“两山理论”的宁波实践

纪念改革开放四十周年、浙江省八八战略十五周年
暨宁波与世界银行合作城市固废管理和低碳建筑研讨会

WORKSHOP ON NINGBO AND WORLD BANK’S COOPERATION IN SOLID WASTE MANAGEMENT AND LOW-CARBON BUILDING PROJECTS

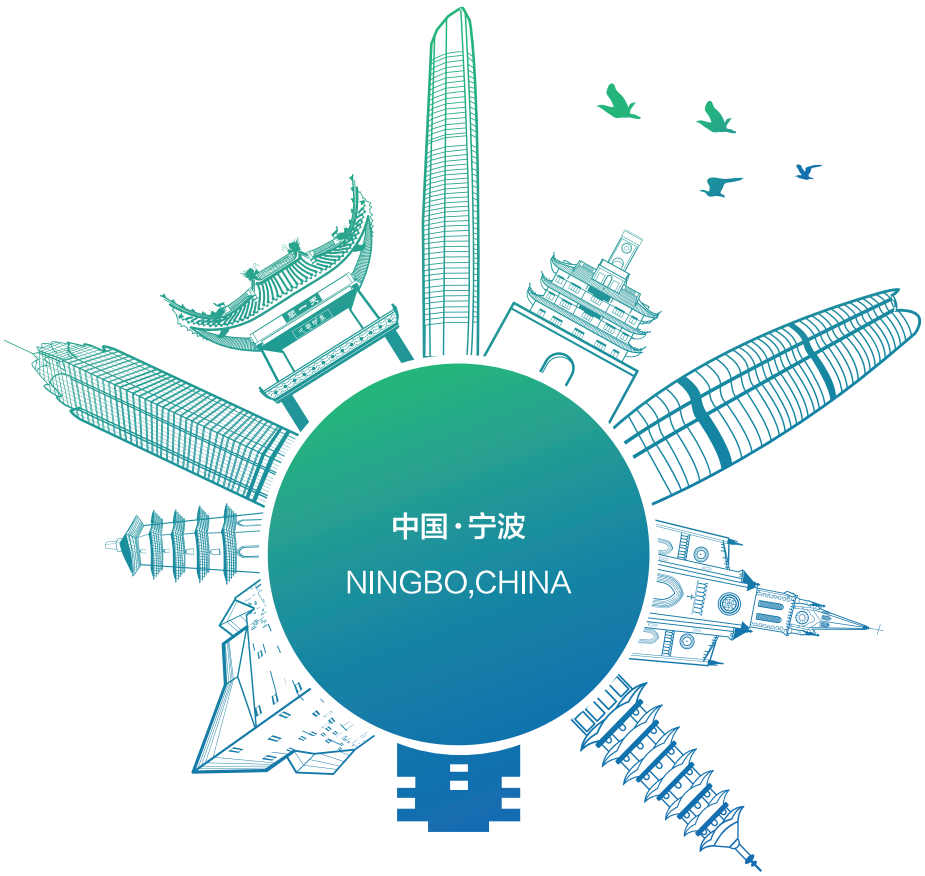
会议手册

MEETING HANDBOOK

中国·宁波　2018年11月8-9日

NINGBO,CHINA　8-9 NOVEMBER 2018

宁波市人民政府 Ningbo Municipal People's Government | THE WORLD BANK IBRD • IDA | gef | 中华人民共和国财政部 Ministry of Finance of the People's Republic of China | 国际财金合作司 | 财政部政府和社会资本合作中心 CPPPC CHINA PUBLIC PRIVATE PARTNERSHIPS CENTER | CDMFUND 中国清洁发展机制基金 CHINA CLEAN DEVELOPMENT MECHANISM FUND


中国·宁波
NINGBO,CHINA

“两山理论”的宁波实践

纪念改革开放四十周年、浙江省八八战略十五周年暨宁波与世界银行合作城市固废管理和低碳建筑研讨会

今年是改革开放四十周年和浙江“八八战略”实施十五周年，十五年来，宁波先后出台《关于推进生态文明建设的决定》等顶层设计，同时以项目为载体，深入践行总书记的“两山理论”，近年来，通过与世界银行合作实施世行贷款宁波城镇生活废弃物收集循环利用示范项目、全球环境基金赠款中国城市规模建筑节能和可再生能源项目宁波子项目和全球环境基金赠款中国城市生活垃圾环境综合管理项目宁波子项目，利用国际经验，结合宁波特色，整体推进城市固体废弃物全流程管理，规模化推进建筑节能和绿色建筑，走出了一条具有宁波特色的绿色发展之路。为进一步推动宁波走在“八八战略”再深化改革开放再出发的前列，总结宁波正在实施的与世界银行合作项目的成效和成功经验，拟举办宁波与世界银行合作城市固废管理和低碳建筑研讨会。

NINGBO PRACTICE OF “TWO-MOUNTAIN THEORY”

IN COMMEMORATION OF THE 40TH ANNIVERSARY OF THE REFORM AND OPENING-UP POLICY AND THE 15TH ANNIVERSARY OF THE ‘EIGHT-EIGHT STRATEGY’ OF ZHEJIANG PROVINCE, WORKSHOP ON THE COOPERATION BETWEEN NINGBO AND THE WORLD BANK IN SOLID WASTE MANAGEMENT AND LOW-CARBON BUILDING PROJECTS

This year marks the 40th anniversary of the reform and opening-up policy and the 15th anniversary of the implementation of the “Eight-eight strategy" in Zhejiang province. Over the past 15 years, Ningbo has issued Decision on Promoting Ecological Civilization Construction and other top-level designs, and practiced in depth through the projects the General Secretary's "two-mountain theory". In recent years, through the implementation of World Bank loan Ningbo Municipal Solid Waste Minimization and Recycling Project, GEF China Urban-Scale Building Energy Efficiency and Renewable Energy Project Ningbo Component, and GEF Grant Municipal Solid Waste Management Ningbo Sub-project, the whole complete-process management of municipal solid waste, along with building energy saving and green building practices on a large scale have been promoted, by applying international experience combined with local characteristics. A path of green development with Ningbo’s characteristics has been set out. In order to further promote Ningbo on the frontier of the implementation of the reform and opening-up policy and the “Eight-eight strategy", and by summarizing the outcome and successful experience from Ningbo Bank-loan projects, a themed workshop on the cooperation between Ningbo and the World Bank in solid waste management and low-carbon building projects has been introduced.

“两山理论”的宁波实践

纪念改革开放四十周年、浙江省八八战略十五周年 | 暨宁波与世界银行合作城市固废管理和低碳建筑研讨会

WORKSHOP ON NINGBO AND WORLD BANK’S COOPERATION IN SOLID WASTE MANAGEMENT AND LOW-CARBON BUILDING PROJECTS

大 | 会 | 议 | 程

11月8日（星期四） 四季厅 9:00–12:00

开 | 幕 | 及 | 致 | 辞

主持人：宁波市人民政府秘书长 张良才

09:00–09:15 浙江省宁波市领导致辞

裘东耀 市长

签 | 约 | 仪 | 式

09:15–09:30 首创集团（宁波首创厨余垃圾处理有限公司）和中国科学院生态环境研究中心（城市与区域生态国家重点实验室）、中国农业科学院农业资源与农业区划研究所、南方科技大学工程技术创新中心（北京）共建“宁波市有机废弃物处理技术重点实验室”（依托宁波厨余垃圾项目）框架协议签约仪式

揭 | 牌 | 仪 | 式

09:30–09:40 园区三家项目公司同时揭牌

裘东耀 市长

09:40–09:55 世界银行领导致辞

Mr. Francis Ghesquiere

社会，城市，农村和灾害风险管理全球发展实践局

东亚和太平洋区 副局长

09:55–10:10 财政部代表致辞

利用国际金融组织资金和智力支持推动城市可持续发展

刘伟华 财政部国际财金合作司 副司长

10:10–10:20 城市生态资产与GEP核算方面的探索

欧阳志云 中国生态学学会 理事长

中科院生态环境研究中心 主任

10:20–10:30 美丽中国的建设者和守护者

——首创集团在“两山理论”指导下的宁波实践

李松平 首创集团 总经理

播 | 放 | 主 | 题 | 片

10:30–10:40 宁波与世界银行合作三个环保项目和宁波市固废处置园区专题记录片

主 | 题 | 发 | 言

10:40–11:00 城镇生活废弃物的收集与循环利用项目架构设计

Frank van Woerden 世界银行 项目经理

11:05–11:20 清洁发展机制基金和PPP业务融合发展推动城市固废管理可持续发展

莫小龙 财政部PPP中心（中国清洁发展机制基金管理中心）副主任

11:25–11:40 建筑节能与绿色建筑的发展形势

胥小龙 住建部建筑节能与科技司节能处 处长

11:45–12:00 POPs履约生活垃圾焚烧二恶英减排与实践

肖学智 生态环境部对外经济合作中心 副主任

11月8日（星期四） 下午

固废管理分会场——考察

13:30–17:00 现场考察点位：水岸心境社区、海曙区生活垃圾分类转运站、宁波市固废处置中心（宁波首创厨余垃圾处理有限公司、宁波明州环境能源有限公司、宁波开诚餐厨废弃物处理有限公司）

