

GREEN CIRCULAR CITIES COALITION

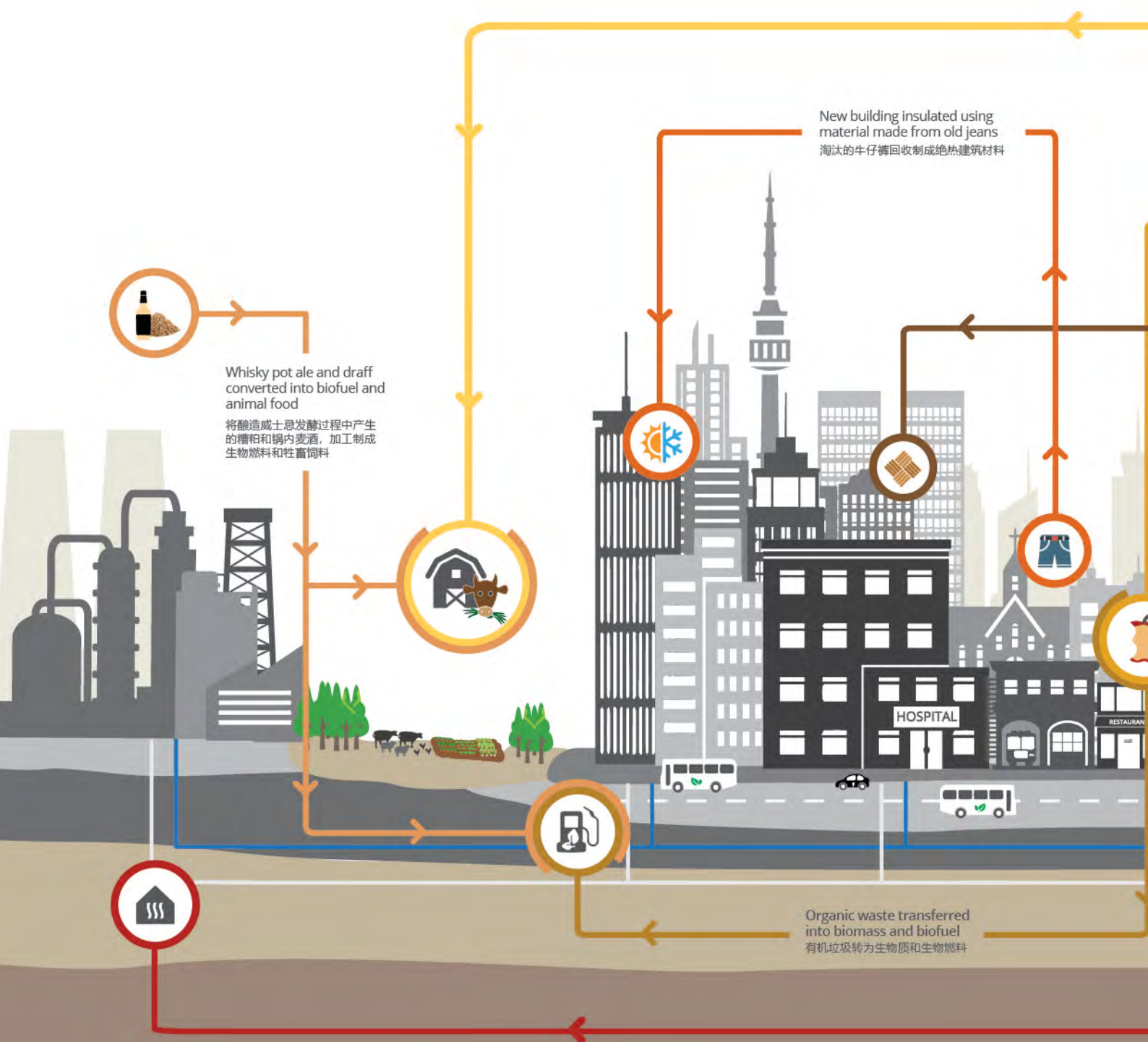
绿色循环城市联盟项目 [筹]

