

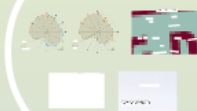
Operator Models 运营商业模式



Costs



基准 Benchmarks



Technologies 技术

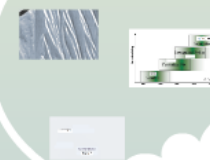


Concepts 理念

What is going on in waste management Globally?		
全球垃圾管理的现状如何?		
Recycling markets 回收市场	Smart cities 智慧城市	Marine litter 海洋垃圾
Waste-to-energy technologies 垃圾焚烧技术	Integrated solid waste management 固体废物综合管理	Sustainable development goals 可持续发展目标
Climate change mitigation 气候变化减缓		

Integrated Waste Management
综合垃圾管理

机会 Opportunities



Low Carbon Integrated Waste Management

低碳 综合垃圾管理

Andy Whiteman



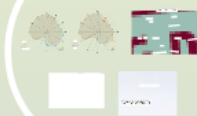
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Costs



基准 Benchmarks



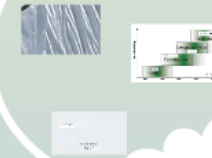
Technologies 技术



Concepts 理念



机会 Opportunities



Low Carbon Integrated Waste Management

低碳 综合垃圾管理

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Low Carbon Integrated Waste Management

低碳

综合垃圾管理

Andy Whiteman

中华人民共和国住房和城乡建设部
Ministry of Housing and Urban-Rural
Development (MoHURD)

NAMA Facility

On behalf of



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety



Department for
Business, Energy
& Industrial Strategy



Danish Ministry
of Energy, Utilities
and Climate



China Integrated
Waste Management
NAMA

giz

Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH



中国城市环境卫生协会
China Association of Urban Environmental Sanitation

Concepts

理念

What is going on in waste management Globally?

全球垃圾管理的现状如何？

Recycling markets

回收市场

Smart cities

智慧城市

Marine litter

海洋垃圾

Waste to energy technologies

垃圾能源化技术

Integrated solid waste management

固体废弃物综合管理

Sustainable development goals

可持续发展目标

Climate change mitigation

气候变化减缓

协调性使用一套方法和解决方案，每个方法和解决方案在整个废物管理系统中发挥作用，并作为一个可识别的连贯整体组合在一起。

Integrated Waste Management

The coordinated use of a set of waste management approaches and solutions, each of which has a functional role in an overall solid waste management system, and combine together as a recognisably coherent whole.

理念

What is going on in waste management Globally?