低碳建筑分会场——四季厅1

主持人：宁波市住房和城乡建设委员会科技处处长 张顺宝

14:00–14:05 致辞

夏海明 宁波市住房和城乡建设委员会 副主任

14:05–14:45 LOCAL城市形态和绿色建筑国际最佳案例分享

Christophe de Gouvello 世行能源部门 主任

14:45–15:25 从国别实践看宁波市可持续建筑高质量发展的前景

何建清 中国可持续发展研究会 理事兼副秘书长

15:25–15:40 茶歇

15:40–16:20 绿色金融及其在低碳建筑领域的应用

施轶晖 HZ资本（香港）合伙人

16:20–17:00 公共建筑能效提升面临的困境及突破方案

龙胜平 华东师范大学 教授、东方低碳 联席董事长

11月9日（星期五）城市固废管理分会场 四季厅1 9:00–12:00

主 题 发 言

主持人：宁波市城管局副局长 陆东晓

09:00–09:15 两山理论、两山经济与城市绿色发展

傅 涛 E20环境平台 董事长、首席合伙人
清华海峡研究院生态中国创新中心 主任

09:20–09:40 城镇生活废弃物焚烧厂运行的最佳环境实践

杨 宁 世界银行 项目经理

“两山理论的宁波实践”高峰对话

09:50–10:50 以城镇生活废弃物的收集与循环利用为切入点，共同探讨两山理论的实践经验，探索城市绿色发展之路

（兼对话主持）傅 涛 E20环境平台 董事长、首席合伙人
清华海峡研究院生态中国创新中心 主任

周宏春 国务院发展研究中心 研究员

徐海云 中国城市建设研究院有限公司 总工程师

刘建国 清华大学环境学院 教授

王光旭 宁波市发改委 总经济师

主 题 发 言

10:50–11:10 完善绿色发展价格机制，促进城市固废管理兼宁波项目成果汇报

潘 功 E20环境平台 固废产业研究中心 负责人

专 家 对 话

11:10–12:00 发挥市场机制作用（PPP、价格机制、融资、绩效监管）促进城市固废管理

（兼对话主持）薛 涛 E20环境平台 执行合伙人、E20研究院 执行院长
国家发改委、财政部PPP双库定向邀请专家

易 赟 财政部金融司金融五处 副处长

夏颖哲 财政部PPP中心推广部 主任

赵宝根 宁波市物价局收费处 处长

11月9日（星期五）城市固废管理分会场 四季厅1 14:00–17:00

主 题 发 言

14:00–14:20 让我们的家园远离垃圾困扰
——首创环境在固废处理领域的实践

曹国宪 首创环境 总裁

14:20–14:40 从源头到终端生活垃圾分类/餐饮及厨余有机固废处理：宁波模式及开诚系统工艺技术解决服务方案

郭明龙 宁波开诚生态技术有限公司

14:40–15:00 康恒环境宁波垃圾焚烧发电项目建设与运营实践

焦学军 康恒环境 总经理

高 端 对 话 一

15:00–16:00 资源循环利用基础设施的互联互通

（兼对话主持）余 宁 宁波市市容环境卫生管理处 处长
宁波市生活垃圾分类管理中心 主任

何锡明 宁波市生活垃圾分类管理中心 副主任

胡再春 首创环境 副总裁

朱华伦 开诚生态 总经理

焦学军 康恒环境 总经理

高 端 对 话 二

16:00–17:00 以城市固废处置设施PPP模式的应用实践
探讨如何利用PPP方式推进政府部门管理方式的变革

（兼对话主持）李德健 宁波市财政局

薛 涛 E20环境平台 执行合伙人、E20研究院 执行院长
国家发改委、财政部PPP双库定向邀请专家

阮书英 宁波城管局计划财务处 处长

周兰萍 中伦律师事务所

陈婷婷 中化咨询公司

11月9日（星期五）低碳建筑分会场 百合厅 9:00–12:00

主持人：宁波市住房和城乡建设委员会科技处处长 张顺宝

09:00–09:40 中国绿色发展的二个动向

王有为 中国绿色建筑委员会 主席

09:40–10:20 城市公共建筑节能机制创新及效果核定

殷 帅 住建部科技发展促进中心 副研究员

10:20–10:40 茶歇

10:40–11:20 绿色建筑性能后评估研究与应用

杨建荣 上海建科院 副院长

11:20–12:00 国内外绿色校园标准的环境需求对比

刘 猛 重庆大学 教授

11月9日（星期五）低碳建筑分会场 百合厅 14:00–16:45

主持人：宁波市住房和城乡建设委员会科技处处长 张顺宝

14:00–14:40 绿色建筑技术适宜性应用及评价

吕石磊 天津大学 教授

14:40–15:30 宁波市大型公共和商业建筑能效对标促进能效提升的探索和实践

巩学梅 宁波工程学院 副教授

15:30–15:50 茶歇

15:50–16:30 基于“多规融合”的绿色建筑专项规划

林 敏 宁波华聪建筑节能科技公司 总经理助理

16:30–16:45 会议总结

张顺宝

NINGBO PRACTICE OF "TWO-MOUNTAIN THEORY"

IN COMMEMORATION OF THE 40TH ANNIVERSARY OF THE REFORM AND OPENING-UP POLICY AND THE 15TH ANNIVERSARY OF THE 'EIGHT-EIGHT STRATEGY' OF ZHEJIANG PROVINCE, WORKSHOP ON THE COOPERATION BETWEEN NINGBO AND THE WORLD BANK IN SOLID WASTE MANAGEMENT AND LOW-CARBON BUILDING PROJECTS

AGENDA

8th November (Thursday) Morning

9:00 a.m.-12:00 a.m., Four Seasons Hall

1) Opening & address

Host: Mr. ZHANG Liangcai, Secretary General of Ningbo Municiple People's Government

09:00 a.m.-09:15 a.m. Speech by Mr.QIU Dongyao, Mayor of Ningbo Municiple People's Government

2) Documentaries

09:15 a.m.-09:30 a.m. Framework agreement signing ceremony of "Ningbo Key Laboratory of Organic Waste Treatment Technology" (based on Ningbo Municipal Solid Waste Minimization and Recycling Project), jointly established by Beijing Capital Group Co., Ltd (Ningbo Shouchuang Kitchen Waste Treatment Co., Ltd.), Research Center for Eco-Environmental Science, Chinese Academy of Sciences (State Key Laboratory of Urban and Regional Ecology), Institute of Agricultural Resources And Regional Planning, Chinese Academy of Agricultural Sciences, and Engineering Technology Innovation Center, Southern University of Science and Technology (Beijing).

3) Unveiling ceremony

09:30 a.m.-09:40 a.m. Unveiling of three project companies

Mr.QIU Dongyao, Mayor of Ningbo Municiple People's Government

09:40 a.m.-09:55 a.m. Speech given by representative of World Bank

Speaker: Mr. Francis Ghesquiere, Practice Manger, Social, Urban, Rural and Resilience Global Practice

09:55 a.m.-10:10 a.m. Speech given by representative of Ministry of Finance on Promoting sustainable urban development by introducing financial and intellectual resources from international financial organizations

Speaker: Mr. LIU Weihua, Deputy Inspector of Department of International Economic and Financial Cooperation, Ministry of Finance

10:10 a.m.-10:20 a.m. Exploration of urban ecological assets and GEP calculations.

Speaker: Mr. OUYANG Zhiyun, Chairman of Ecological Society of China, and Director of Research Center for Eco-Environmental Science, Chinese Academy of Sciences.

10:20 a.m.-10:30a.m. Speech given by Mr. LI Songping, the general manager of Beijing Capital Group Co., Ltd.

4) Signing ceremony

10:30 a.m.-10:40 a.m. Documentaries of the three World Bank Ningbo environmental protection projects and the municipal solid waste disposal zone.

5) Keynote speech

10:40 a.m.-11:00 a.m. Keynote speech: Project Design of Municipal Solid Waste Minimization and Recycling Project

Speaker: Mr. Frank van Woerden, World Bank Project Manager.

11:05 a.m.-11:20 a.m. Keynote speech: Promoting sustainable development of municipal solid waste management with the integration of Clean Development Mechanism Fund and PPP business

Speaker: Mr. MO Xiaolong, Deputy Director of Public-Private-Partnership Management Center (China Clean Development Mechanism Fund Management Center), Ministry of Finance

11:25 a.m.-11:40 a.m. Keynote speech: Trend of development of building energy conservation and green buildings

Speaker: Mr. XU Xiaolong, Director, Division of Energy Efficiency Department of Building Energy and Science & Technology, Ministry of Housing and Urban-Rural Development

11:45 a.m.-12:00 a.m. Keynote speech: Practice in Fulfillment of dioxin and other POPs emission reduction

Speaker: Mr. XIAO Xuezhi, Deputy Director of Foreign Economic Cooperation Office, Ministry of Ecology and Environment

8th November (Thursday) Afternoon

Municipal Solid Waste Management Sub-Forum

13:30 p.m.-17:00 p.m.

Site visit route arrangement: Shuianxinjing community, Haishu District Municipal Solid Waste Transfer Station, Ningbo Municipal Solid Waste Treatment Center. (Ningbo Shouchuang Kitchen Waste Treatment Co., Ltd, Ningbo Mingzhou Environmental Energy Co., Ltd, Ningbo Kaseen Kitchen Waste Treatment Co., Ltd)

Low Carbon Building Sub-Forum

14:00 p.m.-17:00 p.m., Four Seasons Hall

Host: Mr. ZHANG Shunbao, Director of the science and technology department of Ningbo Housing and Urban-Rural Development Committee

14:00 p.m.-14:05 p.m. Mr. XIA Haiming, Deputy Director of Ningbo HURDC

14:05 p.m.-14:45 p.m. International Best Practices in LoCAL Urban Form and Green Buildings (Mr. Christophe de Gouvello, World Bank Energy Sector Coodinator)

14:45 p.m.-15:25 p.m. The Prospect of High-Quality Development of Sustainable Building in Ningbo From the Perspective of Other Nations' Practices (Mr. HE Jianqing, Director and deputy secretary-general of Chinese Society of Sustainable Development)

15:25 p.m.-15:40 p.m. Tea Break

15:40 p.m.-16:20 p.m. Green Finance and its Application in Low-Carbon Buildings (Mr. SHI Yihui, Partner of HZ Capital Limited)

16:20 p.m.-17:00 p.m. Difficulties and Solutions for Improving the Power Efficiency of Public Buildings (Prof. LONG Shengping, Professor from the East China Normal University and co-chairman of East Low Carbon)

9th November (Friday) Morning

Municipal solid waste management sub-forum

9:00 a.m.-12:00 a.m., Four Seasons Hall

Host: Mr. LU Dongxiao, Deputy Director of Ningbo Urban Administration Bureau

1) Keynote Speech

09:10 a.m.-09:25 a.m. "Two-Mountain Theory", "Two-Mountain Economy" and Urban Green Development
Speaker: Mr. FU Tao (Dialogue Host), E20 Environment Platform Chief Partner, Chief of E20 Institute of Environment Industry

09:30 a.m.-09: 50 a.m. Practices in the Best Environment for the Operation of Municipal Solid Waste Incineration Plant
Speaker: Mr. YANG Ning, World Bank Project Manager.

2) Summit Dialogue on "Ningbo Practice of Two-mountain Theory"

09:50 a.m.-10:50 a.m. Content: From the Entry Point of Municipal Solid Waste Minimization and Recycling, Discussion on the Practical Experience of Two-Mountain Theory and the Path of Green Urban Development.
Dialogue Guests:
Mr. FU Tao (Dialogue Host), E20 Environment Platform Chief Partner, Chief of E20 Institute of Environment Industry
Mr. ZHOU Hongchun, Section Chief of Social Development Research Department, Development Research Center of the State Council
Mr. XU Haiyun, Chief engineer of China Urban Construction & Research Institute Co., Ltd
Mr. LIU Jianguo, Professor from School of Environment, Tsinghua University
Mr. WANG Guangxu, Chief Economist of Ningbo Development and Reform Committee

3) Keynote Speech

10:50 a.m.-11:10 a.m. A report on Improving price mechanism for green development and promoting urban solid waste management, as well as outcome presentation of Ningbo Project
Speaker: Dr. PAN Gong, Director of Solid Waste Industry Research Center, E20 Environment Platform

4) Experts Dialogue

11:10 a.m.-12:00 a.m. Content: Give full play to the role of market mechanism (PPP, price mechanism, financing and performance supervision) and promote urban municipal waste management
Dialogue Guests:
Mr. XUE Tao (Dialogue Host), E20 Environment Platform Chief Partner, Chief of E20 Institute of Environment Industry, an expert invited by National Development and Reform Commission and PPP Division, Ministry of Finance
Mr. YI Yun, Deputy Chief of No.5 Financial Department, Ministry of Finance
Mr. XIA Yingzhe, Director of Promotion Division, Public-Private-Partnership Management Center, Ministry of Finance
Mr. Zhao Baogen, Director of Tariff Division, Ningbo Price Bureau

9th November (Friday) Afternoon

Municipal solid waste management sub-forum

14:00 p.m.-17:00 p.m., Four Seasons Hall

1) Keynote Speech

14:00 p.m.-14:20 p.m. Topic to be confirmed
Speaker: Mr. CAO Guoxian, CEO of Beijing Capital Group Co., Ltd

14:20 p.m.-14:40 p.m. Waste Separation and Kitchen and Food Waste Treatment from Source to Terminal: Ningbo Mode and Kaseen System Process and Technology Solutions
Speaker: Mr. GUO Minglong, Ningbo Kaseen Technology Co., Ltd

14:40 p.m.-15:00 p.m. Topic: SUS Environment Ningbo Waste Incineration Power Generation Project Construction and Operation Practice
Speaker: Mr. JIAO Xuejun, General Manager of SUS Environment

2) High-Level Dialogue

Dialogue (1)

*15:00 p.m.-16:00 p.m.*Interconnection of Resource Recycling Infrastructures
Dialogue Guests:
Ms. YU Ning (Dialogue Host), Director of Ningbo Environment and Sanitation Management Office
Mr. HE Ximing, Deputy Director of Ningbo Waste Separation Management Center
Mr. HU Zaichun, Vice President of Beijing Capital Group Co., Ltd,
Kaseen Technology Co., Ltd,
Mr. JIAO Xuejun, General Manager of SUS Environment
Mr. ZHU Hualun, General Manager of Kaseen Ecology

Dialogue (2)

16:00 p.m.-17:00 p.m. Based on the Application Practice of PPP Mode in Municipal Solid Waste Disposal Facilities, Discussion on How to Use PPP Mode to Promote the Reform of Government Departments' Management Modes
Dialogue Guests:
Mr. LI Dejian (Dialogue Host), Ningbo Finance Bureau
Mr. XUE Tao, Executive Partner, Executive Dean of E20 Research Institute, Expert in two pools
Ms. RUAN Shuying, Director of Planning and Finance Division, Ningbo Urban Management Bureau
Ms. ZHOU Lanping, Zhonglun Law Firm
Ms. Chen Tingting, SinoChem Consulting Company

9th November (Friday) Morning

Low Carbon Building Sub-Forum

9:00 a.m.-12:00 a.m., Lily Hall

Host: Mr. ZHANG Shunbao, Director of the science and technology department of Ningbo Housing and Urban-Rural Development Committee

1) Keynote Speech

09:00 a.m.-09:40 a.m. Two Trends in China's Green Development
Speaker: Mr. WANG Youwei, President of China Green Building Council.