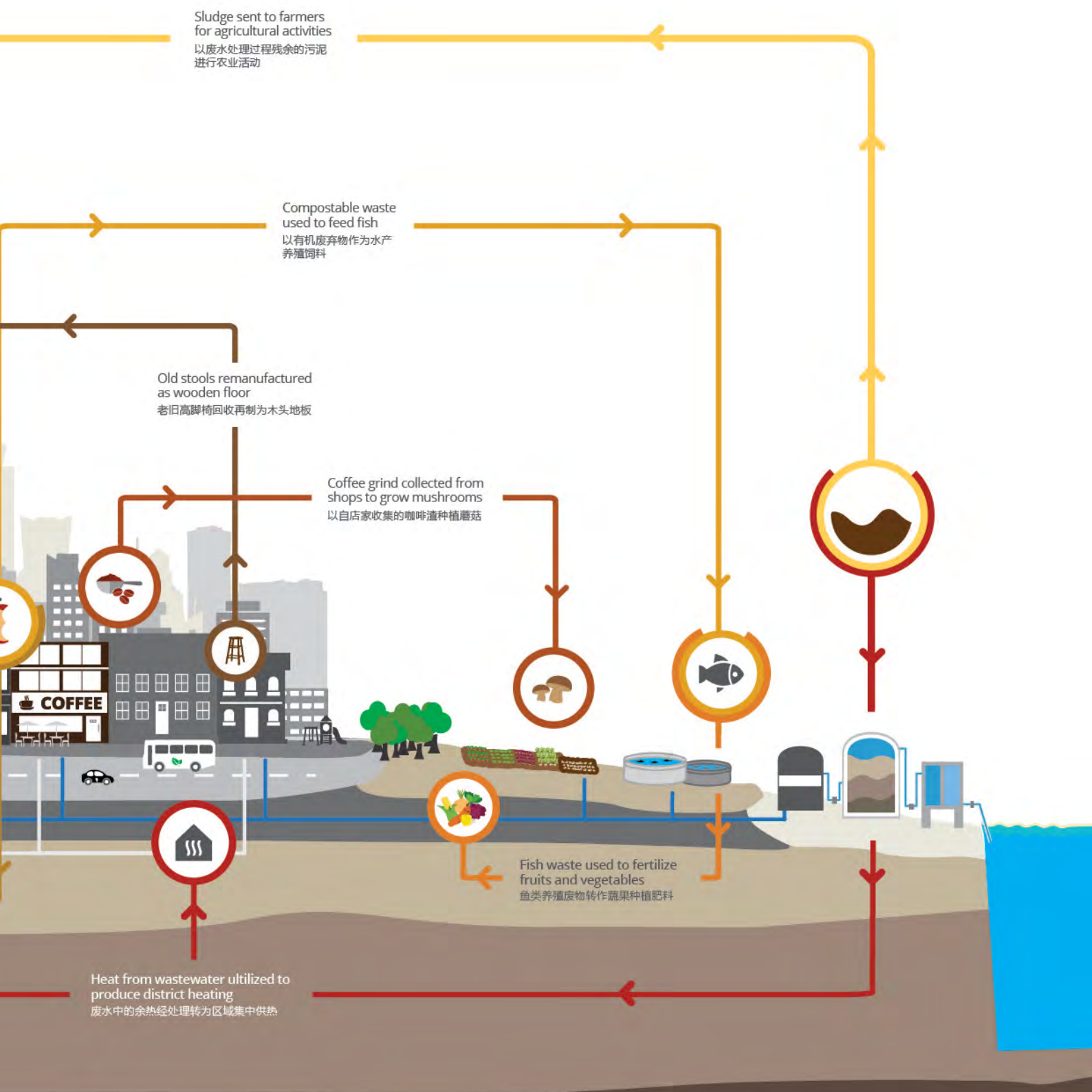


CHEONGGYEcheon
SEOUL, SOUTH KOREA

A **Green Circular City** is a sustainable urban ecosystem in which material loops are closed, and the value of resources is efficiently maximized by applying the circular approach – **Redesign, Reuse, Repair, Remanufacture, Recycle, and Recover** – which will lead environmental benefits, economic prosperity, and a thrive the society.