全球垃圾管理的现状如何？

Smart cities

智慧城市

Recycling markets

回收市场

Marine litter

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Technologies

技术

Mechanical

机械



Biological

生物



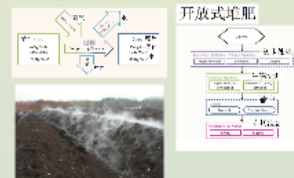
Thermal

热



Open Windrow Composting

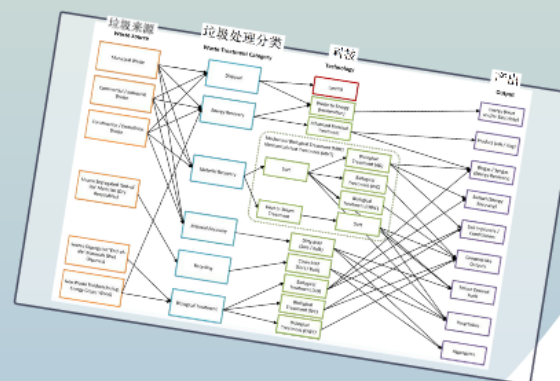
开放式堆肥



Anaerobic Digestion



In Vessel Composting 仓式堆肥





适用于先进废物处理的技术

APPROPRIATE TECHNOLOGY FOR ADVANCED WASTE TREATMENT-GUIDELINE



environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA



Mechanical

机械



Biological

生物



Thermal

热



垃圾来源 Waste Source

垃圾处理分类

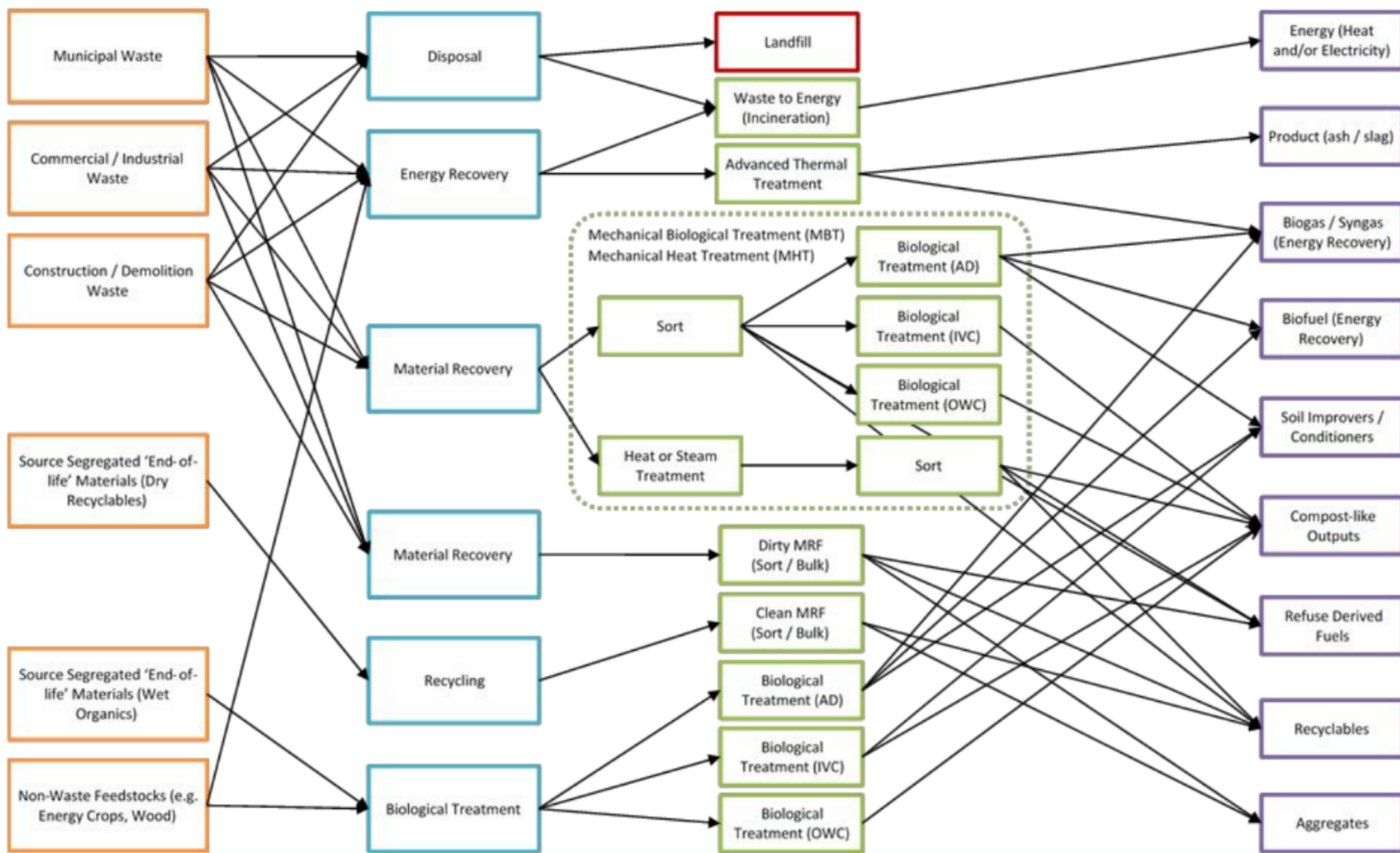
Waste Treatment Category

科技

Technology

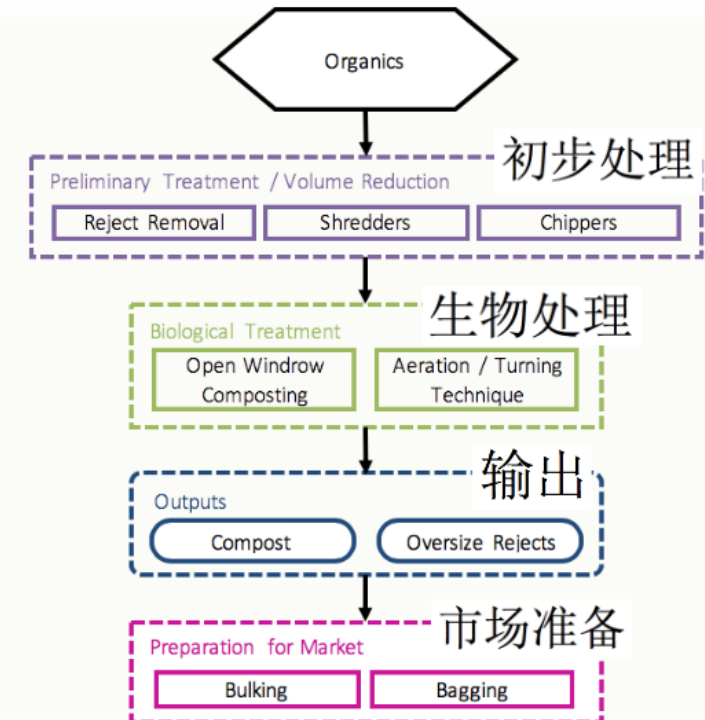
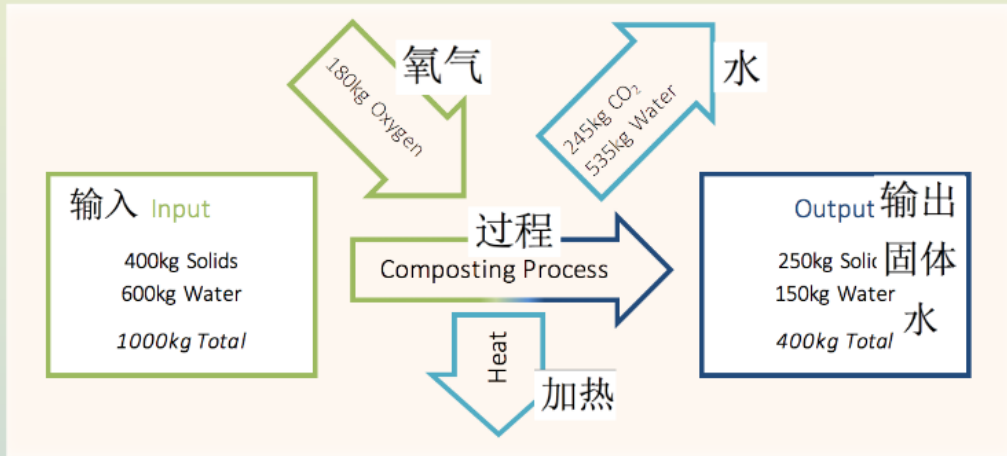
产出

Output

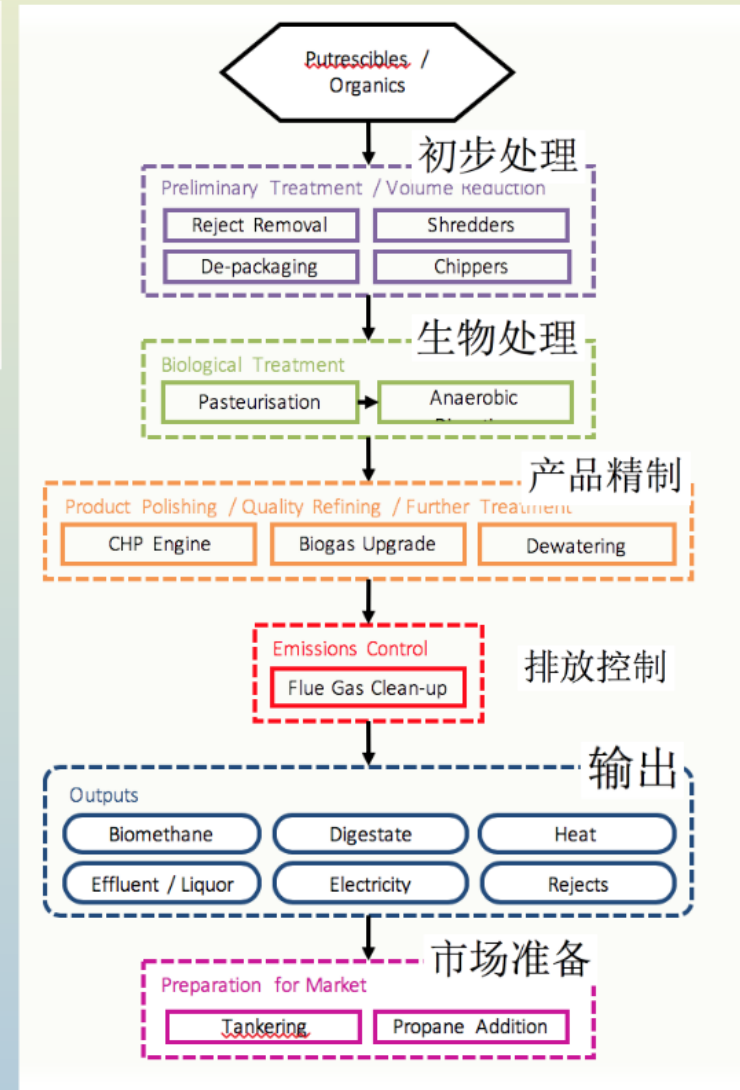
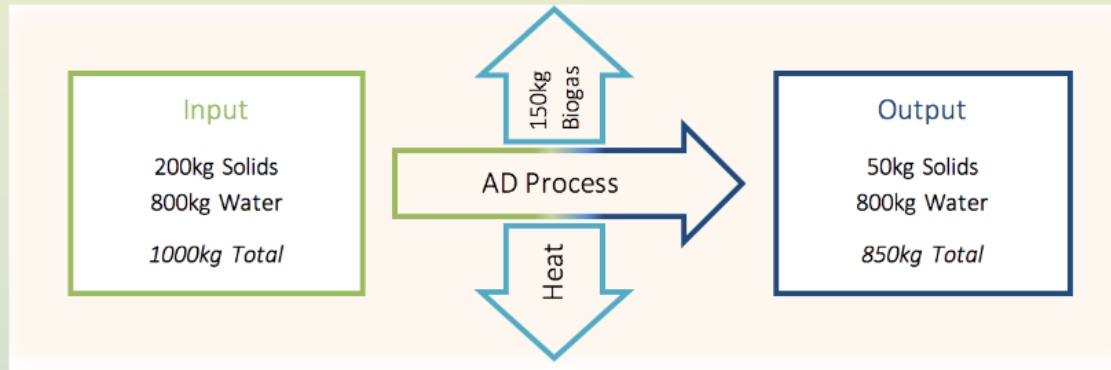