09:40 a.m.-10:20 a.m. Ningbo's Public Building Energy Conservation Mechanism Innovation and Verification on its Effectiveness
Speaker: Mr. YIN Shuai, Deputy Research Fellow, Center of Science Technology and Industrialization, Ministry of Housing and Urban-Rural Development

10:20 a.m.-10:40 a.m. Tea break

10:40 a.m.-11:20 a.m. Post-evaluation Research and Application of Green Building Performance
Speaker: Mr. YANG Jianrong, Vice President of Shanghai Research Institute of Building Science Group

11:20 a.m.-12:00 a.m. Comparison of Domestic and International Environmental Requirements of Green Campus Standards.
Speaker: Prof. LIU Meng, Professor of University of Chongqing.

9th November (Friday) Afternoon

14:00 p.m.-16:45 p.m., Lily Hall

Host: Mr. ZHANG Shunbao, Director of the science and technology department of Ningbo Housing and Urban-Rural Development Committee

1) Keynote Speech

14:00 p.m.-14:40 p.m. Application and Evaluation of Green Building Technology Suitability
Speaker: Prof. LV Shilei, Professor of University of Tianjin.

14:40 p.m.-15:30 p.m. Exploration and Practice of Energy Efficiency Improvement of Large Public and Commercial Building Energy Efficiency Benchmarking in Ningbo.
Speaker: Associate Prof. GONG Xuemei, Associate Professor of Ningbo University of Technology.

15:30 p.m.-15:50 p.m. Tea break

15:50 p.m.-16:30 p.m. Green Building Special Plan Based on "Multi-Regulation Integration".
Speaker: Mr. LIN Min, General Manager Assistant of Ningbo Huacong Building Energy Conservation Technology Co., Ltd.

16:30 p.m.-16:45 p.m. Wrap-up Meeting (Mr. ZHANG Shunbao)

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宁波概况

宁波简称“甬”，位于东海之滨，北临杭州湾，居我国大陆海岸线的中段、长三角东南隅，是我国首批对外开放的沿海港口城市和计划单列市，也是全国 15 个副省级城市之一。宁波设海曙、江北、镇海、北仑、鄞州、奉化六个区，余姚、慈溪两个县级市，宁海、象山两个县。全市陆域总面积 9816 平方公里，其中市区面积 3730 平方公里；全市海域总面积 8355.8 平方公里；截至 2017 年底，全市户籍人口 596.9 万人，其中市区人口 289.6 万人，全市常住人口 800.5 万人。2017 年，宁波实现地区生产总值 9847 亿元，增长 7.8%；完成财政总收入 2415.8 亿元、增长 12.4%，其中一般公共预算收入 1245.1 亿元、增长 10.9%。城镇新增就业 19.5 万人，城乡居民收入分别达到 5.5 万元和 3 万元，分别增长 7.9%和 8%。

宁波主要有四大特色：

东方大港

宁波是“海上丝绸之路”的始发地之一，唐宋以来一直是我国对外贸易的重要口岸。宁波港拥有 1200 余年历史，30 万吨级巨轮可畅行无阻，40 万吨级以上的超级巨轮可候潮进出，是中国大陆进出 10 万吨级以上超级大型巨轮最多的港口。宁波舟山港由北仑、洋山、六横、衢山、穿山、金塘、大榭、岑港、梅山、嵊泗、岱山、镇海、白泉、马岙、定海、石浦、象山港、甬江、沈家门等 19 个港区组成，拥有万吨级以上大型深水泊位 150 多座，5 万吨级以上的大型、

ABOUT NINGBO

Ningbo, or Yong as it is locally known, is located in the middle of the coastal line of Chinese Mainland and in the South of the Yangtze River Delta, by the East China Sea and bordering Hangzhou Bay to the north. Ningbo is one of the first cities opening up to the outside world and Separate Planning Cities which enjoy the same rights as a province in local economic management, as well as one of the 15 sub-provincial cities in China. There are six districts under Ningbo's jurisdiction: Haishu, Jiang¬bei, Zhenhai, Beilun, Yinzhou, and Fenghua; two county-level cities: Yuyao and Cixi; and two counties: Ninghai and Xiangshan. The city covers 9,816km^2 on land (includ¬ing 3,730km^2 of urban area) and 8,355.8km^2 at sea. As of the end of 2017, the city had a population of 8 million, including 5.97 million registered residents; 2.9 million resided in urban areas. In 2017, Ningbo achieved a GDP of 984.7 billion yuan, up by 7.8%. Total fiscal revenue reached 241.58 billion yuan, increasing by 12.4%. The public budgetary revenue was 124.51 billion yuan, up by 10.9%. A total of 195,000 new jobs were created. Per capita incomes of residents in urban and rural areas were 55,000 yuan and 30,000 yuan respectively, increasing by 7.9% and 8%.

Ningbo features the great port in the east, the commercial metropolis, the place with rich culture and the green city.

Great Port in the East

As one of the starting points of “Silk Road on the Sea”, Ningbo has been an important port for foreign trade since the Tang Dynasty (618-907 A.D.). With a history of more than 1200 years, the port can easily accommodate 300,000-DWT vessels, and up to 400,000-DWT vessels

特大型深水泊位 90 多座，是中国大型和特大型深水泊位最多的港口。2017 年，宁波舟山港完成货物吞吐量 10.1 亿吨，成为全球首个突破“10 亿吨”的大港，并连续 9 年位居世界第一；集装箱吞吐量达到 2460.7 万标准箱，蝉联世界第四位。

商贸之都

宁波是一块充满工商灵气的土地，素有“无宁不成市”的美誉。宁波人以善于经商而闻名于世，现有 30 多万海外侨胞旅居世界 64 个国家和地区，涌现了包玉刚、王宽诚、邵逸夫等一大批工商巨子，形成了享誉海内外的“宁波帮”。民营经济高度发达是商城宁波的最大特色，也是“宁波活力”和市场机制的主要源泉。截至 2017 年底，全市累计实有内资企业 332152 户，注册资本（金）42660.26 亿元；其中私营企业 313056 户，注册资本（金）36655 亿元。累计实有个体工商户 518495 户，资金数额 405.53 亿元；累计实有外商投资企业 9325 户，投资总额 985.18 亿美元，注册资本 602.84 亿美元。宁波是全国开放经济大市。2017 年，全市进出口、出口、进口分别为 7600.1 亿元、4984.1 亿元、2616.0 亿元，分别居 36 个省市第 10 位、第 8 位、第 11 位。

at high tide. No other port on the Chinese mainland re¬ceives a larger number of hundred-thousand-ton ships than the Ningbo-Zhoushan Port. The port consists of 19 areas: Beilun, Yangshan, Li¬uheng, Qushan, Chuanshan, Jintang, Daxie, Cengang, Meishan, Shengsi, Daishan, Zhenhai, Baiquan, Ma’ao, Dinghai, Shipu, Xiangshan Port, Yongjiang, Shenjiamen, etc. The port has 150 berths of over 10,000 DWT, and more than 90 of over 50,000 DWT, outperforming its counterparts nationwide. In 2017, the port handled 1.01 billion tons of cargo, breaking global records and maintaining its top position in the world for the ninth consecutive year; the container volume handled by the port reached 24.607 million TEU, rank¬ing fourth in the world.

Commercial Metropolis

Ningbo has been a renowned commercial city from of old. There is not any single market existing without a businessman from Ningbo. The city is world-famous for its merchants. At the moment, there are 300,000 “Ningbo merchants” and their descendants living in 64 countries and regions oversea. Some of them are world-class industrial and commercial giants, for example, Y K Bao, called the king of shipping in the world, Kuanchen Wang, chairman of the Chinese General Chamber of Commerce, Run Run Shao, king of the film industry and so on. A highly developed private sector is the most distinctive feature of Ningbo, as well as the main force behind the city’s dynamic socioeconomic development. As of the end of 2017, there are in total 332,152 domestic Chinese enterprises in Ningbo, with a total registered capital of 4.27 trillion yuan. Among them are 313,056 private enterprises, with a total registered capital of 3.67 trillion yuan. The total number of individually-owned businesses is 518,495 with total capital standing at 40.55 billion yuan. There are also in total 9,325 foreign-invested companies, with an investment totaling US$98.52 billion, and a registered capital of US$60.28 billion. Ningbo is a major city with an open economy. In 2017, the total foreign trade volume, export volume, and import volume reached 760.01 billion yuan, 498.41 billion yuan, and 261.60 billion yuan respectively, ranked 10th, 8th, and 11th in 36 provinces, municipalities and autonomous regions in China respectively.

文化名邦

宁波海洋文明与陆域文明兼蓄，古越文化与中原文化共融，史前文化、浙东学术文化蔚为大观，是中华文明的发祥地之一，为国家历史文化名城和首批全国文明城市。市内古迹众多，拥有 7000 年历史的河姆渡文化遗址，全国最古老的私家藏书楼天一阁等。截至目前，宁波全市现有各级文物保护单位（点）1656 处，其中国家级 31 处，省级 87 处。现有国家级历史文化名镇 3 座（慈城、石浦、前童）；市级以上非物质文化遗产项目 190 项，其中国家级 25 项，市级以上非物质文化遗产传承人 94 名，其中国家级 9 名。宁波人才辈出，涌现过王阳明、黄宗羲、沙孟海等一批文化名人和童第周、谈家桢、路甬祥等著名科学家，在中国科学院与中国工程院中，宁波籍的院士有 116 名，居全国各城市之首。

生态绿城

宁波兼具江南水乡和滨海城市特色，是首批中国优秀旅游城市、国家卫生城市、园林城市、环保模范城市，被评为中国大陆最具幸福感城市和公众首选宜居城市。2017 年，中心城区空气质量优良率达到 85.2 %，同比提高 0.5 个百分点，PM2.5 降至 37 微克 / 立方米，同比下降 5.1 %，雾霾天 38 天，同比减少 29 天，地表水优良率达到 71.3%，同比提高 22.5 个百分点，水环境质量大幅改善。

The Place with Rich Culture

As one of the birthplaces of Chinese civilization, Ningbo is a national famous city for historical culture and one of the first socially developed cities in China. There are many cultural heritage units including the Neolithic Hemudu Culture Relics with the history of 7000 years, the Tianyi Pavilion which is the oldest private library in China etc... At present, Ningbo has 1,656 heritage protection sites, including 31 sites recognized by the central government and 87 by the provincial government. There are also three national historical towns (Cixi, Shipu, and Qiantong), 190 intangible heritage projects recognized by municipal (or higher level) authorities (including 25 recognized by the national government), and 94 inheritors of intangible heritage (9 of whom are recognized by the national government). Ningbo possessed many talented people, for example, Wang Yangming and Huang Zongxi, the great philosophers, Sha Menghai, the well-known calligrapher, Tong Dizhou, Tan Jiazhen and Lu Yongxiang, the famous scientists. Among the academicians at Chinese Academy of Engineering and Chinese Academy of Science, 116 are from Ningbo, a figure that ranks No.1 among Chinese cities.