“绿色循环城市”是透过实行切实有效的六大循环措施——**再设计、再利用、再维修、再制造、再回收、再回复**——而成为物质反复流动、资源价值高效使用的可持续城市生态系统。实践此六大循环措施，将促进创新商业模式、创造绿色就业机会、维护生态环境，助力城市推进生态文明建设和可持续发展。





GREEN CIRCULAR CITIES COALITION

绿色循环城市联盟项目 [筹]

The Green Circular Cities Coalition, an initiative managed by ICLEI — Local Governments for Sustainability, presents an opportunity for cities across the world to become global leaders in urban circular economy transition. The Coalition provides a platform to connect cities, experts, businesses, and other relevant stakeholders to foster urban circular economy transition through knowledge and experience exchange, mutual learning, and technical support.

Cities could also further collaborate through participation in thematic working groups joined by Knowledge Partners and Solution Providers, and receive support and guidance on implementing existing action plans and creating new ones for their urban circular transitions. Results of each working group's efforts would be consolidated and shared with the Coalition.

宜可城—地方可持续发展协会计划统筹开展的“绿色循环城市联盟”项目，将提供世界各地的城市机会，迈向全球先锋的循环城市转型。项目将提供平台，连结城市、科研单位、技术提供者、企业伙伴和其他利益相关者，通过经验和知识交流，支持城市加速转型为循环型社会。

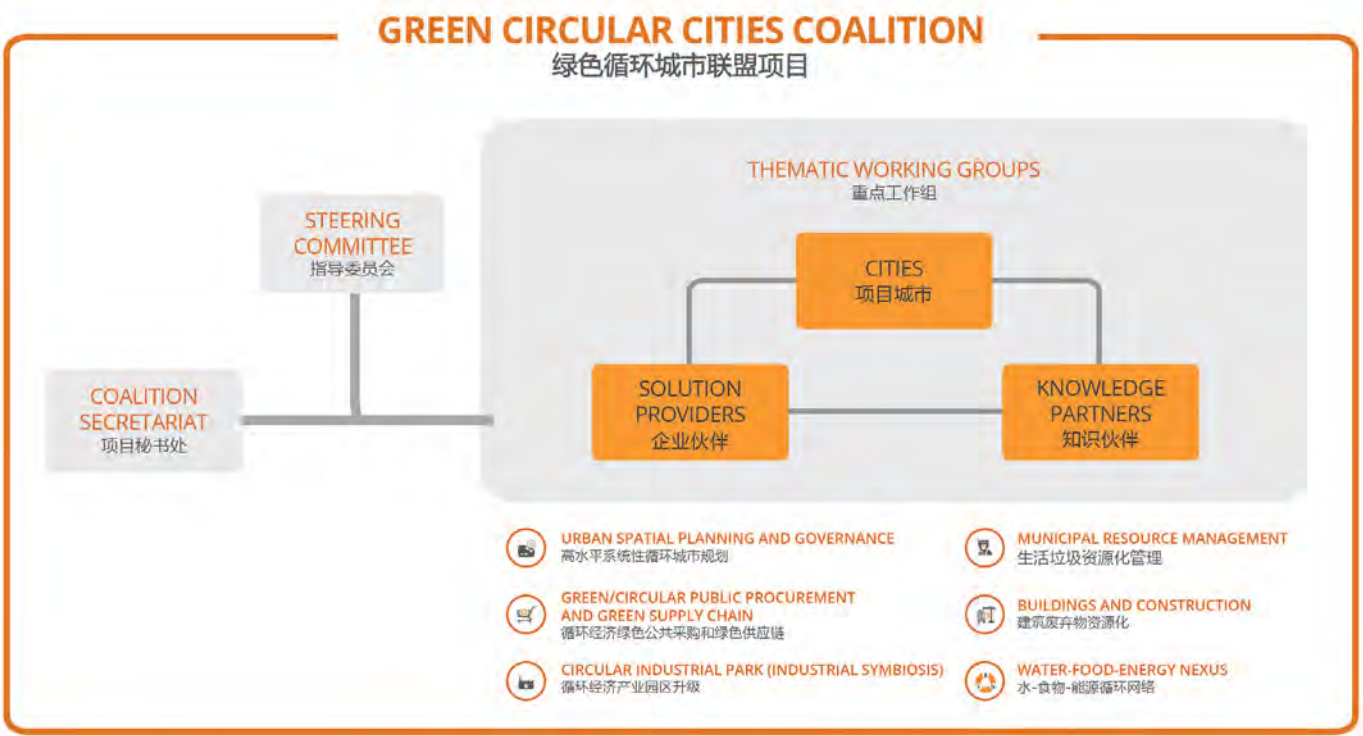
城市可依需求加入六大领域重点工作小组，进一步与其他城市、知识和企业伙伴交流合作，并接受城市循环转型行动方案设计和执行等相关技术支持。小组工作的成果将作为知识产物分享给网络成员。

