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伯恩哈德·申克 Bernhard Schenk mining engineer

BIOS

- 在固废管理领域拥有 30 多年的经验。
- 20 多年来，他主要在亚洲、欧洲、拉丁美洲和非洲的国际项目中工作。
- 他的经验包括废物管理所有领域的技术固废管理实践以及固废管理项目可行性的组织管理和财务分析方面的专业知识。
- 他曾在咨询公司担任工程师和顾问，还曾担任德国一家垃圾填埋场管理公司的首席执行官。
- 他从德国和其他国家的经验中熟悉引入减少废物和回收技术的现代方法。

- **more than 30 years experience in the SWM sector.**
- **Since more than 20 years he works mainly internationally in projects in Asia, Europe, Latin America and Africa.**
- **His experience comprises technical SWM practises in all fields of waste management as well as expertise in organisational management and financial analysis of feasibility of SWM projects.**
- **He has worked as engineer and consultant in Consulting companies but also as CEO of a landfill management company in Germany.**
- **He is familiar with modern methodologies to introduce waste reduction and recycling technologies from his experiences in Germany and other countries.**

Bernhard Schenk 在德国复兴开发银行、德国国际合作机构、欧洲复兴开发银行、世界银行资助的项目中担任自由工程师和高级顾问近 20 年，自今年 5 月起在亚行资助的中国循环经济无废城市技术援助项目中工作，负责广东省城市垃圾零排放行动计划的产出 2。

Bernhard Schenk is working since almost 20 years as a freelance engineer and senior consultant in projects financed by KfW Development Bank, GIZ, EBRD, World Bank and since May this year in the ADB financed TA on Circular Economy Zero Waste Cities in the PRC, being responsible for Output 2 on Zero municipal waste action plan for Guangdong Province.



Dissemination Workshop
ADB TA Solid Waste Management Coordination
in the Beijing-Tianjin-Hebei City Cluster
亚行技术援助传播研讨会
京津冀城市群固体废物管理协调

25-26 AUGUST 2022
2022年8月25-26日

**ADB TA on Circular Economy
Zero Waste Cities in Guangdong –
Focus on Improved Solid Waste Management
and Increased Recycling**
亚行循环经济和零废弃物城市技援广东子项目---
关注改善的固体废物管理和增加回收

Bernhard Schenk
International SWM Expert for the TA
Schenk-Engineering
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伯恩哈德·申克
技援的国际生活固废管理专家
申克工程
德国·柏林



Roadmap for Implementation of CE in Guangdong Province 广东省实施循环经济路线图

Objective of this output: **Reduce significantly household waste in Guangdong Province, with a goal of nearly full recovery of household waste.**

这项产出的目标: 此项产出的目标是大幅减少和全面回收再利用广东省的生活垃圾。

- Analysis of current situation: Policy/legislation background, current management of SWM, financial management and activities already in place
 - 现状分析: 政策/立法背景、当前的生活垃圾管理、财务管理和已经开展的活动
 - Quantification and characterization of feasible waste streams (e.g. plastic waste, organic waste)
 - 对可行的废弃物流(例如塑料垃圾、有机垃圾)进行定量和定性
- ⇒ Integrated waste management and recycling zero waste cities system plan (draft policies, outline administrative regulations, prioritized zero municipal waste action plan)
- ⇒ 综合管理和回收零废弃物城市系统计划草案(政策草案、行政法规大纲和优先行动计划)
- ⇒ Business plans and partnership opportunities to implement 3R/5R projects further, potentially with a strong private partner consideration
- ⇒ 进一步实施3R/5R项目的商业计划和合作机会, 考虑潜在的私营合作伙伴

Working Approach for Implementation of CE in Guangdong Province

广东省实施循环经济路的工作方式

- Hands-on and on-the-ground methodology through a team of national and international experts together with local government, private sectors, and communities.
- 通过一个由国内和国际专家以及地方政府、私营部门和社区组成的团队，采用实践和实地方法。
- Workshop/online meetings/site visits to obtain insights and collect data.
- 研讨会/在线会议/现场访问，以获取见解和收集数据。
- Reviews and gap analysis (policy, institutional, technical analysis) in-depth and identify challenges and bottlenecks and propose feasible solutions relevant to the local context.
- 深入审查和差距分析(政策、体制、技术分析)，确定挑战和瓶颈，并提出适合当地情况的可行解决方案。
- Design of policy framework and pilot program by assessing international best practices and adapting to the local development contexts.
- 通过评估国际最佳实践和适应当地发展环境，设计政策框架和试点计划。