The Green City

Ningbo has blended its traditional charm and coastal prosperity in a unique balance, is among the first China Top Tourism Cities, the Cities with the cleanest environment in China, the National Garden Cities, the National Model Cities of Environmental Protection, the Cities with its citizens having the strongest sense of happiness in China, and the Cities with the most favorable residential conditions in China. In 2017, the air quality in the urban area of the city was good for 85.2% of the time, up by 0.5% year-on-year; PM2.5 density was down by 5.1% to 37mg/m3. There were 38 smog days, 29 days fewer compared with the previous year. A total of 71.3% of surface water is of good or excellent quality, up by 22.5%, a significant progress.

世行贷款宁波市城镇生活废弃物收集循环利用示范项目简介

WORLD BANK-FINANCED NINGBO MUNICIPAL SOLID WASTE MINIMIZATION AND RECYCLING PROJECT

世行贷款宁波市城镇生活废弃物收集循环利用示范项目简介

世行贷款宁波市城镇生活废弃物收集循环利用示范项目是宁波市与世界银行合作开展的重大民生工程。项目目标是建立完整的和现代化的生活废弃物分类投放、分类收集、分类运输、分类处置与循环利用的设施体系，加强对生活废弃物的管理，提高回收利用的比例,提高末端安全性,减少填埋和焚烧的份额，使宁波生活废弃物实现源头减量、资源化循环利用，并提高公众垃圾分类的意识与参与度。

项目总投资 15.26 亿元人民币，其中世行贷款 8000 万美元，实施期为 2014–2020 年，实施范围为宁波中心城区。主要内容包括居民家用和小区垃圾分类容器及垃圾袋，垃圾收集车辆，新建 6 个垃圾分类转运站及分选中心，新建厨余垃圾处理厂，新建和改建小区分类垃圾房和投放点位，对现有处于中心地段小型垃圾转运站进行改造转型，垃圾分类的宣教和培训，小区垃圾分类督导员的聘用，宁波市垃圾分类工作法律法规的制定、生活垃圾收费机制的研究、社区参与外部监测与激励机制研究、智慧环卫信息管理系统的建立等。

2013 年底，世界银行贷款宁波市城镇生活废弃物循环利用示范项目正式启动，根据世行要求，按照统一规划、统一设计、统一采购、统一监理的原则实施本项目。宁波市制定了生活垃圾分类规范，采用“四

WORLD BANK-FINANCED NINGBO MUNICIPAL SOLID WASTE MINIMIZATION AND RECYCLING PROJECT

The World Bank-financed Ningbo Municipal Solid Waste Minimization and Recycling Project (hereafter 'the Project') is a major livelihood project jointly carried out by Ningbo Municipality and the World Bank. The objective of this project is to establish a complete and modern facility system for waste separation, separated collection, separated transportation, and separated disposal, to strengthen municipal waste management, increase recycling resource, enhance safe end-point disposal, and reduce landfill and incineration volume. Therefore, it is achievable to reduce Ningbo's waste volume at the sourcing point, promote resource recovery, and increase public's awareness and participation on waste separation.

The total investment of the project is 1.526 billion RMB, of which the World Bank loan is 80 million USD. The implementation period is 2014-2018, and the implementation scope is the central area of Ningbo. The main contents include household and community waste containers and waste bags purchase, waste collection vehicles, 6 new waste transfer stations and sorting center, new kitchen waste treatment plant, waste separation publicity, educational campaign and training, and recruitment for community waste separation supervisors. It also formulates laws and regulations for waste separation in Ningbo, conducts study on municipal waste charging mechanism, organizes research on community participation in external monitoring and incentive mechanism, and establishes a smart sanitation information management system.

The Project was officially launched at the end of 2013, and implemented as per World Bank requirement with the principles of unified planning, unified design, unified procurement, and unified supervision. Ningbo has formulated municipal waste separation specification and apply the method of 'separation in four categories', which are kitchen waste (food waste), recyclables, hazardous waste and other waste.

分类法”，分别是厨余垃圾（餐厨垃圾）、可回收物、有害垃圾和其它垃圾。

经过五年的探索和实践，初步构建了生活垃圾分类管理网络、分类设施体系。截止 2018 年 11 月，宁波市中心城区生活垃圾分类覆盖面达 89% 万户。其中宁波市党政机关生活垃圾分类覆盖率已达 100%，全市相继建立起示范性的单位、学校及小区。宁波市分类基础已基本完善，全市生活垃圾处置做到了零填埋。经过 5 年的不断完善，目前宁波市厨余垃圾、可回收物、有害垃圾和其他垃圾收运处置体系都已基本建立，其中厨余垃其它垃圾由城管部门负责、可加收垃圾由供销部门统筹、有害垃圾由城管部门和环保部门协同。2017 年，中心城区共收运处置厨余垃圾 6.96 万吨，餐厨垃圾 15.96 万吨，可回收物 164 万吨，有害垃圾 5.2 万吨，其它垃圾 369.73 吨。

目前正在实施的世行贷款宁波城镇生活废弃物循环利用示范项目，是世行在全球首个涉及居民生活垃圾源头分类的项目，其中厨余垃圾处理厂子项目是世行在中国的第一个 PPP 项目，在世行的指导和参与下，作为宁波市第一个规范的 PPP 模板项目，把世行采购政策和中国的 PPP 实践结合，改变了过去传统的项目管理形式，改变了世行贷款项目仅仅是解决融资渠道的传统思维。特别是世行设计的基于成果的社区激励制度贯穿项目实施的整个过程中，用绩效支付报账手段评价社区垃圾分类的成效是中国项目首创。项目主要体现了六大创新：

一、一体化一次性设计生活废弃物分类投放、分类收集、分类运输、分类处置体系，分步实施。充分体现源头分类，资源循环利用，尽量减少垃圾填埋和焚烧。厨余垃圾和其他垃圾通过源头分类，由各自的收集车送至分类转运站压缩打包，分别送往厨余垃圾处理厂和生活垃圾焚烧发电厂进行处理；可回收物通过居民自主变卖或物业集中收集后变卖给附

After five years’ exploration and practice, it preliminary set up the municipal solid waste separation management network and facility system. As of November 2018, 89% of the Ningbo central areas have participated in municipal waste separation, while it is 100% for party and government organs in Ningbo. Several demonstration institutions, schools and communities have been set up across the city. In addition, waste separation facilities are basically improved. None of Ningbo’ municipal solid waste is disposed to landfill. After five years’ continuous improvement, waste collection and disposal facilities are generally set up for kitchen waste, recyclables, hazardous waste and other waste. Among them, other waste and kitchen waste are managed by Ningbo Urban Administration Bureau, recyclables are supervised by supply-market cooperative. Hazardous waste is cooperatively managed by Ningbo Urban Administration Bureau and environmental protection departments. In 2017, there were 69,600 tons of kitchen waste, 159,600 tons of food waste, 1.64 million tons of recyclables, 52,000 tons of hazardous waste, and 369.73 tons of other waste being collected, transported and disposed across central Ningbo.

This Project is the world's first project involving residents’ waste separation at the sourcing point. The kitchen waste treatment plant subcomponent is the World Bank's first PPP project in China. This PPP project, under the guidance and participation of the World Bank, as the first standardized PPP demonstration project in Ningbo, combines the World Bank procurement policy with China's PPP practices, changes the previous traditional project management mode, and changes the traditional concept that World Bank loan is purely used for financing. What is more, the output-based community incentive system designed by the World Bank throughout the project implementation is the very first and innovative application in China, which evaluating the effectiveness of community waste separation quality using performance-based payment. There are six innovative features involved in this project:

The first innovation is the integrated and comprehensive system design of municipal solid waste management, including its separated distribution, separated collection, separated transportation, and separated disposal, and its step-by-step implementation, which fully reflecting the concept of solid waste separation at the sourcing point, maximizing resource recycling, and minimizing landfill and incineration. The kitchen waste and other waste are sorted at source, and sent to the sorting and transfer station by waste collection vehicles, followed by transferring to kitchen waste treatment plant or municipal solid waste incineration power plant for final disposal. Recyclables are sold by residents or collected by the estate management and sold to nearby recyclables collection point, where processed by manually separation

近的资源回收站，经人工筛拣后送至下游，纸张、塑料、金属、玻璃等各类资源再生企业回收利用；有害垃圾通过社区小区定时定点收集、辖区环卫按需转移、处置企业定期上门运输的模式，收运至有害垃圾处置厂，经过高温焚烧、螯合填埋、以及专业拆解等工艺进行无害化处理。

二，融合社会管理体制创新，建立了市、区、街道三级垃圾分类管理网络；设定了街道、社区居委会、小区物业（街道保洁中心）、小区垃圾分类督导员、楼道长 / 楼组长相关项目参与方的职责安排和基于成果的考核奖励机制制度安排，设计详细的垃圾分类宣传、教育、培训方案。

三，结合智慧城市建设设计管理系统框架，确保实施源头垃圾分类基于成果的考核制度。首次引入二维码到居民垃圾袋上，通过小区垃圾分类督导员手持的"智慧环卫通"准确定位每户家庭垃圾分类质量，详细的每户垃圾产生数据库信息将为今后垃圾收费机制的建立打下基础；小区分类垃圾桶植入 RFID 卡，分类垃圾收运车安装环卫智能系统实现垃圾收运模式的优化和改良。通过垃圾分类的绩效考核，可以说是作为资金分配或者社区激励的一个实用的工具，它很好地把绩效评价的作用给发挥起来了，与财务管理、项目管理结合起来了，让绩效评价不是一个事后的工作环节，从目前的预算绩效逐步向国际接轨转为绩效预算，如何保证好的制度设计的有效实施，将是确保生活垃圾实现有效源头分类的制度保证。

四、实现居民小区垃圾投放设施规范化改造和中心城区垃圾收运模式的流程再造，彻底改变目前小型垃圾转运站给周边居民带来的环境问题，截止 2018 年 11 月，累计完成垃圾房新改建 848 座，改造投放点位 9984 个，即将对现有处于中心地段的 22 座小型垃圾转运站进行改造转型。

and transferred to downstream. Paper, plastic, metal, glass and other resource will be recycled in recycling enterprises. Hazardous waste are collected at the community specific point at regular intervals, removed by administrative environmental sanitation departments as needed, and transported by companies for disposal at regular intervals to hazardous waste treatment plant. They are treated harmlessly via high-temperature incineration, absorption and landfill and professional disassembly.

The second aspect is the integration of social management system, to set up a 'municipality – district – subdistrict' three-level waste separation and management system. It also set clear responsibility to all related stakeholders, including staffs from subdistrict, sub-community committee, estate management (or subdistrict sanitation center), community waste separation supervisor, and building supervisor. What is more, an output-based assessment and incentive mechanism is arranged for municipal solid waste separation. Finally, detailed waste separation publicity, education and training programs are provided.

Thirdly, this project introduces an evaluation and assessment mechanism for waste separation output performance at sourcing point, based on the design and management system framework of Smart City Development. It innovatively introduces QR code on household waste bags. By using 'Smart Sanitation' software on the community waste separation supervisor's mobile, waste separation quality for every household will be accurately recorded and uploaded in the database, forming the foundation for the future waste tariff collection mechanism. In addition, all the community waste containers are installed with RFID cards. Waste collection vehicles are equipped with smart sanitation system to achieve optimization and improvement in waste collection and transportation mode. Besides, it is acknowledged as a useful and practical tool for financial allocation or community motivation to introduce waste separation performance assessment mechanism. It allows the full play of performance evaluation and integrated it with financial management and project management, instead of being the final step work. The current 'budget performance' is expected to be turned to an international term 'performance budget'. How to ensure the effective implementation of appropriate mechanism, is the assurance to achieve efficient municipal solid waste separation at souring point.