PROPOSED THEMATIC FOCUSES

拟聚焦主题



COALITION STRUCTURE
项目架构



SERVICES & SUPPORT
服务和支持

GENERAL SUPPORT 基本服务			
CAPACITY BUILDING & AWARENESS RAISING 能力培训与意识提升	ANNUAL SUMMIT & INTERNATIONAL FORUMS 年度高峰论坛与研讨会	CITY-TO-CITY LEARNING & EXCHANGE 城市交流互访	BEST PRACTICES COLLECTION & ANALYSIS 最佳实践案例选集
Regular workshops for Green Circular Cities to exchange thoughts, identify challenges and barriers, and to brainstorm for best solutions 定期举办工作坊促进意见交流、识别挑战与障碍、共同寻求解决方案	International summits for Green Circular Cities and Partners to share insights, discuss solutions, demonstrate progress, and secure political commitments 举办年度绿色循环城市高峰会，促进利益相关者交流见解、展现成果、显示政治承诺	Overseas tours and field trips to better understand good practices and for mutual learning 通过海外参访和实地考察杰出实践案例，并相互学习	The Secretariat will collect, analyse and disseminate best practices from all over the world, for Green Circular Cities to better understand local implementation methods 秘书处蒐集、分析并分享世界各地的最佳实践案例，协助绿色循环城市进一步了解地方实践的方法和程序。

5-STEP VALUE-ADDED SUPPORT 五步骤增值服务				
1 TARGET THEMATIC AREAS 选定重点领域	2 FORM WORKING GROUPS 筹组专家团队	3 DIAGNOSE CIRCULARITY 检视循环程度	4 SET POLICIES & ACTION PLANS 制定政策与行动方案	5 ADVANCED CAPACITY BUILDING 进阶能力培训
Green Circular Cities prioritize at most three focal areas and discuss projects with the Secretariat 绿色循环城市依据发展进程与需求，选择至多三项重点工作领域，与秘书处讨论相关项目	The Secretariat, Green Circular Cities, and Partners form a working group for each selected area 绿色循环城市、科研单位、企业技术提供者和秘书处，针对各重点工作领域，组织重点工作组	Working groups first diagnose Green Circular Cities' current status and circularity 工作组协助绿色循环城市进行现状评估，检视地方循环程度	Based on the circularity diagnosis, working groups and Green Circular Cities discuss policies and set action plans 依据循环程度检视成果，工作组支持绿色循环城市制定因地制宜的政策目标和行动方案	Working groups support Green Circular Cities to develop capacity through deep-dive workshops and capacity building events 工作组根据绿色循环城市的实际需求，设计技术、知识、利益相关方对话等进阶能力培训



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Urban Spatial Planning and Governance

高水平系统性循环城市规划

Mapping the urban metabolism with urban spatial planning to identify cities' potentials and opportunities and to reflect on local policies and decisions.