Open Windrow Composting

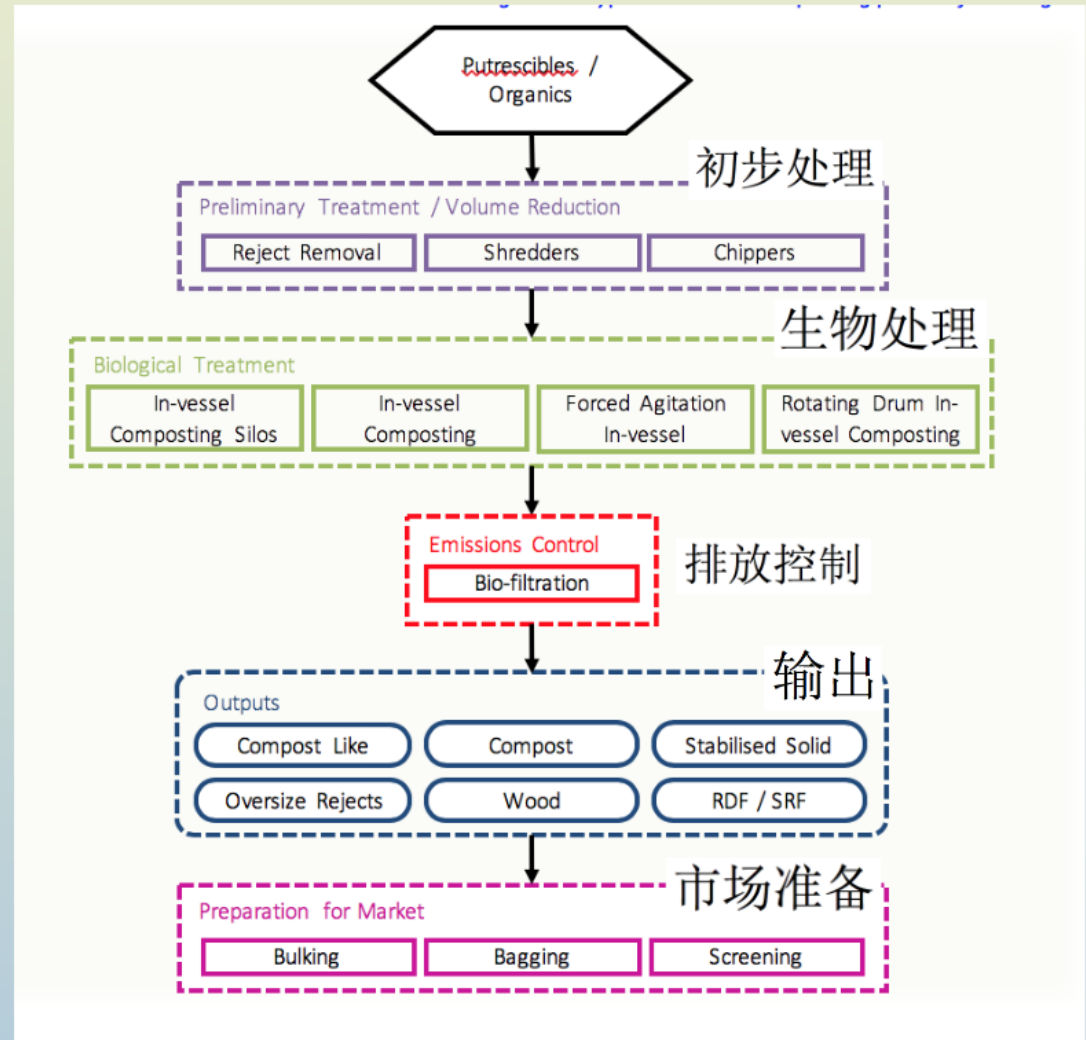
开放式堆肥

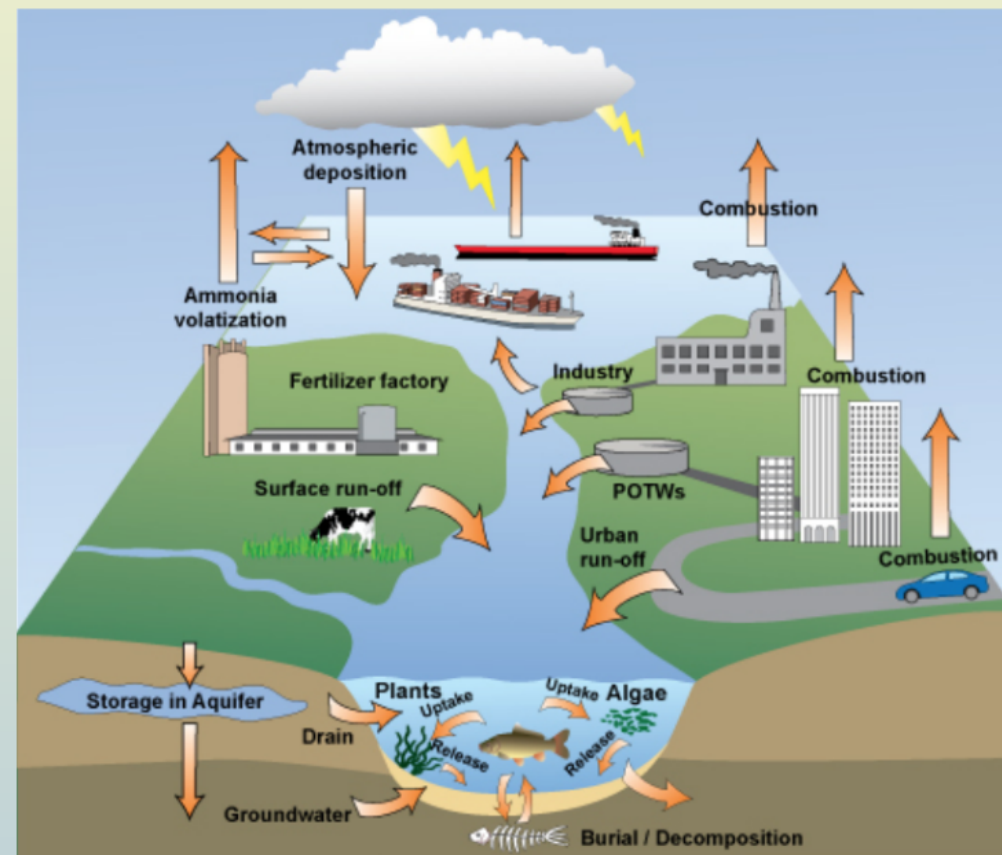


Anaerobic Digestion

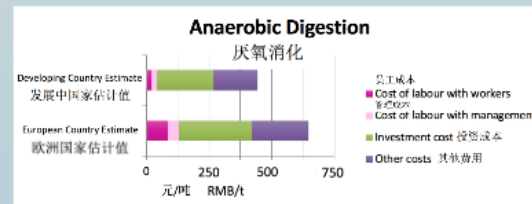
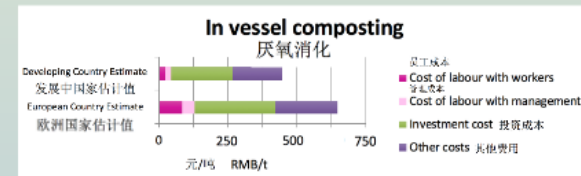
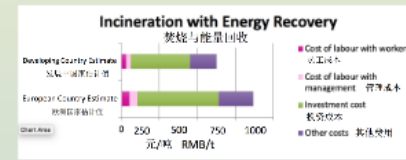
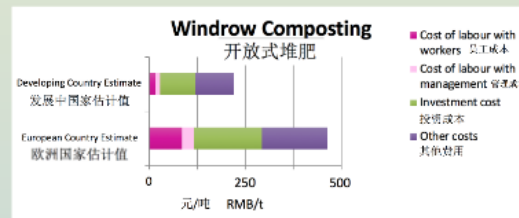