The fourth innovation is the successfully reform of waste collection facilities in communities and the improvement of waste collection and transfer mode in central Ningbo, which comprehensively solve the environmental issues from small transfer station exerted on surrounding residents. By

五，法制化保障，《宁波市生活垃圾分类管理条例》被列为市人大常委会 2017 年立法调研项目，2018 年立法预备项目，2019 年正式实施，届时宁波市分类工作将实现全面突破，不同主体在垃圾分类工作中的具体职责将以法律形式呈现，将进一步明确生活垃圾产生者的责任。

六，收费制度化，2020 年之前，宁波还将出台差别化的生活垃圾处理收费制度，以“污染者付费”为原则，根据不同家庭、不同企业和商家产生垃圾的种类、数量收取金额不等的处理费，以此激发市民、企业及其他排放主体主动减量和分类。

November 2018, 848 waste collection houses have been newly built or reformed and 9984 collection point have been improved. 22 small waste transfer station located in the central areas are going to be reformed soon.

The fifthly point is regulation support. In 2017, the Ningbo Municipal Solid Waste Management Regulations was listed as the 2017 Legislative Research Project of the Municipal People's Congress Standing Committee, the 2018 legislative preparatory project and is going to be officially implemented in 2019. By then, the Ningbo municipal solid waste work will achieve a comprehensive breakthrough. The specific responsibilities of various main bodies involved in the waste separation work will be presented in legal form, which will further clarify the responsibilities of the producers of municipal solid waste.

The last innovation is to set up waste tariff collection mechanism. By 2020, Ningbo will release differentiated municipal solid waste tariff collection mechanism. It will be based on the principal of ‘pay by waste producer’ and collect different amount of treatment fees depend on discarded waste categories and quantities generated from each families, enterprises and commercial bodies. Therefore, residents, enterprises and other waste producers will be initiated to reduce waste volume and waste separation.

全球环境基金中国城市生活垃圾综合环境管理项目宁波子项目简介

BRIEF INTRODUCTION OF GEF CHINA MUNICIPAL SOLID WASTE MANAGEMENT PROJECT NINGBO SUBPROJECT

全球环境基金中国城市生活垃圾综合环境管理项目宁波子项目简介

我国于 2001 年签署了《关于持久性有机污染物（POPs）的斯德哥尔摩公约》，2004 年由全国人大批准。为履行“斯德哥尔摩公约”，落实《中国履行＜关于持久性有机污染物的斯德哥尔摩公约＞国家实施计划》的要求，生态环境部环境保护对外合作中心（FECO）以世行贷款宁波城镇生活废弃物分类收集和循环利用示范项目作为配套，申请利用全球环境基金赠款 1200 万美元实施“中国生活垃圾综合环境管理项目”，世界银行是本项目国际执行机构，宁波为项目示范城市之一，获得 140 万美元项目赠款支持。赠款项目将与世行贷款宁波市城镇生活废弃物收集循环利用示范项目互动推进。

项目目标是通过试点城市的示范引领和国家层面的宣传、复制和推广，帮助宁波、昆明等城市对生活垃圾焚烧二噁英监测及污染防治，逐步使中国生活垃圾焚烧二噁英排放达到国际斯德哥尔摩公约标准。项目主要内容包括：二噁英采样及质量保障 / 质量控制能力建设；焚烧炉在线监测及数据公开；垃圾分类与二噁英排放关系研究；国内外先进经验技术交流学习活动。

BRIEF INTRODUCTION OF GEF CHINA MUNICIPAL SOLID WASTE MANAGEMENT PROJECT NINGBO SUBPROJECT

China signed the Stockholm Convention on Persistent Organic Pollutants in 2001, and it was approved by the National People's Congress in 2004. To fulfill the Stockholm Convention and the requests in China's National Implementation Plan on Fulfilling the Stockholm Convention on Persistent Organic Pollutants, the Foreign Economic Cooperation Office (FECO) of Ministry of Environmental Protection took the World Bank financed China Ningbo Municipal Solid Waste Minimization and Recycling Project as the supporting project, and applied to utilize a grant of 12 million USD for the implementation of the 'China Municipal Solid Waste Management Project'. The World Bank is the international executive agency of the project, and Ningbo is one of the demonstration cities of the project who obtained 1.4 million USD as grant. The grant project and the World Bank financed China Ningbo Municipal Solid Waste Minimization and Recycling Project will be a force of advance for each other.

The aim of the project is to initiate national-level publicity, duplication and promotion through the demonstrative effect of the pilot cities, in order to help cities include Ningbo and Kunming with dioxin monitoring and pollution control, and in time help China reach the dioxin emission standard of solid waste incineration as listed in the Stockholm Convention. Main content of the project include: dioxin sampling and its quality safeguard/quality control capacity building; Incinerator online monitoring and data disclosure; Studies in relations between waste separation and dioxin emission; Domestic and international interactive and learning activities in advanced experiences and technologies.

全球环境基金赠款中国城市规模建筑节能和可再生能源项目
宁波子项目

GEF CHINA URBAN-SCALE BUILDING ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECT NINGBO COMPONENT

全球环境基金赠款中国城市规模建筑节能和可再生能源项目宁波子项目

宁波市是国家首批可再生能源建筑应用示范城市之一，“十二五”期间提出了能源强度和碳强度分别降低 18%和 19%的目标。在 GEF 和世界银行的支持下，宁波市以项目为载体，大力推动规模化发展绿色建筑，对创新型的城市空间规划和设计开展试点，以实现低碳城市化。

全球环境基金中国城市规模建筑节能和可再生能源项目的执行机构为世界银行，在住建部的统一领导下，由北京和宁波共同实施。北京和宁波子项的试点经验将为住建部制定相关国家政策及支持其他城市的类似工作提供重要的实证信息。项目实施时间为 2013 年至 2019 年。

项目的发展目标是：1）促进低碳、具适应性、宜居的城市形态发展；（2）提高大型公共建筑和商业建筑能效；（3）商业化屋顶光伏的推广应用。

宁波子项目总投资 3.8 亿元人民币，其中 GEF 赠款 350 万美元。项目内容包括：

1. 宁波城市形态研究：探讨社区、街区、建筑三个尺度的形态指标与能耗的关系，重点聚焦社区形态指标对交通能耗和街区形态指标对建筑运行用能的影

GEF CHINA URBAN-SCALE BUILDING ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECT NINGBO COMPONENT

Ningbo is among the first national pilot cities for building and renewable energy integration. For the 12th FYP, Ningbo has committed to reduce its GDP energy intensity and carbon intensity by 18 and 19 percent, respectively. With the support of GEF and Word Bank, Ningbo city used the project as a carrier to promote scaling-up green buildings and pilot innovative urban spatial planning and design to achieve the low-carbon urbanization. These activities could provide important experience and lessons for other Chinese cities of similar climate or size.

For the GEF China Urban-Scale Building Energy Efficiency and Renewable Energy（USBEER&E） Project ,the international implementing agency is World Bank. Under the unified leadership of the Ministry of Housing and Urban-Rural Development (MoHURD), the project is jointly implemented by two cities: Beijing and Ningbo. The pilot experience of Beijing and Ningbo components will provide important empirical information for the MoHURD to develop relevant national policies and support similar work in other city. The project implementation period: 2013-2019.

The proposed project development objective is to improve selected national and city-level policies for (1) the promotion of low-carbon, adaptive and livable urban forms; (2) an increase in energy efficiency in public and commercial buildings; and. (3) the scale-up of commercially viable rooftop solar PV deployment.

The total investment for the Ningbo component is 57.49 million USD including 3.50 million USD of GEF grant. The main content of Ningbo component includes the following:

1. Ningbo Urban Form Studies: Explores the relationship between morphological indicators and energy consumption at three levels: community, block and buildings, with the main focus on the impact exerted on traffic energy consumption

响。项目基于入户调研取得的一手资料，结合收集的宁波市城市形态数据，采取实证和模型模拟两种手段对形态指标与能耗情况进行对比分析，最终对形态指标进行了评价，并为宁波低碳城市规划提出建设性意见。

2. 宁波市绿色住区技术指标设计评价体系研究：基于城市形态研究的成果开展此项研究，旨在在新城区规划和建筑方案布局之初融入绿色社区理念，建立设计阶段的绿色住区技术指引和节能审查阶段的绿色住区评价体系。

3. 大型公共建筑和商业建筑能效比对及信息披露：这项工作结合宁波市在线能耗监测平台建设，从国家和城市两个层面开展研究。将住建部主导开发建筑能耗评价比对方法、工具应用于宁波能耗监测平台，开发能效对标和披露所需的软件，实现能耗数据收集、对标指标生成及能效披露的智能化管理；设计宁波城市层面能耗和建筑能效披露的策略，通过项目的实施，在宁波形成有效的 EPB&D 机制，促进各大型商业和公共建筑进行节能管理和节能改造，提高建筑能效。

4. 宁波市公共建筑能效提升实施研究：基于 EPBD 项目成果，探索宁波市公共建筑能效提升项目社会资本参与模式，为下一步全面开展建筑能效提升工作奠定基础。选定一批可操作、可落地的建筑能效提升试点项目，根据功能属性、技术关联性、经济指标进行分类，以合同能源管理（EMC）模式，制定具体实施方案。

5. 绿色建筑政策研究：建立完善的绿色建筑政策法规、技术标准、产业发展、科技支撑工作体系，促进绿色建筑规模化发展。作为本项目的成果产出，发布的政策法规包括：《宁波市绿色建筑行动实施方案》、《宁波市绿色建筑发展的若干意见》、《关于

from community morphological indicators, and the impact on building operational energy consumption from block morphological indicators. Based on the first-hand data obtained from household survey, combined with the collected Ningbo urban morphology data, the project uses empirical and model simulation methods to compare the morphological indicators and energy consumption, and finally evaluates the morphological indicators. Then constructive comments on low carbon urban planning and development are proposed.

2. Studies on design and evaluation system of technical indicators of Ningbo green residential area: Based on the research results of Ningbo Urban Form Studies, this subcomponent aims to incorporate the green community idea at the initial stage of the new urban area planning and architectural layout plan, establish the technical guidelines of design stage for green residential areas and a green residential area evaluation system for the EE review stage.

3. Energy Performance Benchmarking and Disclosure (EPB&D) for Large Public and Commercial Buildings: This subcomponent was carried out at the national and city levels, in conjunction with the establishment of Ningbo's online energy monitoring platform for large public and commercial buildings. The methodology and tools for EPB&D developed at the national level have been applied to the Ningbo's online energy monitoring system, and the software needed for EPB&D has been developed, to achieve intelligent management of energy consumption data collection, benchmarking indicator creating, as well as the energy performance disclosure; the policies for EPB&D was designed at city level, through the implementation of the subcomponent, an effective EPB&D supporting mechanism can be formed in Ningbo to improve building energy efficiency by promoting energy-saving management and energy-saving renovation of large commercial and public buildings.

4. Studies on Implementation of the Energy Efficiency Improvement Project for Public Buildings in Ningbo: The purpose of this subcomponent is to explore the models of social capital participate in energy efficiency improvement projects of public buildings in Ningbo, to lay the foundation for the next comprehensive development of building energy efficiency; and to select a number of operational and achievable building energy efficiency improvement pilot projects, to classify according to functional attributes, technical relevance, and economic indicators, then propose specific implementation plans based on the Energy Performance Contracting (EMC) model.

