第六章 绿色发展

CHAPTER VI. GREEN DEVELOPMENT

华润水泥积极履行企业公民的环境责任，大力推行绿色生产，降低污染物排放，严格遵循《环境保护法》《大气污染防治法》《水污染防治法》以及《固体废物污染环境防治法》等法律法规。根据国家、行业、地方法律法规要求，开展大气、废水以及噪声等污染物防治工作，所有生产线的污染物排放值达到或优于国家、地方污染物标准限值。此外，华润水泥还大力推动资源综合利用，致力于资源节约型、环境友好型企业建设。

CR Cement proactively fulfills its environmental responsibilities as a corporate citizen, vigorously implements green production, reduces emission of pollutants and strictly complies with laws and regulations including the "Environmental Protection Law", the "Law on the Prevention and Control of Atmospheric Pollution", the "Law on the Prevention and Control of Water Pollution" and the "Laws on the Prevention and Control of Environmental Pollution by Solid Waste". According to the requirements of national, industrial and local laws and regulations, the Company carried out prevention and control on pollutants such as exhaust gas, sewage and noise. The pollutant emission levels at all production lines met or were better than the national and local standard limits of pollutant emission. In addition, CR Cement strongly promoted composite utilization of resources and was committed to building a resource-saving and environment-friendly enterprise.

（一）立足绿色管理 / Green Management Positioning

华润水泥在《华润水泥管理手册》中专设"EHS 篇"，严格执行及监控环境管理体系，尽力发掘提升机会，紧贴市场需求，确保可持续发展理念有效落实，保持华润水泥在行业内的领先地位及声誉。

2017 年，公司不断推动环境保护和节能减排技改、运营工作及水泥窑协同处置废弃物项目工作。得益于完善的管理架构，公司所有熟料生产线和水泥粉磨站均取得了 ISO14001 环境管理体系认证及清洁生产审核认证，保障环境管理体系工作行之有效。此外，2017 年，华润水泥还建立了一套系统完整的星级管理评价体系，基于行业对标或内部对标结果设定目标值，对环境、健康和安全等进行多维度、全面评价，以评定星级，进而促进管理提升，推动发展。

The specific "EHS chapter" in the "Management Manual of CR Cement" requires CR Cement to strictly enforce and monitor the environmental management system. We use our best endeavours to explore opportunities for improvement and keep abreast of market demand to ensure effective implementation of the concept of sustainable development and maintain a leading position and reputation of CR Cement in the industry.

In 2017, the Company continued to promote technological transformation and operation of environmental protection, energy saving and emission reduction, as well as waste co-processing projects by use of cement kilns. Thanks to the sound management structure, all clinker production lines and cement grinding stations of the Company achieved ISO14001 environmental management system certification and clean production audit certification, which secured that our environmental management systems work effectively. In addition, in 2017, CR Cement also established a complete and systematic star-rating management system, setting target values based on industry benchmarks or internal benchmarks results for multi-dimensional and comprehensive evaluations on environment, health and safety in order to assess the star rating and promote management upgrade to drive for development.

（二）落实达标排放 / Compliance with Emission Standards

华润水泥按照《水泥工业大气污染物排放标准》等国家、地方大气污染物、水污染物环境保护规范及环保方面的各项法律法规管控污染物排放。

公司持续增加技术研发资金，特别针对在水泥生产过程中的大气污染物如氮氧化物、二氧化硫、粉尘等，全力推动脱硝、脱硫、除尘设备改造，以先进的工艺技术减轻生产活动对环境可能造成的影响，确保各类污染物达标排放。2017 年华润水泥主要排放口二氧化硫排放量 2,726 吨、颗粒物排放量 2,472 吨、氮氧化物排放量 41,513 吨。

另外，华润水泥还升级了污染物排放监控平台。目前在水泥基地的窑头、窑尾排放口均安装了在线监测系统，并与地方环境监督部门联网，对污染物排放实时监控。在此基础上，利用信息技术将所属基地污染物排放数据采集到总部，通过污染物排放监控平台实现总部对各基地污染物排放指标的实时监控、主动预警。

CR Cement controls emission of pollutants in accordance with the national and local environmental laws and regulations on air pollutants and water pollutants including "Emission Standards of Air Pollutants for Cement Industry".

The Company continuously increases the funding for technological research and development for fully promoting transformation of equipment which especially removes air pollutants such as nitrogen oxides, sulphur dioxide and particulate matters generated in the process of cement production. By applying advanced technology, we minimize potential environmental impacts caused by production activities and ensure compliance with emission standards for all types of pollutants. In 2017, the major discharge points of CR Cement emitted 2,726 tons of SO_2, 2,472 tons of particulate matters and 41,513 tons of NO_x.

In addition, CR Cement upgraded the monitor platform for pollutant emission. At present, online monitor systems have been installed at the discharge points of the front and the rear of cement kilns and connected to the local environmental supervision department for real-time monitor and control of emission levels of pollutants. Data on pollutants emission is collected from our production plants and sent to headquarters by utilizing information technology. Headquarters managed to implement real-time monitor and control of pollutant emission indicators of each production plants through the monitor platform for pollutant emission, and proactively issue pre-warning.

2017 年华润水泥主要排放口

二氧化硫排放量

2,726 吨

颗粒物排放量

2,472 吨

氮氧化物排放量

41,513 吨

In 2017, the major discharge points of CR Cement emitted 2,726 tons of SO_2, 2,472 tons of particulate matters and 41,513 tons of NO_x.