International Experiences EU – Circular Economy Action Plan 2020 国际经验 欧盟——2020年 循环经济行动计 划

CEAP provides a future-oriented agenda

循环经济行动计划提供了一个面向未来的议程

- ⇒ achieving a cleaner and more competitive Europe in co-creation with economic actors, consumers, citizens and civil society organisations
- ⇒ 与经济行为者、消费者、公民和民间社会组织共同创建一个更清洁、更具竞争力的欧洲
- ⇒ Establish a strong and coherent product policy framework that will make sustainable products, services and business models the norm and transform consumption patterns so that no waste is produced in the first place:
 - Design sustainable products
 - Empowering consumers and public buyers
 - Circularity in production processes
- ⇒ 建立一个强有力和连贯的产品政策框架，使可持续的产品、服务和商业模式成为规范，并改变消费模式，以便首先不产生浪费；
 - 设计可持续产品
 - 赋能消费者和公众买家
 - 生产过程中的循环性
- ⇒ Enhanced waste policy in support of waste prevention and circularity
- ⇒ 加强废弃物政策，支持废弃物预防和循环利用
- ⇒ Enhancing circularity in a toxic-free environment
- ⇒ 在无毒环境中增强循环性
- ⇒ Creating a well-functioning EU market for secondary raw materials
- ⇒ 为二次原材料创建一个运转良好的欧盟市场
- ⇒ Addressing waste exports from the EU
- ⇒ 解决欧盟废弃物出口问题

International Experiences EU – Circular Economy Action Plan 2020 国际经验 欧盟——2020年循环经济行动计划

CEAP Policy Framework – Business Models 循环经济行动计划政策框架—商业模式



International Experiences EU – Circular Economy Action Plan 2020 国际经验 欧盟——2020 年循环经济行 动计划

KEY PRODUCT VALUE CHAINS

关键产品价值链

Packing Waste:

- Reducing (over)packaging and packaging waste, setting targets and other waste prevention measures;
- Driving design for re-use and recyclability of packaging, including restrictions on the use of some packaging materials for certain applications;
- Considering reducing the complexity of packaging materials.

包装废弃物:

- 减少(过度)包装和包装废弃物, 设定目标和其他废弃物预防措施;
- 推动包装的再利用和可回收性设计, 包括限制某些包装材料在某些应用中的使用;
- 考虑降低包装材料的复杂性。

• Plastic Waste:

- mandatory requirements for recycled content and waste reduction measures for key products such as packaging, construction materials and vehicles
- measures to reduce plastic litter with a focus on presence of microplastics in the environment
- a policy framework on:
 - sourcing, labelling and use of bio-based plastics;
 - use of biodegradable or compostable plastics

• 塑料垃圾:

- 对包装、建筑材料和车辆等关键产品的再生成分和减少废弃物措施提出强制性要求
- 减少塑料垃圾的措施, 重点是环境中存在的微塑料
- 关于以下方面的政策框架:
 - 生物基塑料的采购、标签和使用;
 - 使用可生物降解或可堆肥的塑料

International Experiences

Germany 国际经验

德国

Germany

德国

- Until 1972 no legal regulation of SWM sector more than 50,000 disposal sites
- 直到1972年，还没有对生活垃圾管理的法律规定
5万多个处置场
- 1972, first law on SWM with responsibility of local governments for SWM
- 1972年，第一部关于生活垃圾管理管理的法律，由地方政府负责生活垃圾管理
- 1986, law on Avoidance and Disposal, Recycling of glass, paper, metal
- 1986年，《关于玻璃、纸张、金属的废弃和处理、回收的法律》
- 1991, Packaging Waste Ordinance ⇒ Dual System EPR for packaging material
- 1991年，《包装废弃物条例》⇒包装材料的双系统生产者责任延伸制
- 1994, Circular Economy Law
- 1994年，《循环经济法》
- 2005, Ordinance on Disposal of Waste, No disposal without pre-treatment
- 2005年，《废弃物处置条例》，未经预处理不得处置
- Future (2020): Zero Waste ⇒ not yet!
- 未来(2020年): 零废弃物，还没有实现!