5. Studies on Policies of Green Buildings: Establish a sound work system of policy and regulations, technical standards, industrial development and scientific & technological support for green buildings, to promote it's scaling-up development.

调整绿色建筑商品房预售条件的通知》、《宁波市民用建筑节能评估技术及管理审查实施细则》等。发布的技术标准包括：《宁波市绿色建筑评价实施细则》、《烧结保温砖建筑构造图集》。在科技支撑及培训体系方面，协助建立宁波市绿色建筑管理架构及专家委员会、搭建绿色建筑在线申报系统平台，并初步建立宁波市绿色建筑培训及宣传协作机制。

6. 宁波大学科技服务大楼三星级绿色建筑示范：该示范项目为一座新建 8 层办公建筑，总建设面积 12600 平方米，按照国家绿色建筑三星级标准设计和建造。技术措施包括内院式布局、增加墙体的隔热、采用被动制冷措施、被动通风、被动遮阳技术、屋面和墙体绿化、导光系统、节水技术（例如雨水的回收利用）、地源热泵空调系统和建筑自动化系统、采用模盒无梁楼板新技术等。本项目的目标是形成夏热冬冷地区绿色建筑适宜技术模式，推进绿色建筑在宁波地区乃至全国范围内的规模化发展。该项目于 2016 年 6 月开工，2017 年 10 月底完工，2018 年 4 月底正式投入使用。项目总投资 4900 万元，其中绿色建筑增量成本 1033 万元。

7. 宁波厨余垃圾处理厂工业三星级绿色建筑示范：本项目为宁波市首个工业三星级绿色建筑，将建成一个从内涵到表现形式都充分体现绿色、低碳、环保理念的绿色工厂，为宁波地区乃至同行业的绿色工业发展和推广做出贡献。本项目集成多项前沿绿色建筑技术：高效回收处理工艺、采购合同能源管理模式实施太阳能光伏屋面一体化、辐射吊顶式空调系统、智能化监控计量系统、立体绿化等。本项目于 2017 年 12 月开工，预计于 2018 年底完工。一期项目总投资 30066 万元，其中绿色建筑增量成本 1507 万元。

As results of the subcomponent’s output, the published policies and regulations include: Ningbo Green Building Action Implementation Plan, Several Suggestions on Ningbo Green Building Development, and Notice on Adjusting the Conditions for Pre-sale of Green Building Commodity Houses, Technical and Management Review Implementation Rules for Energy Saving Evaluation in Ningbo Civil Buildings, etc.; Technical Standard released: Ningbo Green Building Evaluation Implementation Rules, Structure drawing sets for sintered insulation brick building; Science & technology support and training system: assisted in the establish of Ningbo Green Building Management Framework and Expert Committee, set up a green building online declaration system platform and initially established Ningbo green building training and publicity & cooperation mechanism.

6. Three-star National Green Building Demonstration-Ningbo University Science and Technology Service Building: The demonstration project is a new 8-storey office building with a total construction area of 12,600 m2, which was designed and built according to the standard of three-star green building. The technical measures to be taken for the project include interior courtyard layout, intensified wall insulation, and such techniques as passive cooling, passive ventilation, passive shading, roof and wall greening, light guiding system, water saving (e.g., rainwater recycling),air conditioning system with ground-source heat pump, building automation system, new technology of mold box beamless floor slab, etc. the objective of this demonstration is to form a suitable technical model for green buildings in the hot-summer and cold-winter regions to promote the large-scale development of green buildings in Ningbo and even the whole country. It was completed at the end of October 2017 and officially put into use at the end of April 2018. The total investment of the project is 49 million yuan, of which the incremental cost of green buildings is 10.33 million yuan.

7. Three-star Industrial National Green Building Demonstration-Ningbo Kitchen Waste Treatment Plant: The project will be the first industrial three-star green building in Ningbo city, which will be built into a green factory, fully reflecting the green, low-carbon and environmental protection concepts from the connotation to the form and making contributions to the green industrial development and promotion in Ningbo and even the same industry. The project will integrate multiple cutting-edge green building technologies, such as efficient recycling process, integration of roofs and solar PV installations, radiant ceiling-mounted air conditioning system, intelligent monitoring and metering system, and integrated 3D greening. The project started in December 2017 and is expected to be completed by the end of 2018. The total investment of the first phase of the project is 30.66 million yuan, of which the incremental cost of green buildings is 15.07 million yuan.

宁波市固废处置中心三个 PPP 项目概况

BRIEF INTRODUCTION TO 3 PPP PROJECTS AT NINGBO MUNICIPAL SOLID WASTE DISPOSAL CENTER

宁波市固废处置中心三个 PPP 项目概况

宁波市固废处置中心位于海曙区洞桥镇宣裴村，占地 365 亩，固废处置中心园区由宁波市厨余垃圾处理厂、宁波市餐厨垃圾处理厂和宁波明州生活垃圾焚烧发电工程三个 PPP 项目组成，其中世行贷款宁波市厨余垃圾处理厂项目和鄞州区生活垃圾焚烧发电项目是财政部第二批 PPP 示范项目，宁波市固废处置中心主要处理宁波市中心城区每天产生的居民生活垃圾和餐馆及机关企事业的餐厨垃圾，服务人口约 230 万。同时，宁波市政府按照项目实施方案责任分担，落实财政专项资金 10 亿元，用于项目用地政策处理、移民拆迁安置和处置中心公共道路等设施建设，确保了三个项目顺利开工建设。

宁波市固废处置中心园区秉承绿色环保理念，我市把三个 PPP 项目功能、环境、美学、教育四位一体的设计理念贯穿始终，以鼓励社会资本技术创新和管理提升为导向，期望把宁波市固废处置中心园区打造成全国性环保教育基地、固废处置领域行业典范和宁波市 PPP 项目示范基地。

一、世行贷款宁波市厨余垃圾处理厂 PPP 项目

（一）项目基本情况

世行贷款宁波市厨余垃圾处理厂是世行贷款宁波市城镇生活废弃物收集循环利用示范项目的子项目之一，为宁波市中心城区生活垃圾分类后产生的厨余

BRIEF INTRODUCTION TO 3 PPP PROJECTS AT NINGBO MUNICIPAL SOLID WASTE DISPOSAL CENTER

Ningbo Municipal Solid Waste Disposal Center locates at Xuanpei Village, Dongqiao Township, Haishu District, with an occupied area of 365 Mu. The Solid Waste Disposal Center Park consists of 3 PPP projects, namely the Ningbo Kitchen Waste Treatment Plant, Ningbo Food Waste Treatment Plant, and Dongqiao Municipal Solid Waste Incineration Power Generation Project. Among them, the World Bank Loan Ningbo Kitchen Waste Treatment Plant and Dongqiao Municipal Solid Waste Incineration Power Generation Project are included in the second batch of PPP demonstration projects by the Ministry of Finance. Ningbo Municipal Solid Waste Disposal Center mainly deals with the daily household solid waste generated by the downtown area of Ningbo city, as well as the kitchen waste produced by restaurants and government institutions, serving a population of about 2.3 million. Meanwhile, Ningbo municipal government shared responsibility according to the project implementation plan, and allocated financial special fund of 1 billion RMB, which was used for the land acquisition, resettlement and he construction of facilities such as the public road construction of the center, ensuring the smooth construction of the three projects.

Ningbo Municipal Solid Waste Disposal Center Park adheres to the concept of environmental friendly development. It comprehensively integrates ‘four in one’ design concept, including function, environment, aesthetics and education, through the PPP projects’ implementation. The Center Park is developed by encouraging social capital investment to innovate technology and improve management, and built into a national environmental protection education base, an industry model in municipal solid waste disposal sector and a demonstration base of Ningbo PPP projects.

1.World Bank loan Ningbo Kitchen Waste Treatment Plant PPP Project

1) Brief introduction of the project

World Bank Loan Ningbo Kitchen Waste Treatment Plant is

垃圾和农贸市场垃圾资源化利用和无害化处理服务，是宁波市生活垃圾分类顺利推进的重要设施保障。

宁波市厨余垃圾处理厂与宁波市餐厨垃圾处理厂和鄞州区生活垃圾焚烧发电厂项目毗邻，厨余厂项目占地约 115 亩，设计处理规模为 800 吨 / 日，分两期实施，总投资 37660 万元，其中一期处理规模 400 吨 / 日，投资 30066 万元。厨余厂项目主要建设内容包括厨余垃圾接受与预处理系统、厌氧发酵系统、除臭系统、污水处理系统、沼气提纯系统、市政配套设施及环保教育示范基地。根据固废处置中心共建共享原则，项目进场道路，通讯、排洪、排污管道等由固废处置中心共建共享；厨余厂建设的污水处理系统和沼气提纯系统同时承担餐厨厂产生的污水处理和沼气提纯，按照污水和沼气处理购销协议进行付费。

（二）项目运作模式

本项目采用以政府可行性缺口补助为核心的 PPP 合作模式，可行性缺口补助（厨余垃圾处理）所需资金列入年度财政预算和中长期财政规划。

（三）体系架构

市政府授权市城管局作为本项目的实施机构，市生活垃圾分类管理中心作为本项目的具体操作单位，具体负责各项工作落实。

（四）融资模式

中标的社会资本与宁波市政府指定的国有企业组建项目公司，按照社会资本出资占 60%，国有企业出资占 40% 组建项目公司，项目公司注册资本为项目总投资的 30%。项目公司承担厨余垃圾处理厂的设计、投资、融资、建设、运营和维护。

（五）项目主要边界条件

one of the sub-project of World Bank Loan Ningbo Municipal Solid Waste Minimization and Recycling Project. This plant is functioned at recycling and disposing separated kitchen waste generated by household and farmer's market in the downtown area of Ningbo harmlessly, and is the significant facility to promote Ningbo municipal solid waste separation.

Adjacent to Ningbo Food Waste Treatment Plant and Dongqiao Municipal Solid Waste Incineration Power Generation Plant, Ningbo Kitchen Waste Treatment Plant covers an area of 115 Mu, with a design treatment capacity of 800 tons/d. The total investment for two-phase construction is 376.6 million RMB, of which the phase-one treatment scale is 400 tons/d, with the investment of 300.66 million RMB. The Kitchen Waste Treatment Plant Project constructs kitchen waste pretreatment system, anaerobic fermentation system, deodorization system, wastewater treatment system, biogas purification system, municipal auxiliary facilities and environmental protection education demonstration base. According to the co-construction and sharing principle of Municipal Solid Waste Disposal Center, the project access road, communication, flood discharge and wastewater pipeline are jointly built and shared within solid waste disposal center. The wastewater treatment and biogas purification system constructed by Kitchen Waste Treatment Plant will undertake the wastewater treatment and biogas purification tasks for Food Waste Treatment Plant, and will be paid according to the purchase and sale agreement.

2) Project operation mode

This project adopts the PPP cooperation mode with the Viability Gap Funding as the core. The funds needed for the Viability Gap Funding (kitchen waste treatment) are included in the annual budget and medium - and long-term financial planning.

3) System structure

The municipal government authorizes the Urban Administration Bureau as the implementing agency of this project, and the Ningbo Municipal Solid Waste Separation Project Management Center as the project operator, who is responsible for the implementation of all work.