比对城市物质流向与城市总体空间规划，识别城市的循环经济潜力，制定政策与行动方案。

Yamaguchi Prefecture, Japan

日本·山口县

| Keywords | *logistics redesign, food waste remanufacture, geographical proximity, spatial planning*

| 关键字 | 商品物流再设计、餐厨废弃物再制造、地理区位邻近性、城市总体空间规划

Understanding the interactions between urban activities and material flows can facilitate the circularity of urban systems. The circulation could be more economically feasible when geographical proximity is carefully taken into consideration. In the Japanese Prefecture Yamaguchi, stakeholders collaborate on the circularity of food and agriculture. The prefecture generates around 10,000 tons of food waste annually, and most of the unwanted food is incinerated. To enhance resource efficiency, Yamaguchi Prefecture initiated an action plan, together with local food shops, poultry feed industry, consumers, and egg farmers, aiming to set up an efficient food waste collection and reuse system with business locations taken into account.

In addition to calculating the amount of food waste in the urban area, identifying sources of waste, and assessing reusers' capacity, Yamaguchi Prefecture further estimates distance, time and cost of food waste collection. With all these well considered, it was suggested that Ube City of the Prefecture could implement an individual plan, whereas Hofu and Yamaguchi City could conduct a joint plan. Food waste would be collected from local shops and shipped to poultry feed manufacturers following the planned route. The remanufactured food waste would then be sent to egg farmers and used to feed chickens. Eggs will be shipped back to food shops.

了解城市内商业活动和物质流间的关联，并审慎将地理区位邻近性纳入考量，有助于优化城市系统的循环性与其经济效益。日本山口县的利益相关方针对促进食物和农业领域的循环经济开展合作。山口县每年制造约一万吨餐厨垃圾，其中多数经焚化销毁。为提升资源效率，山口县政府携手当地超级市场、家禽饲料制造业、消费者和养鸡场，制定一份行动计划，旨在建立一个充分考量产业商家地理位置的高效餐厨垃圾收集和回收系统。

除了计算市区餐厨垃圾量、追踪餐厨垃圾来源、和评估再利用者的容纳能力外，山口县还进一步估算了收集餐厨垃圾时的距离、所需时间和相关成本。在经过多方评比后，山口县建议县内的宇部市开展独立计划，而防府市和山口市则可开展联合计划。餐厨垃圾车将依照规划的路线至商家收集餐厨垃圾，并送往家禽饲料制造厂进行加工制造；加工后的饲料则将运往养鸡场，作为蛋鸡的营养来源。最后，蛋鸡生产的鸡蛋将再被运送回超级市场。

REDESIGN 再设计

REMANUFACTURE 再制造

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Green/Circular Public Procurement and Green Supply Chain

循环经济绿色采购和绿色供应链

Mainstreaming the circular approach in the process of public procurement to close material loops with the support of ICLEI's intensive experience in Green Public Procurement.

协同宜可城绿色公共采购项目，将循环经济思维导入公共采购流程，加速封闭物质的流向循环。

Copenhagen, Denmark

丹麦·哥本哈根

| Keywords | *reused bricks, outer wall, public buildings extension, GHGs reduction, life cycle assessment*
| 关键字 | 废旧砖块再利用、建筑外墙、公共建筑扩建、温室气体减排、生命周期评估

Public procurement creates demand of goods and services that follow principles of the circular economy, and supports cities' circularity. By specifying the requirement of using reused bricks for the outer wall of the Katrinedals School, the tender aligned with the city's commitment to improve the environment through public procurement. The reused bricks were from the Bispebjerg Hospital and the National University Hospital in the city. 70 tonnes of CO₂ equivalent emissions were reduced through the project.

Copenhagen aims to promote the reuse and recycling of building materials, and to inspire private investors pursuing higher environmental standards in construction projects. In 2016, the Municipality issued 'Miljø i Byggeri og Anlæg 2016 (in English: Environment in Construction)', a collection of requirements to be applied to all buildings and construction owned and regulated by the Municipality, including procurement for recycling and reuse of materials. When delivering building projects, Municipal departments are required to provide at least two alternative materials for each building with life cycle assessment, and choose the material with the lowest negative environmental impact.