Source: Hamburger Stadtkemung



Source: Arbeitsgemeinschaft Abfallberatung Unterfranken



Source: Berliner Stadtreinigung

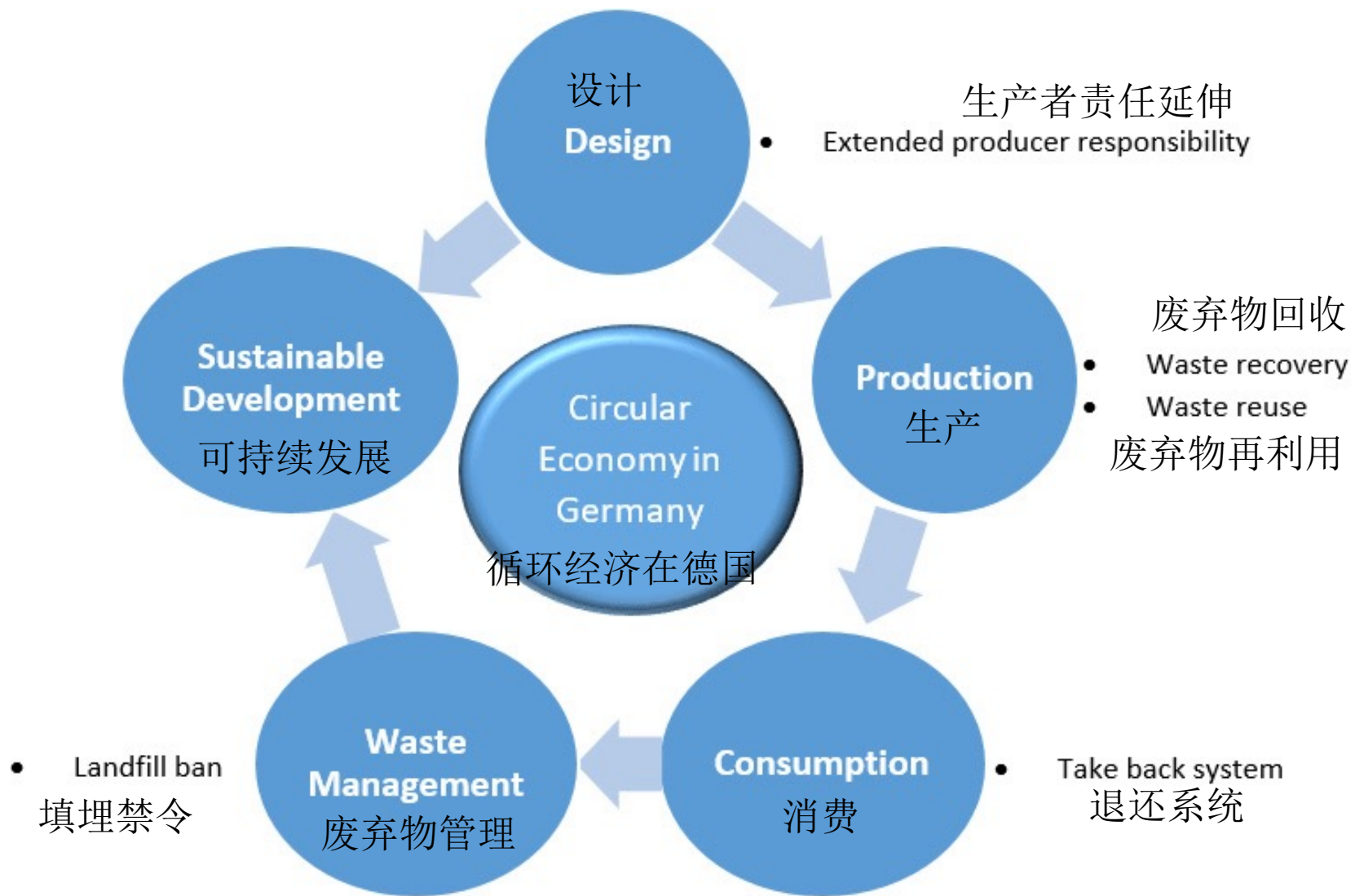


Source: Umweltbundesamt

International Experiences

Germany 国际经验

德国



International Experiences

South Korea

Current Achievements

国际经验

韩国

目前的成就

종이 분리배출 PS 분리배출 HDPE 분리배출
 유리 분리배출 철 분리배출 PP 분리배출
 Separate collection('92~)
 单独收集('92~)