4) Financing mode

The private investor won the bid and the state-owned enterprise designated by Ningbo municipal government jointly set up the project company, with the social capital contribution accounts for 60%, and the state-owned enterprise contribution accounts for 40%. The registered capital of the

1、项目公司股权情况。宁波市政公用投资公司与首创环境在宁波成立项目公司（SPV），在项目公司中市政公用投资公司占 40% 股份，首创环境占 60% 股份。

2、资金来源。本项目资金来源中项目公司资本金占总量的 30%，由项目公司股东按股份比例出资；市财政局向项目公司提供一笔以美元计价的世界银行贷款，该贷款包括本项目 100% 的机电设备投资及 50% 的土建部分投资，实行实报实销制，融资期限为二十（20）年，其中宽限期三（3）年，采用每年两（2）次等额本金还本，融资利率为世行浮动利差贷款（VSL）。

3、政策处理费用。本项目的政策处理费只考虑土地协议出让费用和工程前期手续费用，政策处理需社会资本支付的费用最终合计为 6730 万元（其中，土地费用 6325 万元，前期手续费用 405 万元）。

4、沼气、固体废弃物、沼渣、污水排放处理

（1）沼气处理。本项目沼气利用方案为提纯，产品并入甬金高速洞桥出口附近市城投公司拥有的天然气管网，价格按浙江省天然气并网价（当前价为 2.29 元 / m^3）的 95%（结算价为 2.17 元 / m^3）结算，市城投公司落实责任主体与项目公司签订与 PPP 期限匹配的购销合同。另外，根据沼气中甲烷含量 55% 与天然气甲烷含量 95% 比例，餐厨厂提供给厨余厂的原生沼气销售结算价为 1.26 元 / m^3。

（2）固体废弃物和沼渣。固体废弃物优先考虑焚烧发电，焚烧单价为 150 元 / 吨，沼渣焚烧单价为 250 元 / 吨，鼓励固体废弃物和沼渣按照循环利用方式综合利用，实现垃圾减量化，其收入作为企业经济增长点，不核减政府补贴。

（3）污水排放。厨余厂污水排放按环评批复要求并

project company is 30% of the total project investment. The project company undertakes the design, investment, financing, construction, operation and maintenance of Kitchen Waste Treatment Plant.

5) Project major boundary conditions

i. Equity of the project company. Ningbo Municipal Utilities Investment Co., Ltd. and Shouchuang Environmental Protection Investment Co., Ltd jointly established the project company (SPV) in Ningbo. In terms of shareholding, Ningbo Municipal Utilities Investment Co., Ltd. takes 40% shares, while Shouchuang Environmental Protection Investment Co., Ltd. takes 60% shares.

ii. Sources of funds. The project company's capital accounts for 30% of the total capital source of the project, which shall be invested by the project company's shareholders in proportion to their shares. Municipal Finance Bureau provides the project company with a World Bank on-lending loan in US dollars, covering 100% of the project electromechanical equipment investment and 50% of the project civil work investment, based on actual expenditure. The principal repayment period lasts for 20 years, including grace period of 3 years, with equal payment of principal semi-annually. The interest rate is the World Bank variable spread loan (VSL).

iii. Policy processing costs. The policy processing cost in this project only takes into account the land transfer cost and the pre-project procedure cost. The total amount paid by private capital for policy processing is 67.3 million RMB (among which, the land transfer cost is 63.25 million RMB and the pre-project procedure cost is 4.05 million RMB).

iv.Biogas, solid waste, biogas residue, wastewater treatment

a) Biogas treatment. After purification of biogas produced by this project, the products will be merged into the natural gas pipe network near Hang-Yong Expressway Dongqiao Toll Gate, which belongs to Ningbo Urban Construction Investment Holding Co., Ltd. The rate will be 95% of the natural gas purchase rate of Zhejiang province (2.29 RMB/m^3 currently) i.e.2.17 RMB/m^3. Ningbo Urban Construction Investment Holding Co., Ltd. shall carry out the responsibility main body and sign the purchase and sale contract with the project company matching the PPP period. In addition, according to the proportion of methane content of 55% in biogas and 95% in natural gas, the sales settlement price of biogas produced by the Food Waste Treatment Plant to the Kitchen Waste Treatment Plant is 1.26 RMB/m^3.

b) Solid waste and biogas residue. Solid waste is prioritized for incineration and power generation with a charge rate of 150 RMB/ton, and 250 RMB/ton for the biogas residue incineration. It is encouraged to comprehensively utilize the solid waste

入鄞西污水处理厂，费用按市内统一收费标准支付。

5、项目审批

由选定的社会资本完成厨余厂设计、投资、融资、建造管理、运营，政府根据 PPP 合同实施监管，不再对其初设进行审批，只对其施工图设计文件进行审查。

6、垃圾量供应最低保障

实施机构对垃圾实行最低供应量保底，一期按设计能力 60% 即 240 吨 / 日，二期工程按一期 90% 加二期 60% 的设计能力即 600 吨 / 日保证。每吨厨余垃圾处理费 198 元 / 吨。

7、合作期满移交

项目公司在 20 年 PPP 合作期满后，向实施机构或其指定机构无偿、完好移交项目公司对项目设施的所有权和所有权益。

二、宁波市餐厨垃圾处理厂 PPP 项目

（一）项目基本情况

宁波市餐厨垃圾处理厂项目占地面积：33251 平方米（约 50 亩），餐厨垃圾处理规模 400t/d（远期规模 600t/d），废弃食用油脂处理规模 40t/d（远期规模 60t/d）。包括餐厨垃圾接收及预处理系统、厌氧发酵及沼渣脱水系统、废弃油脂接收及预处理系统、沼气净化系统和除臭系统 5 个子工艺系统。项目总投资 1.6 亿元。项目采用以政府缺口补助为核心的 PPP 合作模式，合作期 20 年（含建设期和运行期）。宁波市城管局为实施机构，宁波市市容环卫处为该 PPP 项目的具体操作单位。经公开招标，宁波市开诚生态技术有限公司为中标人，并独资设立项目公司——宁波开诚餐厨废弃物处理有限公司（全民营

and biogas residue in a circular manner to achieve waste reduction, and the income is regarded as enterprise economy growth point which will not affect the amount of government subsidy.

c) Wastewater discharge. Wastewater discharged by Kitchen Waste Treatment Plant according to the requirements of the EIA approval will be transferred to the Yinxi wastewater treatment plant, with the handling fees according to municipal standards.

v. Project approval

The selected social capital completes the design, investment, financing, construction management and operation of the Kitchen Waste Treatment Plant. The government carries out supervision and regulation according to the PPP contract. The preliminary design is no longer subject to approval, only the detailed drawing needs to be reviewed by government.

vi. Guarantee of minimum waste supply

The implementing agency shall guarantee the minimum supply of waste, at 60% of the design capacity for phase-one, i.e. 240 tons/d, and 90% of the phase-one design capacity plus 60% of phase-two design capacity, i.e. 600 tons/d. The waste treatment fee is 198 RMB per ton.

vii. Transfer after PPP contract expiration

The project company shall transfer the ownership and all rights and interests of the project facilities to the implementing agency or its designated agency for free and completely after 20 years when the term of PPP cooperation expires.

2. Ningbo Food Waste Treatment Plant PPP Project

1) Basic information

The project covers an area of 33,251 m^2 (appx.50 Mu). The treatment capacity for food waste is 400 tons/d (600 tons/d total in the long-term) and 40 tons/d (60 tons/d total in the long-term) for illegal cooking oil. This project has 5 technical sub-systems, include a food waste reception and pretreatment system, illegal cooking oil reception and pretreatment system, anaerobic fermentation and biogas residue dehydration system, biogas purification system, deodorization system. Public private partnership (PPP) mode has been introduced for the project with a project period of 20 years (construction phase and operation phase included). Ningbo Urban Administration Bureua is the implementation agent, while the Ningbo Municipal Sanitation Division is the PPP project operator. Ningbo Kaseen Ecology Technology Co., Ltd was awarded the contract through open bidding. A project company: Ningbo Kaseen Kitchen Waste Treatment

独资），负责本项目的投融资、建设、运营等。

社会资本背景：宁波开诚生态技术有限公司成立于2003年，注册资金1.1亿元，是宁波市政府指定的餐厨废弃物专业处理运营商，也是国内技术领先的餐厨垃圾处理设备制造商、EPC承包商和PPP项目投资运营商，国家高新技术企业。十多年来，开诚坚持探索餐厨垃圾的处理工艺，积极自主研发，并与德国、荷兰等欧美大公司，以及与国内大专院校、科研机构合作，开发出高效率、自动化、规模化、集中化的有机废弃物处理系统，获得40多项专利和设备制造首台（套）等诸多荣誉。现设备输出及EPC承建业务销售额已近3.5亿元，设备日处理餐厨垃圾规模累计约3500吨，项目遍布全国各主要省市。已投资营运的餐厨（厨余）垃圾处理厂PPP项目有浙江慈溪市、绍兴柯桥、上虞项目等；正在投资建设的PPP项目有宁波市餐厨垃圾处理厂迁建工程，浙江江山市等项目；累计投资额度近4亿元。

目前，开诚公司在餐厨垃圾和其他易腐有机垃圾处理方面，集研发设计、设备制造销售、EPC输出、垃圾处理运营、PPP项目投资运营等于一体，是一家完整的全产业链企业。

三、宁波明州生活垃圾焚烧发电工程PPP项目

（一）项目基本情况

项目占地面积82729m^2(124.1亩)，日处理生活垃圾为2250吨，年处理生活垃圾82.13万吨。采用3×750t/d台VON ROLL-日立造船机械炉排炉技术，配备2台25MW汽轮机组（发电机2×30MW）；烟气处理采用国内最先进的超低排放组合处理技术，其烟气排放值优于欧盟（EU2010/75/EC）标准及国家《生活垃圾焚烧污染控制标准》（GB18485-2014）。垃圾渗沥液需经处理70%以上达到《城市污水再生利用工业用

Co., Ltd (solely-invested by Kaseen) was established and is responsible for the investment, finance, construction and operation of the project.

Background of the private capital: Ningbo Kaseen Ecological Technology Co., Ltd. was established in 2003 with a registered capital of 110 million RMB. Designated by the Ningbo Municipal Government as a professional food waste treatment operator, it is also a food waste treatment equipment manufacturer leading in techniques nationwide, an EPC contractor, a PPP project investor and operator, and a national high-tech enterprise. For more than ten years, Kaseen has been persistent in exploring treatment techniques for food waste and active in researching and developing independently. It has been cooperating with many European and American enterprises such as Germany and the Netherlands, as well as domestic universities and research institutes to develop a highly-efficient, automatic, scaled-up and centralized organic waste treatment system. The company has awarded by several honors such as more than 40 patents and the first in equipment manufacturing facility set. The current sales figure of the equipment output and EPC construction business nearly reaches to 350 million RMB, and the daily treatment capacity of food waste is about 3,500 tons. The company projects have reached main provinces and cities around the country. The food (kitchen) waste treatment plant PPP projects already in operation include Zhejiang Cixi project, Shaoxing Keqiao, Shangyu Project, etc. The PPP projects under construction include the Ningbo Kitchen Waste Treatment Plant relocation project, Zhejiang Jiangshan project, etc. The cumulated investment is about 400 million RMB.

Currently, Kaseen is developed to be a company whose business covers all steps along the industry chain. It is capable of research, development and design, equipment manufacturing and marketing, EPC output, waste treatment operation and PPP project investment and operation, in the area of food waste treatment and other perishable organic waste treatment.

