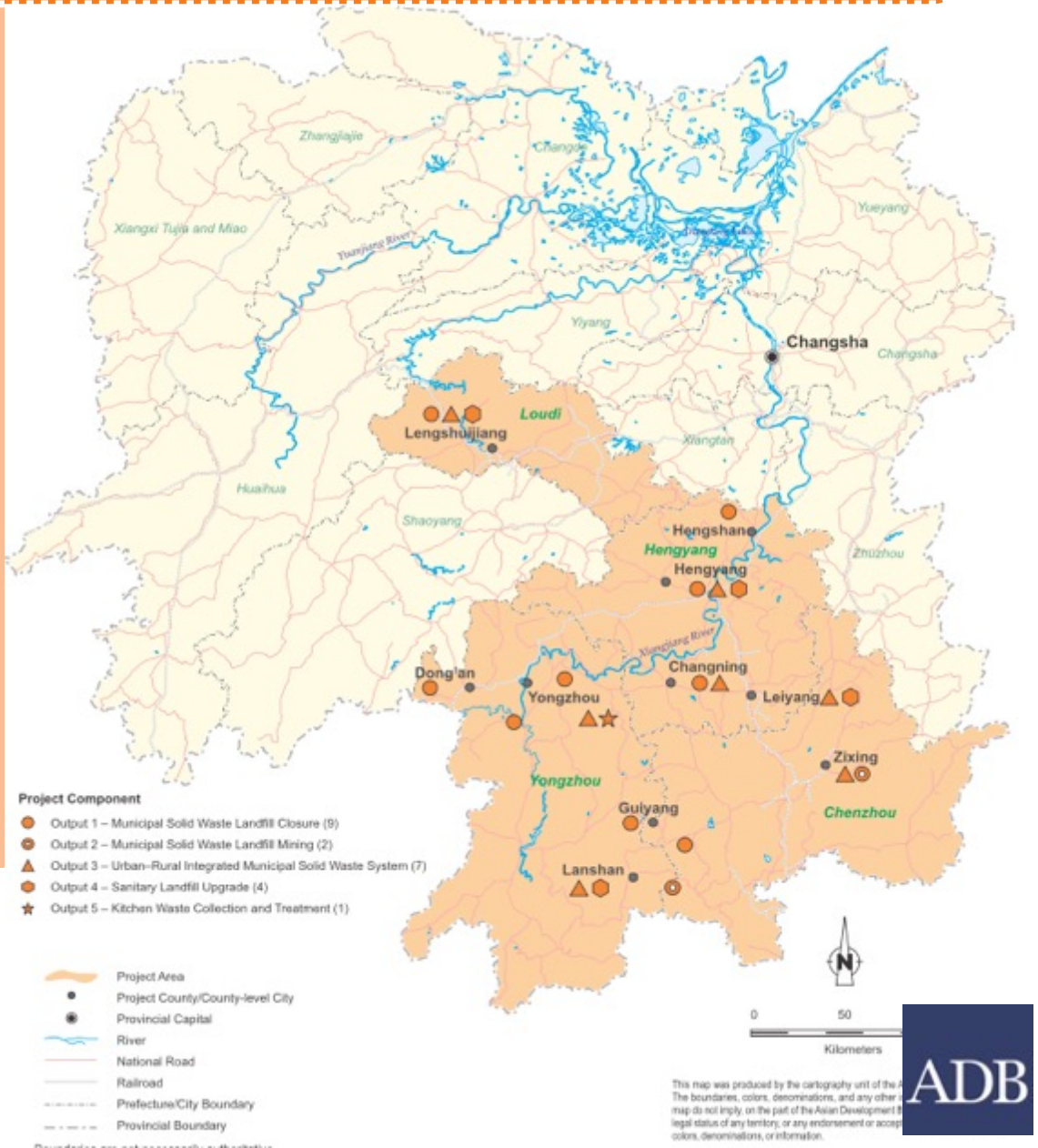
Ave. 1, Steps 1/2: Manage Solid Waste, Land, Urban Mining: Hunan

Hunan Xiangjiang River Watershed Existing Solid Waste Comprehensive Treatment Project

ADB loan project improves environment in Xiangjiang River watershed in Hunan and reduces pollutants discharge to Xiangjiang River and directly benefit 6.9 million people and more indirectly

- **Substandard municipal solid waste landfills closed, and/or mined and remediated.**
- **New urban–rural integrated municipal solid waste management systems established.**
- **Sanitary landfill facilities upgraded.**
- **New kitchen waste treatment and management system established.**



Ave. 1, Steps 1/2: Manage Solid Waste, Recycling: Changzhi

Shanxi Changzhi Low-Carbon Climate-Resilient Circular Economy Transformation Project

2023 approval and commitment
$300 million, more than $250 million climate financing

- Supports improved SWM with sorting and recyclables storage and trading
- Supports use of recycled materials in infrastructure construction (i.e. roads and buildings)
- Supports reuse of treated wastewater
- Supports lifecycle assessment of all investment components
- Supports capacity building on planning CE and linking upstream and downstream activities locally: facilitate industrial symbiosis in industrial parks within and among industries and use of locally recovered recycled materials from MSWM; ICT platform for industrial symbiosis and recyclables trading

Ave. 1, Steps 1/2/3: Manage Solid Waste and Waste to Energy: Canvest

Canvest Waste Management Project

ADB PSOD Loan for 2024 Approval for Canvest company $50 million loan for:

- Municipal Solid Waste Management with segregation, collection, sorting and recycling and transport; and
- Waste to Energy on the county level and with a small, adequately scaled facility to have incineration not compete with resource recovery and recycling

Ave. 1, Step 3: Scaled Waste to Energy

1. ADB Private Sector Operations loan to China Everbright Environmental Energy Limited
Loan of $200 million for PRC with six investments in WtE plants and additional $100 million for Viet Nam

2. ADB Private Sector Operations loan to SUS Environment to invest in Waste to Energy (WtE) plants in eco-industrial parks in 2nd and 3rd tier cities.
Use of advanced technologies including advanced flue gas emission control systems meeting EU emissions standards. This project supports the construction and operation of a portfolio of SUS Environment's WtE plants. The proceeds of ADB loan of $100million will be channeled into portfolio of subprojects as project equity which is not available from the local commercial banks.

Need Further Support: Institutional Strengthening

Institutionalization of cross-sector coordination and cooperation
(i.e. working group established among concerned national ministries and related local agencies, think tanks and academia)

Simultaneous multilevel engagement
(national, provincial and municipal pilots)

Policies, standards, governance
(taxes, market-based instruments with incentives, disincentives, education, technical training, capacity development, R&D, IT Platform, monitoring, and enforcement)

Private sector engagement, business models and pilots, capacity development amd education, support R&D

Community engagement and consumer behavior change
proactively promoted by government and private sector

Need Monitoring of Results and Achievements

Institutions strengthened, policies and governance improved as result of lessons learned from the pilot program and policy dialogue, digital platform installed

Circular Economy Zero Waste Cities Program and Pilots implemented and lessons for a number of key challenges captured from successes and failures

Waste management improved with 3R/5R principles and increased segregation, and recycling rates and decreased landfilling and optimized waste-to-energy in a number of cities

Private sector engaged resulting in a number of improved product designs with increased durability, reusability, upgradability, reparability, with increased recycled content, more products from remanufacturing eliminated hazardous chemicals, and increased energy and resource and land efficiency, reduced single-use introduced ban on the destruction of unsold durable goods

Improved digitalization, EPR, product-as-a-service, sharing economy in a number of pilots tested

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Circular Economy Training 2024,
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