In Vessel Composting 仓式堆肥



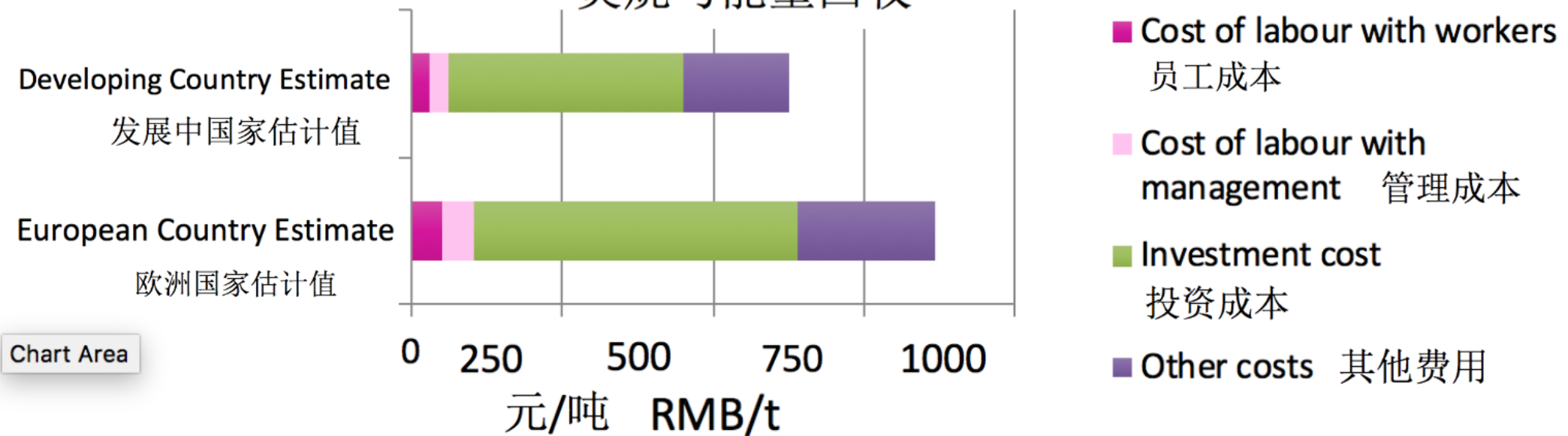


Costs



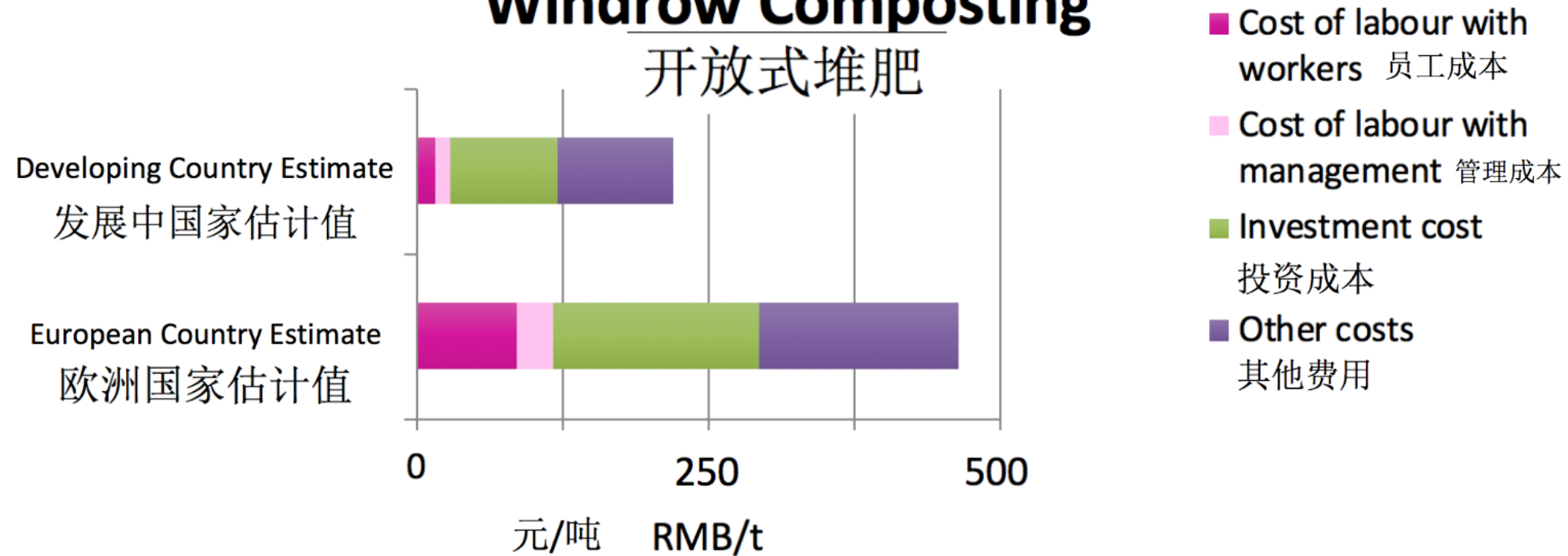
Incineration with Energy Recovery

焚烧与能量回收



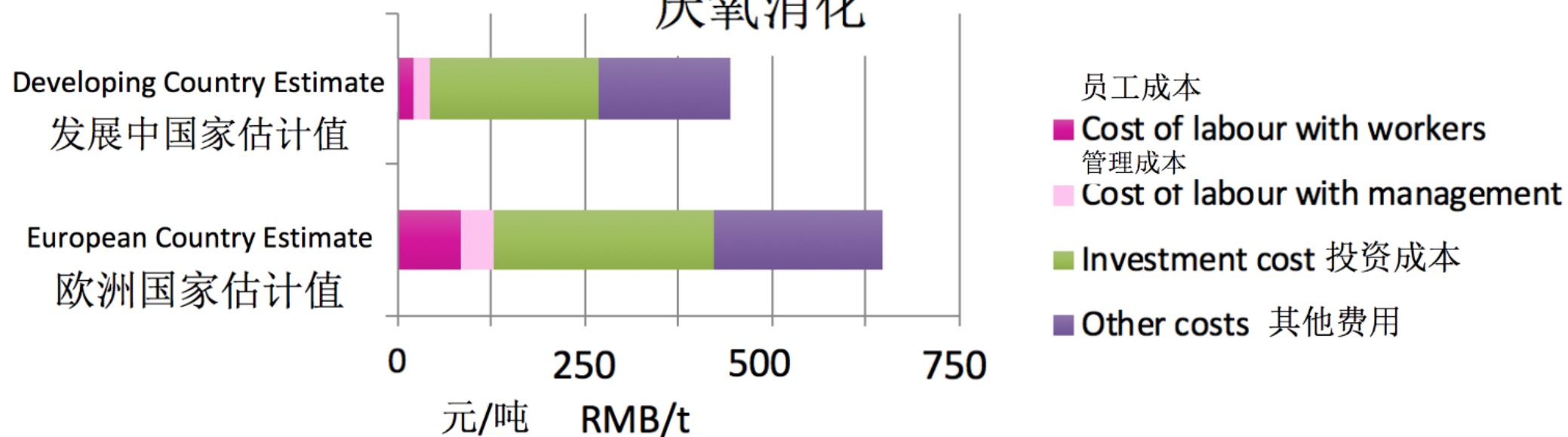
Windrow Composting

开放式堆肥



Anaerobic Digestion

厌氧消化



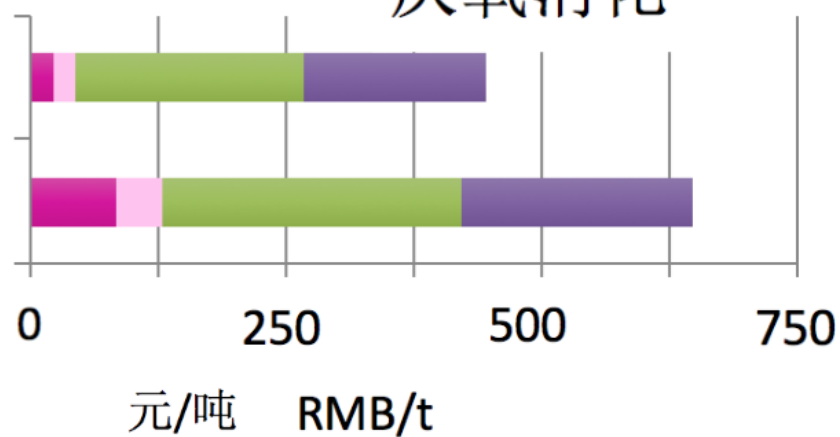
In vessel composting 厌氧消化

Developing Country Estimate

发展中国家估计值

European Country Estimate

欧洲国家估计值



员工成本

Cost of labour with workers

管理成本

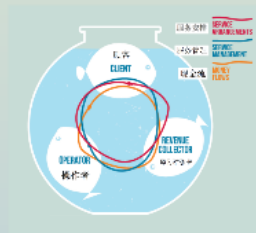
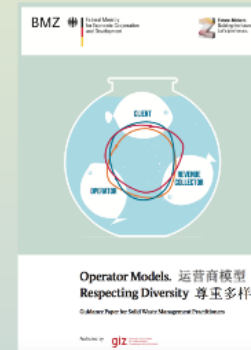
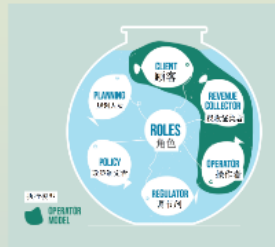
Cost of labour with management

Investment cost 投资成本

Other costs 其他费用

Operator Models

运营商模型



ISWM Service elements	
服务成分	
Street sweeping	Primary collection
街道清扫	一級收集
Transfer	Secondary collection
轉化	二級收集
Recycling	Disposal
回收	處理



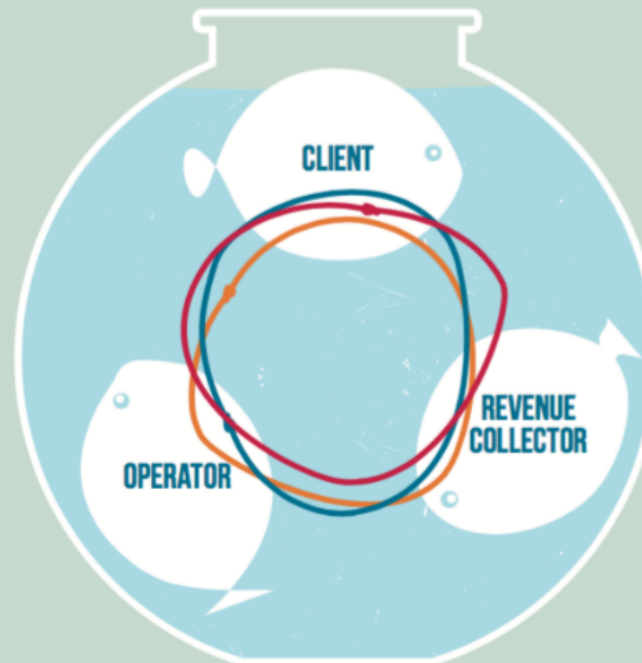
BMZ



Federal Ministry
for Economic Cooperation
and Development



Future-Makers.
Building the future.
Let's join forces.