Volume-based waste fee
 - municipal waste(1995~),
 - food waste(2010~)
 基于数量的废弃物处理费
 ——生活垃圾(1995~),
 ——厨余垃圾(2010~)

생산자책임재활용제도
 Extended Producer Responsibility(2003~)
 生产者责任延伸 (2003~)

Recycling rate marked 84.4% in 2015

(household wastes 59.2%, business wastes 78.2%, construction wastes 97.6%)

2015年回收率为84.4%

(生活垃圾59.2%，商业垃圾78.2%，建筑垃圾97.6%)

Food waste :
 Banned from landfills('05~)
 厨余垃圾:
 禁止填埋('05~)

• 순환 잔골재 (5~) • 순환 골은골재 (6~) • 순환 골은골재 (13~)
 • 순환 골은골재 (20~) • 순환 골은골재 (25~) • 순환 골은골재 (40~)

Eco-Assurance System(EcoAS)
 For WEEE and vehicles ('08~)
 生态保障系统
 对于电子废弃物和车辆 ('08~)

International Experiences
South Korea
New Paradigm – CE
国际经验
韩国
新范式——循环经济

National Resource Circulation Goals
(to be established in 2018)
国家资源循环目标
(将于2018年建立)

- ① Reduction rate, ② Recycling rate,
- ③ Energy recovery rate, ④ Terminal disposal rate
- ①降低率, ②回收率,
- ③能源回收率, ④终端处置率

① Manufacturing · Production 制造 生产

- (Process improvement) Enhance resource productivity in manufacturing process - providing reduction guideline/consulting service, developing and disseminating environment-friendly technologies, etc.
- (过程改进)提高制造过程中的资源生产率-提供减少的指南/咨询服务, 开发和传播环境友好型技术等。
- (Performance management) Introduce Recycling Performance Management that sets recycling target for large emitters* and manage the performance * Total waste amount above 1,000 tons a year or hazardous wastes above 100 tons a year (2,500 business sites nationwide)
- (绩效管理)引入回收绩效管理, 为大型排放者设定回收目标*并管理绩效*每年1000吨以上的废弃物总量或每年100吨以上的有害废弃物(全国2500个营业场所)
- (Product design) Introduce Produce Recyclability Assessment to promote easy-to-recycle product design
- (产品设计)引入产品可回收性评估, 以促进易于回收的产品设计

International Experiences

South Korea

New Paradigm – CE 国际经验

韩国

新范式——循环经济

② Consumption消费

- (Reuse) Promote second-hand products, encourage reuse behavior
- (再利用)推广二手产品，鼓励再利用行为
- (Disposables) Take comprehensive approach to reduce the use of disposables - cup deposit, standardization of materials, public collection system, etc.
- (一次性物品)采取综合措施减少一次性物品的使用——杯子寄放、材料标准化、公共收集系统等。
- (Food waste] Prevent and reduce generation by expanding Food Waste Volume Based Fee system using RFID
- (食物垃圾)通过使用射频识别技术扩展基于食物垃圾量的收费系统来防止和减少垃圾的产生

③ Recycling and Disposal回收和处置

- (EPR) Expand the product range subject to EPR incl. automobiles
- (生产者责任延伸制)扩大生产者责任延伸制的应用范围，包括汽车
- (Landfill/Incineration Charges) Impose charges (\$9-27/ton) on waste landfill and incineration
- (填埋/焚烧费)对垃圾填埋和焚烧收费(9-27美元/吨)
- (Demand side) Increase public procurement of recycling goods, give incentives to businesses that use recycled resources
- (需求侧)增加回收商品的公共采购，对使用回收资源的企业给予奖励
- [Industry Support] Develop innovative technologies, expand financial support for small businesses
- [产业支持]发展创新技术，扩大对小企业的金融支持

ADB TA for
Circular Economy in the PRC,
Guangdong Province
and International Experiences

亚行的发展路线图
广东省的循环经济
和国际经验

Thank you for your interest
感谢您对我们工作的支持。

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