政府公共采购的需求，可为符合循环经济原则的商品和服务提供市场，并支持城市的循环性。丹麦哥本哈根市卡特琳道尔学校建案，在招标文件中明确指定使用回收后的废旧砖块作为学校外墙。此项目使用了自该市国立大学医院和比斯珀比约医院回收而来的废旧砖块，经计算减少了相当于 70 吨的碳排放量，并同时落实该市“通过公共采购改善环境”的承诺。

哥本哈根市致力于推广建筑材料的回收和再利用，并鼓励私人投资者在建筑项目中追求更高的环境标准。2016年，哥本哈根市政府针对所有市政府持有和监管的建筑物及工程项目，发布了“2016 年度环境与社会责任 (Miljø i Byggeri og Anlæg 2016; 英译 Environment in Construction) ”标准。该标准要求政府部门采购再回收和再利用的物料。市政部门在开展建筑和工程项目时，必须为每座建筑物进行生命周期评估，提供至少两种材料替代方案，并选用对环境负面影响较小的建筑材料。

REDESIGN 再设计

REUSE 再利用

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Circular Industrial Park (Industrial Symbiosis)

循环产业园区升级

Facilitating local governments to enhance the collaboration between individual companies on resources and by-products exchange with the consideration of both physically and virtually geographical proximity.

将地理区位因素纳入规划, 促进地方政府强化循环产业园区内资源与副产品间的交换利用。

Beijing, China

中国·北京

| Keywords | *circular economy industrial park, waste-to-energy, waste heat, economic benefit*

| 关键字 | 循环经济产业园区、废料转化能源、废热回收、经济效益

(Eco-) Industrial Parks play an vital role in accelerating transitions towards a circular economy, with manufacturers located in close proximity so that residual products could be efficiently exchanged. The Beijing Chaoyang Circular Economy Industrial Park is a business cluster aiming for the reuse and remanufacture of unwanted resources. The 'Circular Economy Implementation Plan of Beijing Chaoyang Circular Economy Industrial Park' is released as the principle guidance of the Park.

The Park is composed of a waste-to-energy plant, a construction waste treatment center, a food waste processing center, and office buildings. Dustcarts carry municipal waste to the waste-to-energy plant, and the electricity generated there is then transmitted to charging stations for electric vehicles and connected to the grid. Residual ash from the combustion is transported to the construction waste treatment center and remanufactured as construction materials; bio-residuals from the food waste processing center is used for organic agriculture. The waste heat generated from other plants provides heating and hot water to office buildings in the Park through underground pipes. It is estimated that the reuse of waste heat saves RMB 233 million annually and the energy generated from combustion and transmitted to grid has contributed to around RMB 120 million of monetary benefit.

在生态产业园内, 企业可以通过资源与废弃物的交换、物质与水的分享利用等, 实现园区经济效益和环境效益的双赢, 是加速开展循环经济转型的重要火车头。中国北京市朝阳区循环经济产业园为北京市第一批循环经济类试点单位。园区依据《北京市朝阳区循环经济产业园循环经济实施方案》规划发展战略和管理制度, 聚焦垃圾处理相关工作和创新发展模式, 以完善循环经济链条。

北京市朝阳区循环经济产业园包含垃圾焚烧发电厂、卫生填埋场、餐厨垃圾处理厂等设施, 和科研教育中心等行政办公大楼。园区内的生活垃圾由环卫车辆载往焚烧厂进行焚烧, 产生电力输送到充电站为车辆充电; 燃烧残余的炉渣则送往建筑垃圾厂, 加工制成建筑材料; 餐厨垃圾处理过程中剩余的生物残留物转用于有机农业; 厂房产生的余热则经由地下管线送往园区设施及办公大楼供暖和热水。据估计, 余热回收利用每年可节省约人民币 233 万元的电费开销, 而焚烧发电也可带来人民币 1.2 亿元左右的经济效益。

REUSE 再利用

RECOVER 再恢复

REMANUFACTURE 再制造

积攒绿色 储蓄生命

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Municipal Resource Management

生活垃圾资源化管理

Identifying municipal waste stream, minimizing the generation of waste, recovering waste into resources, and maximizing the demand of secondary materials within cities.