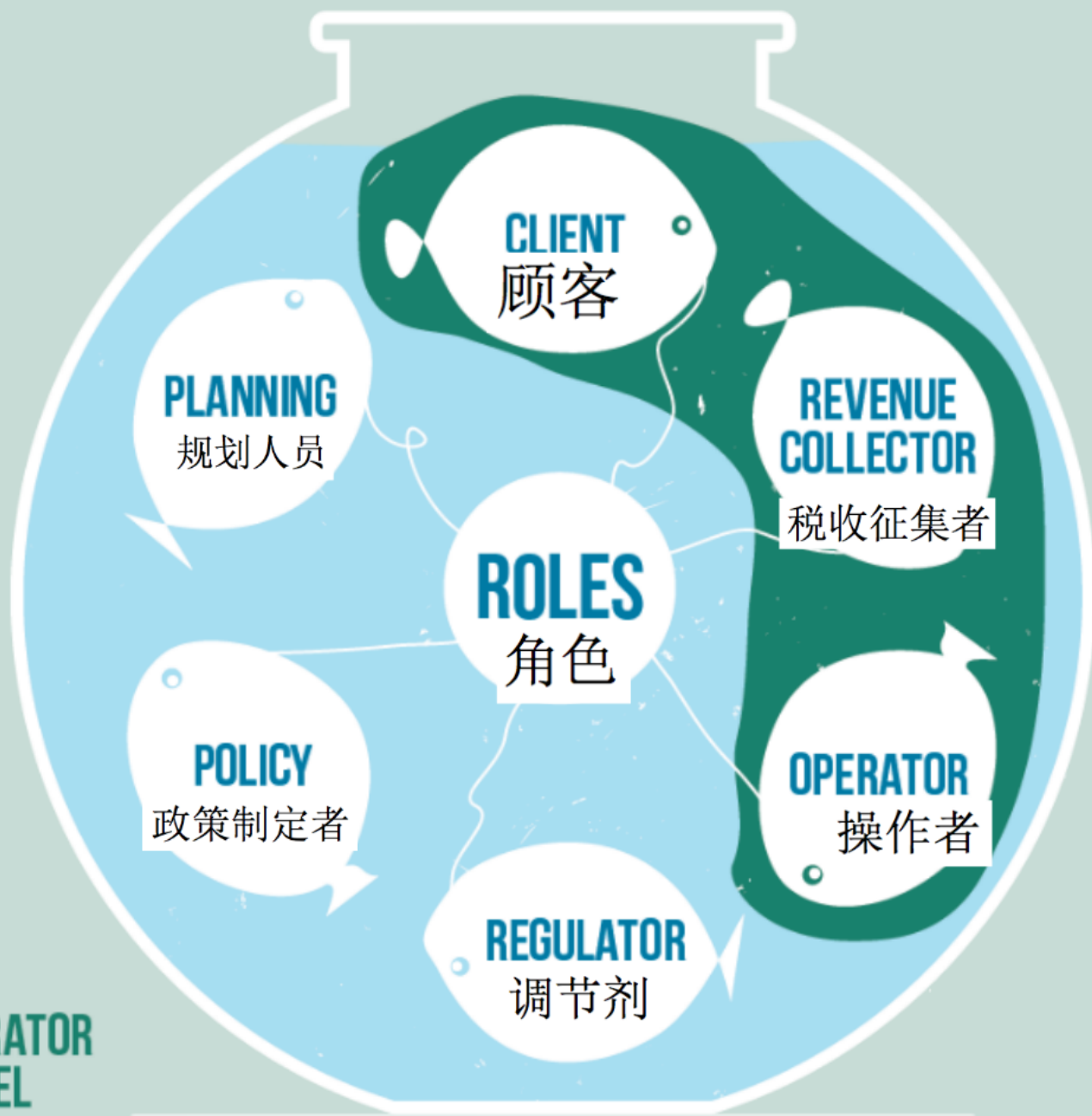
Operator Models. 运营商模型 Respecting Diversity 尊重多样性

Guidance Paper for Solid Waste Management Practitioners

Published by

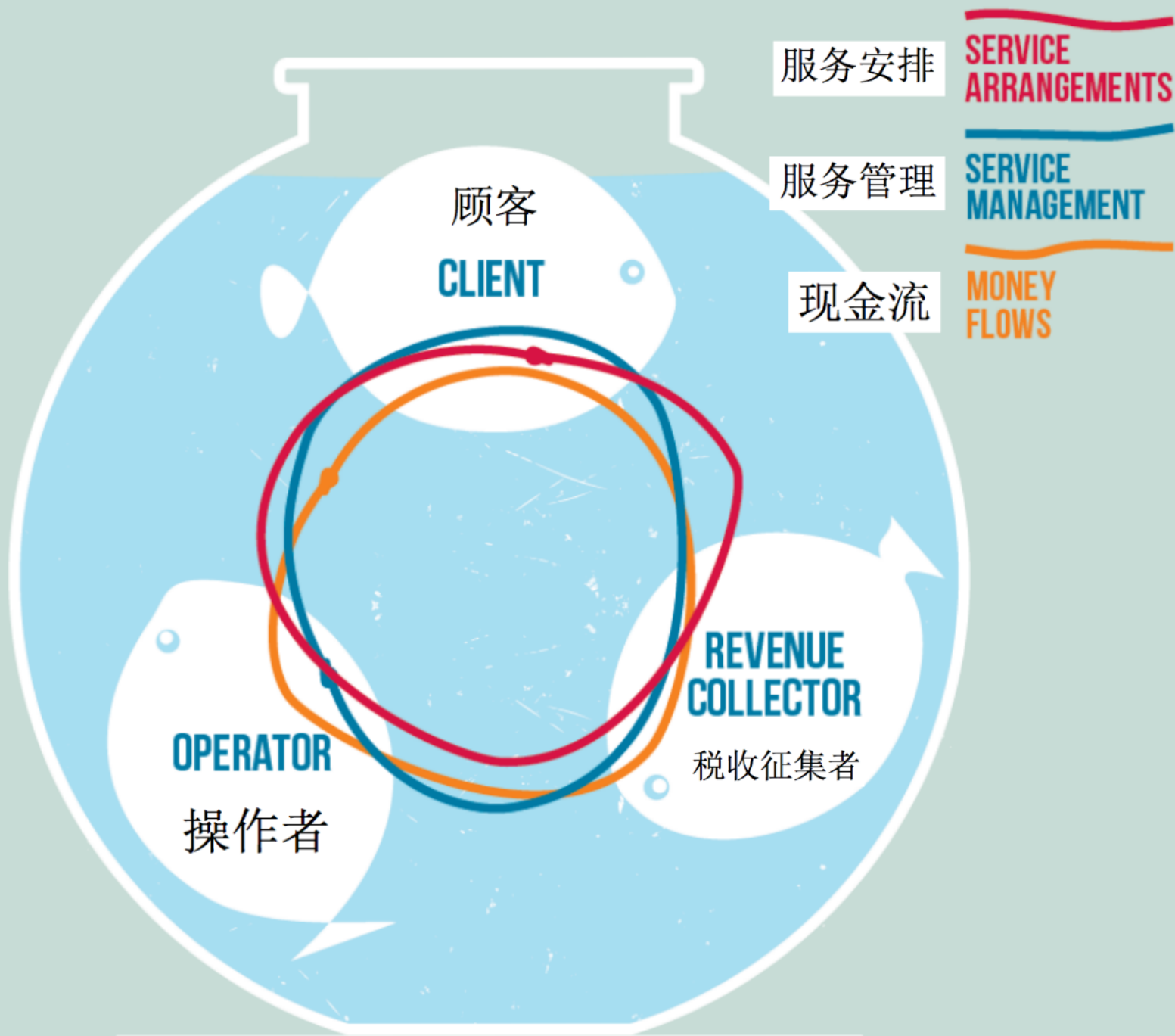
giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH





执行模型

 **OPERATOR
MODEL**



ISWM Service elements

服务成分

Street sweeping

街道清扫

Primary collection

一级收集

Transfer

转化

Secondary collection

二级收集

Recycling

回收

处置

Disposal

Treatment

处理

Common Operator Models in China

中国的通用运营商模型

公共模式：清扫

1 Public model: sweeping.

Street sweeping by public authority staff.