3. Dongqiao Municipal Solid Waste Incineration Power Generation PPP Project

1) Basic Information

The project occupies 82,729 m^2 (about 124.1mu) of land, disposing 2,250 tons of solid waste per day, and 821,300 tons per year. The project adopts three VON ROLL mechanical grate incinerator with unit capacity of 750 ton/d, with two steam turbine sets (2 x 30MW generators). Flue gas treatment adopts the most advanced combination treatment technology in China of ultra-low emission, with emission less than standard of both Europe Standard EU2010/75/EC and National Standard

水水质标准》(GB/T19923-2005)后作为项目循环冷却水补充全部回用或利用。

(二)建设运行模式

2015 年,宁波市鄞州区以 BOT 模式(投资建设 - 运营 - 移交)方式引进上海康恒环境股份有限公司投资约 14 亿元建设运营一座 2250 吨 / 日的焚烧发电厂(含渗滤液处理站)。生活垃圾按照全市统一规划由各区域的环卫部门统一收集到垃圾焚烧发电厂,通过进厂地磅的称重后进入生活垃圾焚烧厂内环保处理。

在项目建设运行操作过程中,由鄞州区政府成立项目办公室,从各乡镇及相关职能部门抽调骨干组建工作领导小组,负责整个项目的前期政策处理、总体协调及对项目公司的监督管理工作。同时城市管理局作为项目主体负责本项目的 PPP 谈判签约等技术工作。项目公司负责焚烧发电厂的建设、运营,在建设、运营期内接受政府按特许经营服务进行行业监管,包括:根据适用法律的规定,指定、调整、变更行业服务质量和产品质量标准;监控项目公司的生产和服务;检查和监控特许经营产品或特许经营服务的质量;根据适用法律的规定对投资方进行日常监管。

(三)社会资本合作方基本情况

宁波市鄞州区人民政府基于以下条件选择了上海康恒环境股份有限公司、中信环境投资集团有限公司作为主要投资人持有项目公司 80% 的股权、宁波市鄞州区城市建设投资发展有限公司持有项目公司 12% 的股权、当地的环保企业国骅集团有限公司持有项目公司 5% 的股权、浙江泰来环保科技有限公司持有项目公司持有项目公司 3% 的股权。

根据上述股东共同投资并控股项目公司,成立了宁波明州环境能源有限公司并具体实施本项目。

Standard for Pollution control on the municipal solid waste incineration (GB18485-2014). The waste leachate needs to be treated for over 70% to meet the national standard The Reuse of Urban Recycling Water – Water Quality for Industrial uses (GB/ t19923-2005), and reused as project recirculated cooling water.

2) Construction & operation mode

In 2015, Ningbo Yinzhou District introduced a 1.4 billion RMB investment from SUS Environment through BOT mode (invest to construct-operate-transfer), in the construction and operation of an incineration power plant (with leachate treatment facilities) with a disposal capacity of 2,250 tons per day. The solid waste is collected and delivered to the incineration plants by local sanitation departments, and disposed in environmental friendly ways after being weighed on weighbridges at the plant entrance point.

During the establishment and the project operation, the Yinzhou district government established the PMO and assembled a leading group with key members from various counties and related departments. They are responsible for the preliminary policy management, overall coordination of the entire project and supervision and management of the project company. At the same time, as the main implementation unit of the project, the Ningbo Municipal Urban Administration Bureau is responsible for the technical work of PPP negotiation and contract signing. The project company is responsible for the construction and operation of the incineration power plant under the government's supervision according to franchise services, including designating, adjusting or changing sector service quality and product quality standard as per applicable laws and regulations; monitoring the production and services of the company; inspecting and monitoring the quality of franchise products and services; conducting daily supervision of investors in accordance with pertinent laws.

3) Basic information on the private capital partners

Ningbo Yinzhou district government selected SUS Environment and CITIC Environmental Investment Group as the main private investors, holding 80% of the equity of the project company. Ningbo Yinzhou District Urban Construction Investment Development Company holds 12%, the local environmental-friendly company Greata Group and Zhejiang ECO-WASTE Technology Company own 5% and 3% of the shares respectively.

Ningbo Mingzhou Environmental Energy Company was established through the co-investment and co-holding of the project company by the afore-mentioned shareholders, to implement the project.

现场参观点位介绍

INTRODUCTION OF SITE-VISIT AREAS

现场参观点位介绍

一、水岸心境社区

水岸心境社区地处宁波市海曙区望春街道北面，东接悠云路，南达新星路，西连丽园北路，北与规划中的滨江大道相通，社区成立于 2007 年 8 月，包括水岸心境和维科上院 2 个小区，共计 1984 户。水岸心境社区于 2015 年 11 月底正式启动推广生活垃圾分类，也是望春街道首批试点社区。在将近三年的分类工作开展过程中，水岸心境社区立足“服务和自治”工作理念，运用“微”服务，努力推进社区垃圾分类工作向前迈进。

二、海曙区生活垃圾分类转运站

海曙区生活垃圾分类转运站位于范江岸路北侧、规划路西侧、蔡江河南侧、双杨河东侧，转运规模为 300t/d，其中厨余垃圾为 140t/d，其他垃圾 160t/d，建筑面积 3153 ㎡，其中地上建筑面积 2756 ㎡，地下建筑面积 397 ㎡。项目初设总投资额为 4078 万元，主要功能定位包括生活垃圾分类转运、辅助生产设施、配套管理设施。

三、宁波首创厨余垃圾处理有限公司

宁波首创厨余垃圾处理有限公司位于宁波市循环经济静脉产业园内（海曙区洞桥镇宣裴村裴岙），占地 115 亩，设计处理规模为 800 吨 / 日，分两期实施，总投资 37660 万元，其中一期设计处理规模 400 吨 / 日，投资 30066 万元，建设内容主要包括厨余垃圾预处理系统、厌氧发酵系统、除臭系统、污水处理系统、沼气提纯系统、市政配套设施及环保教育示范基地。

INTRODUCTION OF SITE-VISIT AREAS

1. Shui'an Xinjing Community

Shui'an Xinjing Community locates in the north of Wangchun Subdistrict, Haishu District, Ningbo, with Youyun Road in its east, Xinxing Road in its south, Liyuan North Road in its west, and Binjiang Avenue in its north. This community was established in August 2007, including 2 residential areas (sub-comunities) named Shui'an Xinjing and Weike Shangyuan with a total of 1984 households. Shui'an Xinjing Community initiated its municipal solid waste separation program at the end of November 2015. It was the first pilot community in Wangchun Subdistrict. During these three years, Shui'an Xinjing Community keeps the idea of 'ervice and self-management' and adopts 'micro' services mode to promote waste separation.

2. Haishu Solid Waste Transfer Stattion

Haishu Solid Waste Transfer Station locates on the north side of Fanjiang'an Road, west of a planning road, south of Caijiang River and east of Shuangyang River, with its capacity of 300 t/d, including 140 t/d of kitchen waste and 160 t/d of other waste. The construction area is 3,153 m^2, of which 2,756 m^2 is above ground and 397 m^2 is under ground. The cost estimation in preliminary design stage is 40.78 million RMB, and the main function of this transfer station includes solid waste sortation and transfer, auxiliary production facilities provision and supporting management facilities provision.

3. Ningbo Shouchuang Kitchen Waste Treatment Co., Ltd

Ningbo Shouchuang Kitchen Waste Treatment Co., Ltd locates in Ningbo Circular Economy Venous Industry Park (Pei'ao, Xuanpei Village, Dongqiao Town, Haishu District), covering an area of 115 Mu, with the design treatment capacity of 800 tons/day. It is implemented in two phases with a total cost of 376.60 million RMB. The design capacity of Phase 1 is 400 tons/day, with its cost estimation of 300.66 million RMB. The main construction contents includes kitchen waste pretreatment system, ADU and composting system, odor control system, waste water treatment system, biogas storage and purification system, municipal supporting facilities and an environmental education demonstration base.

本项目以“厨余垃圾—能源 / 肥料—居民 / 农作物”闭合工艺链，生产绿色能源 – 沼气回用于居民，将沼渣制成有机肥料 / 营养土回归于土壤，充分实现低碳和固碳的发展理念，推动垃圾处理的循环和可持续发展。项目运行后将为宁波市民提供生物天燃气 42000 立方米 / 日，并实现年均 340000 吨的二氧化碳减排效果，为改善宁波市的城市综合环境做出积极贡献。

四、宁波明州环境能源有限公司

宁波明州环境能源有限公司是康恒环境在宁波区域投资建设重点环保项目之一，位于宁波市循环经济静脉产业园内（海曙区洞桥镇宣裴村裴岙），占地面积 124 亩，处理规模 2250 吨 / 日，装机容量 50MW，总投资 14.2 亿元。本项目于 2015 年 1 月 19 日签署 BOT 特许经营协议，成立项目公司正式开始运作，2016 年 1 月进场施工，2017 年 6 月投产发电。同时，本项目还被评为财政部第二批 PPP 示范项目，省、市、区三级重点工程，荣获 2017 年中国循环经济最佳实践奖、被列为省工业旅游示范基地、宁波市市民科普教育基地、党建教育基地等。

五、宁波开诚餐厨废弃物处理有限公司

宁波开诚餐厨废弃物处理有限公司位于宁波市循环经济静脉产业园内（海曙区洞桥镇宣裴村裴岙），项目以 PPP 模式建设，2018 年 6 月建成投产，以政府采购服务的形式每吨餐厨垃圾补贴处置费 188.5 元。项目占地 50 亩，总投资 1.6 亿元，处理总规模为餐厨垃圾 600t/d + 地沟油 60t/d，分两期建设，一期建设餐厨垃圾 400t/d + 地沟油 40t/d，二期建设餐厨垃圾 200t/d + 地沟油 20t/d，项目包括餐厨垃圾预处理、地沟油预处理、厌氧发酵系统、沼气净化和利用系统、沼渣脱水系统、除臭系统等相关配套辅助系统。

This Component adopts a closing processing chain as “kitchen waste - energy/fertilizer - household/crop”, producing green energy-biogas for residents, and turning residue into organic fertilizer/nutrient soil and back to soil, which fully realizing the development idea of low carbon and carbon fixation, thus promoting the recycling and sustainable development of waste treatment. After its operation, it will provide 42,000 m^3/day of biogas to Ningbo citizens, and achieve an average of 340,000 tons of carbon dioxide emission reduction annually, which will make positive contributions to improving the comprehensive urban environment in Ningbo.

4. Ningbo Mingzhou Environmental Energy Co., Ltd.

Ningbo Mingzhou Environmental Energy Co., Ltd. is one of the key environmental projects invested by SUS Environment in Ningbo. It locates in Ningbo Circular Economy Venous Industry Park (Pei’ao, Xuanpei Village, Dongqiao Town, Haishu District), covering an area of 124 Mu, with the design capacity of 2,250 tons/day and an installed capacity of 50MW. Its total investment is 1.42 billion RMB. This project is implemented by BOT franchise mode whose contract was signed on January 19, 2015, and forming a project company for the implementation. The construction started in January 2016 and put into operation by generating power in June 2017. In addition, this project is also listed in the second batch of PPP demonstration projects of MOF and a key project in provincial, municipal and district level. It was also awarded as 2017 China Circular Economy Best Practice Award and set as a provincial industrial tourism demonstration base, Ningbo citizen science & education base, and party building education base, etc.

5. Ningbo Kaseen Kitchen Waste Treatment Co., Ltd

Ningbo Kaseen Kitchen Waste Treatment Co., Ltd locates in Ningbo Circular Economy Venous Industry Park (Pei’ao, Xuanpei Village, Dongqiao Town, Haishu District). It is established by PPP mode and completed and put into operation in June 2018. The government pays 188.5 RMB / ton as waste treatment subsidy via government purchasing services mode. This project covers an area of 50 Mu with a total investment of 160 million RMB. The total capacity is 600 ton/day of food waste and 60 ton/day of illegal cooking oil, and implemented in 2 phases. The first phase is of 400 ton/day of food waste and 40 ton/day of illegal cooking oil, and the second phase is of 200 ton/day of food waste and 20 ton/day of illegal cooking oil. The project includes restaurant waste pretreatment, illegal cooking oil pretreatment, anaerobic fermentation system, biogas purification and utilization system, biogas residue dehydration system, odor treatment system and other supporting system.

指导单位

财政部金融司、发改委环资司

住建部城建司、住建部建筑节能与科技司、生态环境部对外经济合作中心

协办单位

首创集团、开诚生态、康恒环境

承办单位

宁波市财政局、宁波市城管局、宁波市发改委

宁波市住建委、宁波市环保局、E20环境平台

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