识别城市废弃物的物质流向，降低废弃物的产生，将废弃物回复成为资源，同时最大化城市内对于再生资源使用的需求。

Genoa, Italy

意大利·热那亚

| Keywords | *recycling rate, stakeholder engagement, exchange platform, repair*

| 关键字 | 回收率、利益相关方参与、交换平台、再修复

Municipal waste could be transformed into valuable resources, and through embedding the circular principles, the development of eco-businesses could be improved. The Italian city Genoa encountered a severe crisis when it failed to manage its waste and had to transport all waste to adjacent region. Since 2014, AMIU, the municipality-owned waste management company, have been working with the Genoa Municipality, local communities and stakeholders to design and implement a new municipal waste collection plan. AMIU has adopted a new business model focusing on the value and recovery of materials; meanwhile, the Genoa Municipality is upgrading separation plants and provides training on the new separation process to AMIU employees.

Genoa engages multiple stakeholders through municipal initiatives and, together with AMIU, the Municipality has developed phone applications on separating waste for consumers. The first Repair Cafe was introduced to the city in 2017, gathering talented people to support visitors in repairing household appliances. Three more Repair Cafes are expected to be opened in the near future.

城市的生活垃圾可转为有用的资源，实践循环经济，并有助于绿色及环保企业的发展。意大利城市热那亚曾因无法妥善处置城市内所产生的生活垃圾，必须将垃圾运往临近地区。为了解决该困境，热那亚市政府营云的废弃物管理公司 AMIU，自 2014 年起携手市政府、地方社群和相关利益方，为该市设计并实施新的垃圾收集计划。AMIU 选用了关注材料价值和回收率的新商业模型；热那亚市政府升级了该市的废弃物分类厂，并针对新的分类流程为 AMIU 员工举办能力培训。

为促进多方交流与意见交换，热那亚市政府搭建项目平台，广泛邀请利益相关方参与，并与 AMIU 合作开发手机应用程序，及时指导市民进行日常生活垃圾分类工作。2017 年，该市开设了首家“修复咖啡馆（Repair Cafe）”，聚集优秀人才协助民众维修家用电器。另外三家“修复咖啡馆”将于近期内开始运营。

REDESIGN 再设计

REPAIR 再修复

RECYCLE 再回收

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Buildings and Construction

建筑废弃物资源化

Mainstreaming the circular approach and life cycle assessment in local governments' building code regulation, and synergizing with ICLEI's expertise in Building Efficiency Accelerator and GreenClimate Cities to retain the value of building materials as much as possible in the urban system.

在城市的建筑设计规范，引进循环思维与生命周期评估机制，协同宜可城建筑能效加速器项目与绿色气候城市方法学，使建筑材料的价值尽可能保留在城市系统内。

Brummen, the Netherlands

荷兰·布鲁门

| Keywords | *performance contract, redesign, stakeholder engagement*

| 关键字 | 绩效合同、再设计、利益相关方参与

Buildings are temporary destinations of construction materials. With reusability and recyclability well considered, components of buildings could be properly reused after dismantlement. The Town Hall of Brummen is built on a historic structure owned by the Municipality, and is constructed with 90% of its materials that is either reusable or can be properly dismantled. The use of concrete was minimized, and the supporting structure, facade and floors are made with prefabricated wooden components. The building could be easily disassembled after a pre-setting 20-year lifespan, and large timber components will be returned to manufacturers. Instead of purchasing light bulbs, the Municipality signed contracts with lighting companies. The building received the country's first "materials passport", which identifies the destinations of recycled materials.

Close collaboration with stakeholders is the key to make the Town Hall of Brummen circular. Suppliers played a vital role in the design phase, while employees of the Municipality and citizens also engaged in the coordination process since the early stage. A multidisciplinary team of experts were formed to focus on delivering products and systems with the best value at the right price to meet the defined environmental standards.