公共模式：一级二级收集

5 Public model: primary and secondary collection.

Primary collection by the public authority together with secondary collection.

微特许经营私营部门参与：一级收集

6 Micro franchise PSP: primary collection.

Primary collection by micro-service providers (MSPs) as a singular service item, with revenue collected by the MSP.

9 Public model: secondary/one-step collection.

Secondary/one-step collection by the public authority.

公共模型：二级收集

7 Micro contracted PSP: primary collection.

Primary collection by micro-service providers (MSPs) as a singular service item, with revenue

微合同私营部门参与：主要收集

18 Public model: transfer.

Transfer by public authority or enterprise.

公共模式：转移

24 PSP open competition: recycling.

Collection and sorting of recyclables by the private sector (informal/formal) in open competition.

私营部门公开竞争：回收

33 Public model: landfill.

Landfill constructed and operated by the public authority.

公共模式：垃圾填埋场

35 PSP service: landfill.

Landfill constructed by the public authority and operated by PSP.

私营部门参与：垃圾填埋场

私营部门设计建设财务运营：焚烧

32 DBFO PSP: incineration.

Incineration financed, constructed and operated by PSP under concession contract with the public authority.

私营部门综合特许权

39 Integrated PSP concession: All service elements combined into one, with investment financing, construction and operation by the PSP.

公共模式：清扫

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Public model: sweeping.

Street sweeping by public authority staff.

公共模式：一级二级收集

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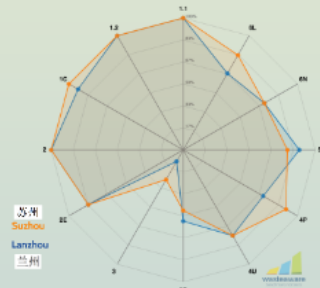
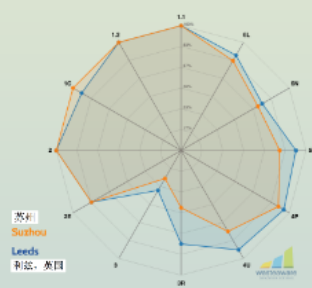
私营部门综合特许权

39

Integrated PSP concession: All service elements combined into one, with investment financing, construction and operation by the PSP.

基准

Benchmarks



Indicator	Indicator	Indicator	Indicator	Indicator
12. Waste collected through PUs collection	70	70	70	70
13. Collection and transportation management for recycling	70	70	70	70
14. Quality of waste collection and treatment services	70	70	70	70
15. Satisfaction of waste management services	70	70	70	70
16. Quality of waste management services	70	70	70	70
17. Quality of waste management services	70	70	70	70
18. Quality of waste management services	70	70	70	70
19. Quality of waste management services	70	70	70	70
20. Quality of waste management services	70	70	70	70
21. Quality of waste management services	70	70	70	70
22. Quality of waste management services	70	70	70	70
23. Quality of waste management services	70	70	70	70
24. Quality of waste management services	70	70	70	70
25. Quality of waste management services	70	70	70	70
26. Quality of waste management services	70	70	70	70
27. Quality of waste management services	70	70	70	70
28. Quality of waste management services	70	70	70	70
29. Quality of waste management services	70	70	70	70
30. Quality of waste management services	70	70	70	70