建筑物只是各种工程材料的临时休息站，而不是建材生命的终点。若充分考虑材料的可重复利用性和可回收性，建材在拆解后将可被适当当地重复使用。荷兰东部城市布鲁门市政府，选择在历史建筑物旧址上修建新市政厅。其中高达 90% 的建筑材料可被重复使用及/或适当拆解拆除。建造过程中，混凝土的使用量被降至最低，并采用预制木结构组建作为建筑的支持结构、门面和地板。在设计过程中即预先设定，当市政厅的 20 年设计使用年限期满，所有材料都可被轻易拆解，大型木制材料也可返还给制造商。另外，市政府并未采购灯具，而是选择与照明服务厂商签订绩效合同，由该厂商一并提供灯具及照明服务的管理、维修和采购。本建安申请并获得荷兰第一本明确载有建材第二生命归宿的“材料护照”。

与利益相关方紧密合作是布鲁门市政厅循环建筑项目成功落实的关键。供应商在设计阶段扮演了关键角色；而市政府的员工和市民也自项目前期积极参与协调过程。项目执行的专业团队由来自多元领域背景的专家组成，专注在符合环境标准的情况下，以最合适的价格提供最具价值的产品和服务系统。

REDESIGN 再设计

REUSE 再利用

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Water-Food-Energy Nexus

水-食物-能源循环网络

Implementing systematic process to link and to close the loops between food-water-energy, and applying nature-based solutions to regenerate Green Circular Cities with nature features.

以系统性思维串联水-食物-能源循环网络，并应用自然解决方案，创建绿色循环城市。

Amsterdam, the Netherlands

荷兰·阿姆斯特丹

| Keywords | *recover, food-water-energy, wastewater treatment*

| 关键字 | 再恢复、水-食物-能源、废水处理

Food-water-energy is a interrelated complex system in which food, water, energy and waste treatment material flows intersect. By replacing the existing sectoral and silo thinking with a systematic process focusing on the linkages among food, water and energy, the nexus approach facilitates the transition towards circular economy. An on-going project in Buikslooterham, a northern district of Amsterdam, aims to build a neighbourhood wastewater biorefinery that converts organic waste into biogas and nutrients for plant fertilization (phosphate and nitrate) via biological processes. As opposed to traditional energy-consuming wastewater treatment systems, the biorefinery connects systems of food and water, and produces energy.

Waternet, the water company in the Netherlands dedicated to the entire water cycle, collaborates with the Government of Amsterdam and 23 partners to develop the innovative water system. The low-temperature heat of grey water (from kitchen sinks, shower and washing machines) will be captured in the biorefinery and used for room heating, and the energy captured from black water (from toilet) will be treated, and the gas will be converted into electricity for vehicles. Phosphate will be extracted from black water and used as fertilizers for growing food.

水-食物-能源是复杂而相连的系统，通过突破单一部门取向的思维，系统性连结食物、水和能源，将有助于迈向循环经济转型。位于荷兰阿姆斯特丹北部的荒废重工业區布克斯羅特漢，正着手进行一个促进水-食物-能源循环的项目。该项目将于当地建造一座以生物炼制技术为基础的废水处理厂，将有机废物转化为沼气，并提炼磷酸盐和硝酸盐等营养物质作为农业用肥料。有别于传统耗能的废水处理系统，此厂不仅可产生能源，更同时串联起食物和水资源循环。

这个创新型废水处理系统项目由致力于促进水循环工作的荷兰公司 Waternet、阿姆斯特丹市政府和 23 个合作伙伴共同开展。厨房水槽、沐浴和洗衣机排放的废水中所含的低温热能，经特殊处理后可用于室内供暖系统；排泄物废水中的沼气，将妥善处理，转为电力，提供区内电动汽车使用，而自污水中提炼出的磷酸盐则将作为肥料用于种植区内农作物。

REDESIGN 再设计

RECOVER 再恢复

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GREEN CIRCULAR CITIES COALITION

绿色循环城市联盟

The Green Circular Cities Coalition is managed by ICLEI — Local Governments for Sustainability, the leading global network of over 1,500 cities, towns and metropolises with the mission to promote global sustainability through local actions. The Coalition Secretariat is hosted by ICLEI East Asia.

“绿色循环城市联盟”项目由宜可城—地方可持续发展协会统筹管理，秘书处设于宜可城东亚秘书处。宜可城—地方可持续发展协会是由全球 1500 多个地方政府及合作伙伴共同组成的合作网络，旨在推动地方行动，支持城镇走向低碳发展，建立韧性。

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