综合可持续垃圾管理

INTEGRATED SUSTAINABLE WASTE MANAGEMENT

兼顾性

公共健康

收集

**PUBLIC HEALTH
COLLECTION**

INCLUSIVITY

USER & PROVIDER

用户（居民）与供应商

**ENVIRONMENT
DISPOSAL**

环境 处置

PHYSICAL

现实要素

GOVERNANCE

管理要素

**SOUND INSTITUTIONS
& PRO-ACTIVE POLICIES**

合理的机制与前瞻的政策

3Rs

3R 原则

REDUCE, REUSE, RECYCLE

减量化，再利用，资源化

**FINANCIAL
SUSTAINABILITY**

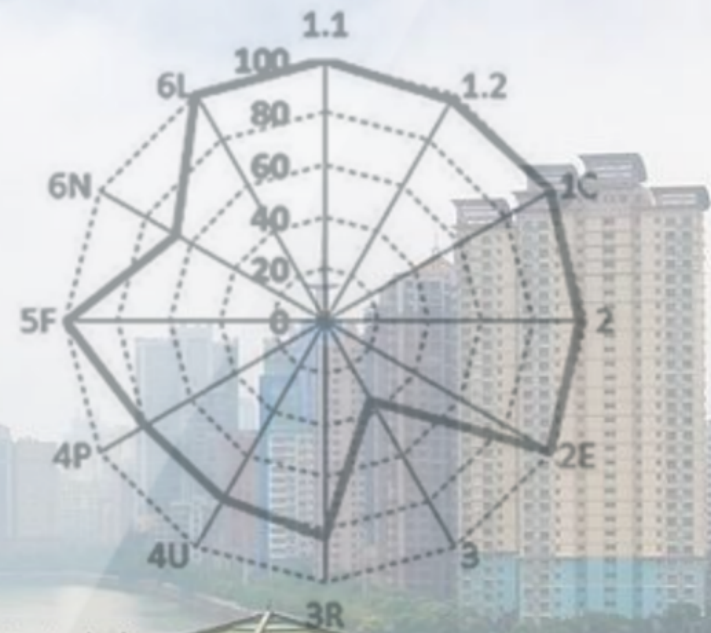
财务可持续性

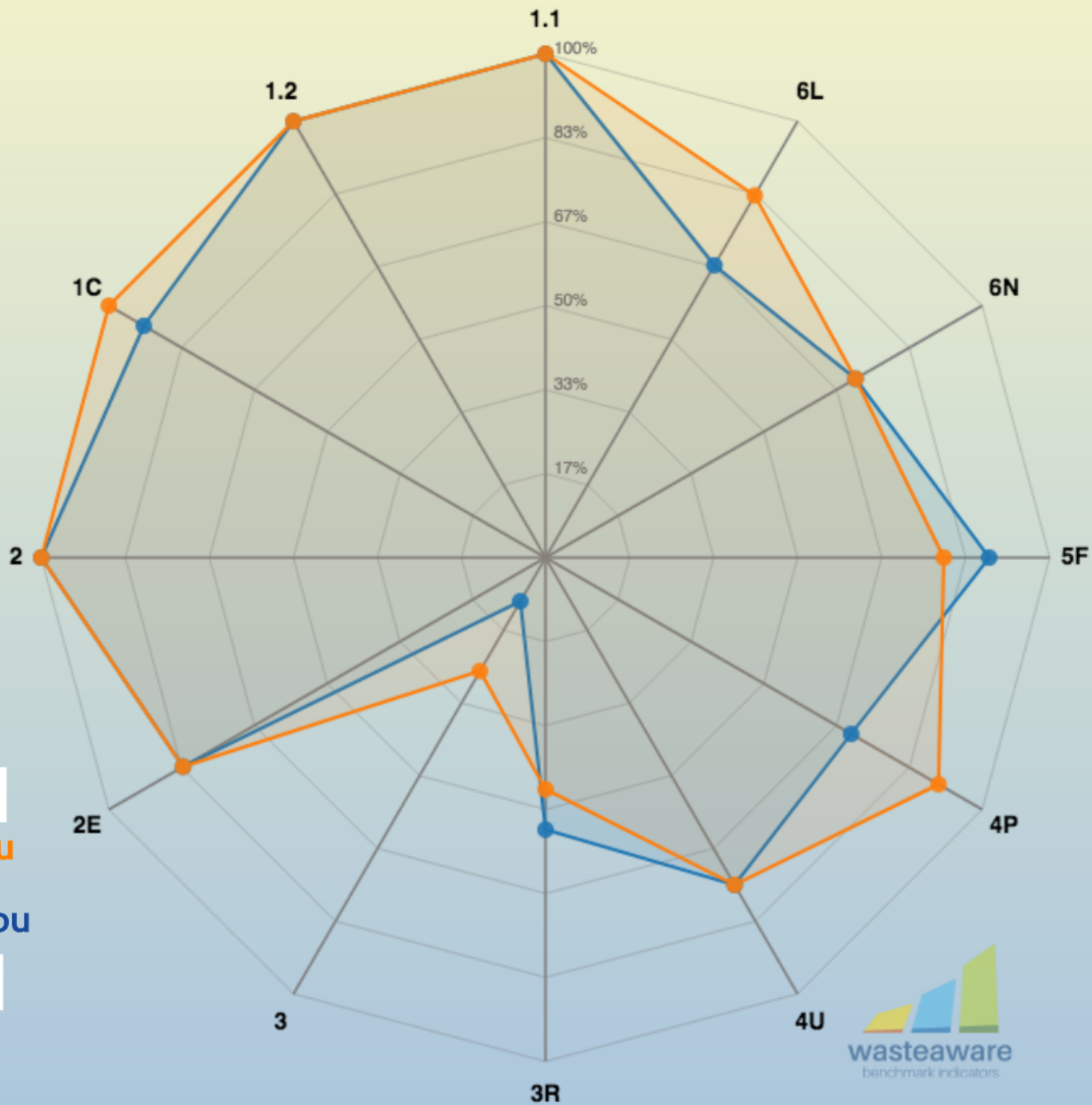
“Wasteaware” 评价指标

Cities and Waste Around the World

A huge variety of city environments - a single
standardised toolkit to assess all

城市以及全世界垃圾

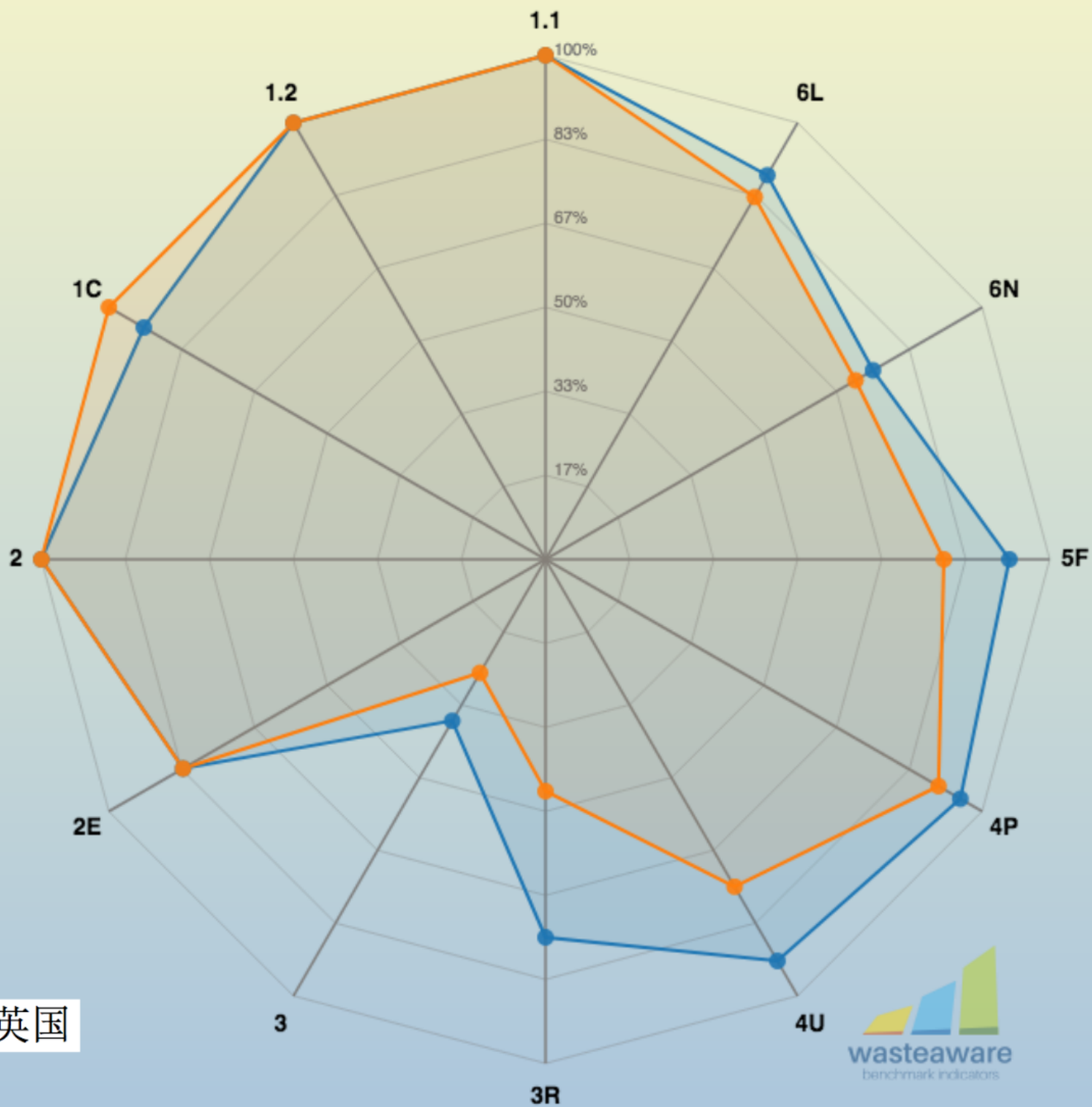




苏州
Suzhou

Lanzhou

兰州



苏州
 Suzhou
 Leeds
 利兹, 英国

苏
 Suz
 Lan
 兰



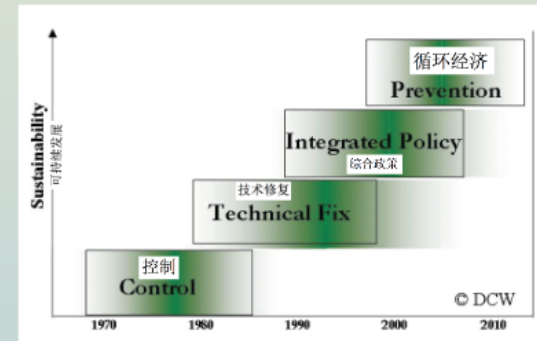
Performance

■ Low
 ■ Low-Medium
 ■ Medium
 ■ Medium-High
 ■ High

Physical components		Benchmark indicator	Lanzhou		Leeds		Suzhou	
Public health - waste collection	1.1	Waste collection coverage (% households)	100	<div></div>	100	<div></div>	100	<div></div>
	1.2	Waste captured by solid waste management and recycling system (% wt.)	100	<div></div>	100	<div></div>	100	<div></div>
	1C	Quality of waste collection and street cleaning service (%)	92	<div></div>	92	<div></div>	100	<div></div>
Environmental control - disposal	2	Control treatment and/or disposal (% wt.)	100	<div></div>	100	<div></div>	100	<div></div>
	2E	Quality of environmental protection in waste treatment and disposal	83	<div></div>	83	<div></div>	83	<div></div>
Resource value - 3Rs: reduce, reuse, recycling	3	Recycling rate (% wt.)	10	<div></div>	37	<div></div>	26	<div></div>
	3R	Quality of 3Rs - reduce, reuse, recycle (%)	54	<div></div>	75	<div></div>	46	<div></div>
Governance factors		Benchmark indicator	Lanzhou		Leeds		Suzhou	
Degree of user and provider inclusivity	4U	Degree of user inclusivity (%)	75	<div></div>	92	<div></div>	75	<div></div>
	4P	Degree of provider inclusivity (%)	70	<div></div>	95	<div></div>	90	<div></div>
Degree of financial sustainability	5F	Degree of financial sustainability (%)	88	<div></div>	92	<div></div>	79	<div></div>
Sound institutions and proactive policies	6N	Adequacy of national framework for solid waste management (SWM) (%)	71	<div></div>	75	<div></div>	71	<div></div>
	6L	Degree of local institutional coherence (%)	67	<div></div>	88	<div></div>	83	<div></div>

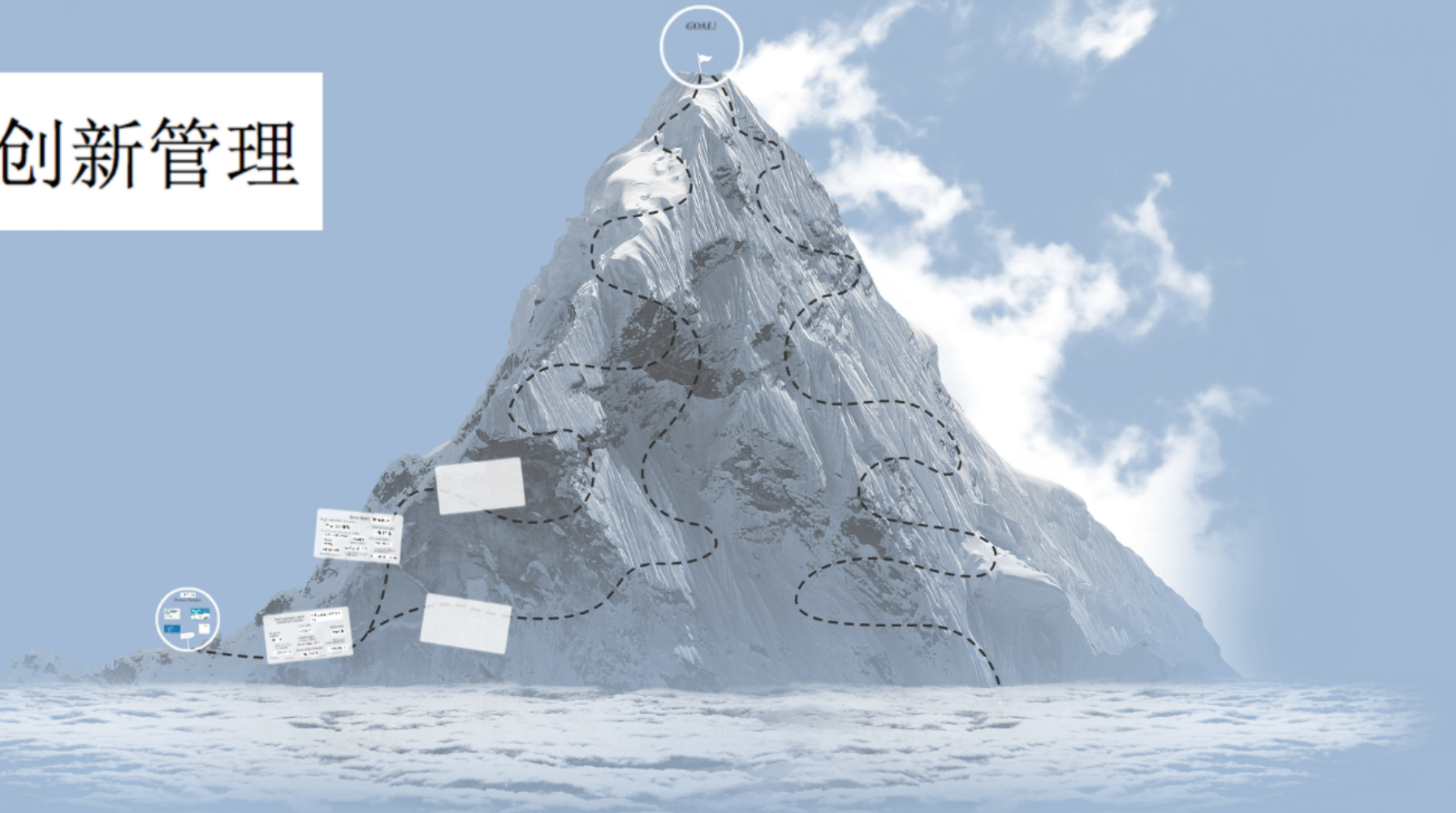
机会

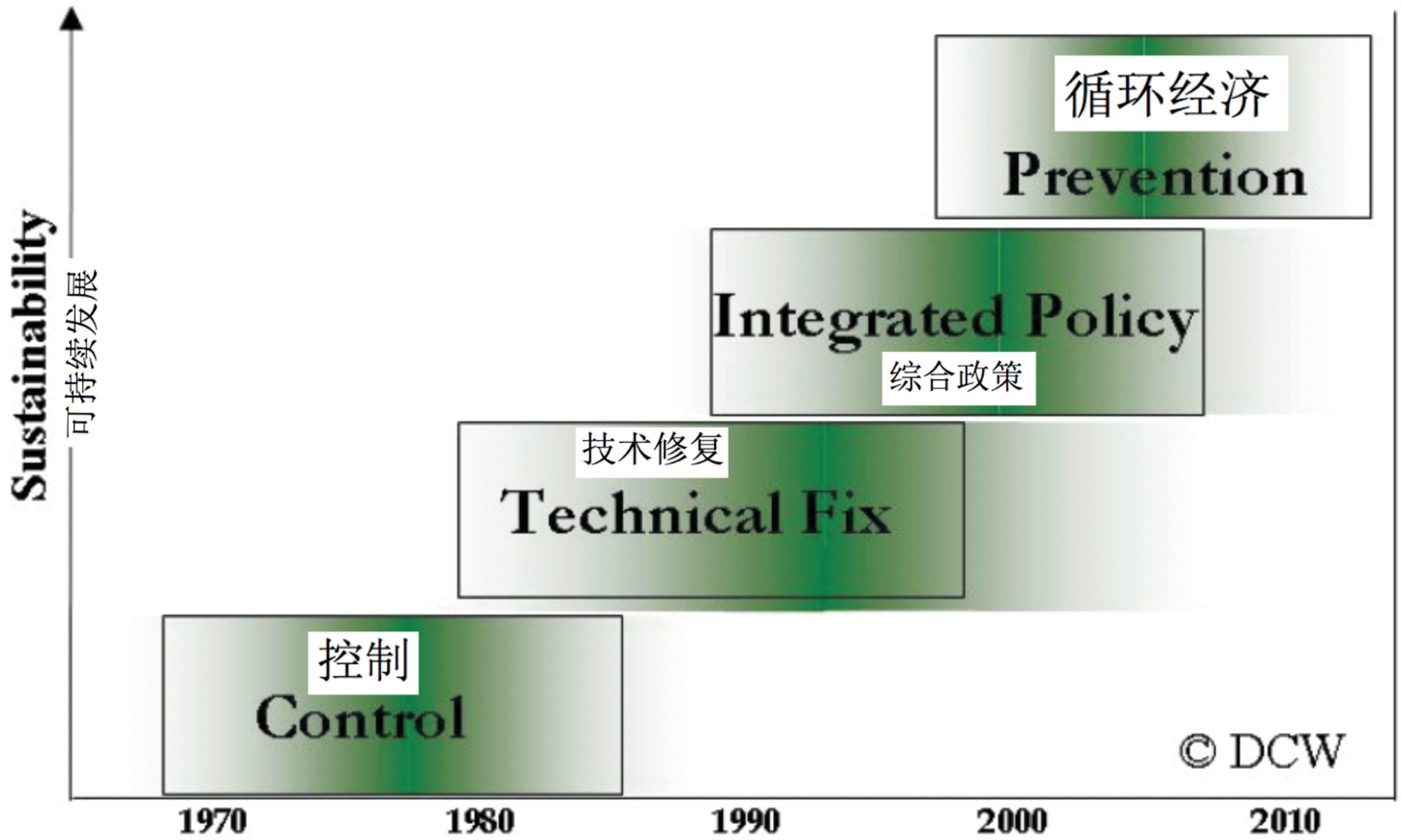
Opportunities



Waste management innovations

垃圾创新管理





Some ideas? 新的想法?

Single trip plastic

一次性塑料

China-Germany technology partnership

中德技术合作伙伴关系

智能数据系统

Smart data systems

押金返还

Deposit refunds

Incentive structures

激励结构

Compostable packaging

可降解包装

Motivational branding

品牌价值提升

Design for dis-assembly
for construction

可拆卸设计（用于建筑）

Operator Models 运营商业模式



Costs



基准 Benchmarks



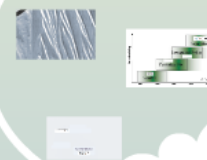
Technologies 技术



Concepts 理念



机会 Opportunities



Low Carbon Integrated Waste Management

低碳 综合垃圾管理

Andy Whiteman