全面建成配套脱硝系统
Comprehensive construction of denitration systems

- 华润水泥所有生产线均建成配置 SNCR（选择性非催化还原）脱硫系统，在国内各大水泥集团中率先实现所有熟料生产线脱硝系统全覆盖，实现了氮氧化物末端减排的目标。
- All production lines of CR Cement had been equipped with SNCR (Selective Non-Catalytic Reduction) denitration systems. We are at a leading position among various domestic cement groups in achieving full coverage of denitration systems at all clinker production lines and the objective of emission reduction of nitrogen oxides.
- 同时组织团队探索水泥窑分级燃烧技术，从源头降低氮氧化物产生量，解决脱硝系统运行成本较高和能源浪费问题，确保水泥企业能够长期有效地满足氮氧化物减排的需求。
- Meanwhile, the Company organized teams to explore multi-tiered combustion technology at cement kilns and reduce the volume of nitrogen oxides generated from the sources, in order to resolve the issues of high operational cost of denitration systems and energy wastage and ensure the cement enterprises' requirements for long-term and effective emission reduction of nitrogen oxides.

创新脱硫改造
Innovative transformation of desulphurization systems

· 对生产线进行复合脱硫技术改造，系统脱硫效率可达 98%，二氧化硫排放浓度可控制在 50mg/Nm^3 以下，远低于国家排放标准限值。

· Upon the technological transformation of composite desulphurization systems at our production lines, the desulphurization efficiency of the system could reach 98% and emission density of sulphur dioxide could be controlled within 50mg/Nm^3, which is far lower than the national emission standard limits.

· 截至 2017 年 12 月华润水泥共完成 9 套烟气脱硫系统的建设，确保二氧化硫达标排放，居业内领先水平。

· As of the end of December 2017, CR Cement had completed the construction a total of 9 sets of exhaust gas desulphurization systems in order to ensure the emission level of sulphur dioxide is in compliance with standards and at a leading position in the industry.

实施“电改袋”工程
Project for "replacing the static electricity dust collection systems with bag filter systems"

· 袋收尘与电收尘相比，其排放浓度更低，运行稳定性更高。

· Compared to static electricity dust collection systems, bag filter dust collection systems enable dust emission of lower concentrations and higher operational stability.

· 2017 年 6 月底，公司实现所有窑头 / 窑尾收尘全部为袋式除尘器，累计完成 65 台除尘器的技改 , 改造后收尘效率可达 99.99%，粉尘排放浓度优于国家标准，稳定性得到有力保证。目前，华润水泥所有生产线的颗粒物排放浓度居业内领先水平。

· By the end of June 2017, the Company had equipped the front/rear of all cement kilns with bag filter dust collection systems and completed the technological upgrade of 65 dust collection systems in total. Upon the upgrade, the dust collection efficiency reached 99.99% and the concentration of particulate matters emitted is better than the national emission standard with secured stability. Currently, the emission concentrations of particulate matters of all the production lines of CR Cement are at a leading position in the industry.

绿色工厂示范企业
Pilot corporate with green factories

· 2017 年华润水泥（南宁）有限公司、华润水泥（田阳）有限公司获得国家工业和信息化部批准的第一批绿色工厂示范企业，华润水泥（鹤庆）有限公司获得云南省级绿色制造示范单位。

· In 2017, China Resources Cement (Nanning) Limited and China Resources Cement (Tianyang) Limited were awarded the first batch of pilot corporates with "Green Factories" by the Ministry of Industry and Information Technology of China. China Resources Cement (Heqing) Limited was awarded the green manufacturing pilot corporate by Yunnan provincial government.

华润水泥长期以来高度重视水资源的保护工作，积极倡导节约用水、循环用水。所有生产线生活废水均配套生物化学深度水处理系统，处理后再进行厂内绿化或达标排放。余热发电系统及生产冷却水系统全部循环利用，无污水外排。

水泥生产过程中可消纳工业废弃物，如脱硫石膏、粉煤灰、铁尾矿等，有利于社会总体废弃物的减量化、无害化、资源化处置，对环境保护做出积极贡献。

熟料生产线在物料处理、输送过程中均采用全封闭式传送，物料装卸过程均在封闭的室内进行，同时采用密闭方式收集颗粒物。对各有组织排放的含尘废气均采用高效袋式除尘器进行除尘处理，颗粒物的排放浓度均优于《水泥工业大气污染物排放标准》（GB4915-2013）。除尘器收集的粉尘均返回原料、半成品、成品中再次利用，循环利用生产过程产生的废弃物。

CR Cement has always placed strong emphasis on protection of water resources and actively promotes conservation and recycling of water. Domestic wastewater from all production lines equipped with intensive biochemical wastewater treatment systems are treated, and used for gardening in the factories or discharged in compliance with standards. Water from heat recovery generators and cooling water systems are all recycled and no sewage is discharged.

Industrial waste such as de-sulphur gypsum, fly ash and iron ore tailings can be consumed in the cement production process, which is conducive to processing of aggregate wastes in the society in a mass-reducing, hazard-free and recyclable manner with positive contribution to environmental protection.

Our clinker production lines adopt totally sealed transmission during the processes of handling and conveying of materials. The processes of loading and unloading materials are carried out in a sealed indoor cell, and particulate matters are collected in a sealed condition at the same time. Highly effective bag filter systems have been adopted for dust collection at every component of production line which emits exhaust gas with dust. The concentration of particulate matters emitted is better than that of the "Emission Standards of Air Pollutants for Cement Industry" (GB4915-2013). Dust collected by dust collectors are recycled for raw materials, semi-finished products and finished products, and the wastes generated during production process are recycled.

推动资源综合利用

Promoting composite utilization of resources

华润水泥长期研究和探索工业废渣在水泥生产中的应用，所处置的工业废渣包括脱硫石膏、磷石膏、粉煤灰、湿煤渣、炉底渣和矿渣等。目前，华润水泥的所有基地均能大量消纳工业废弃物，2017 年共消纳工业废渣超过 2,147 万吨。

CR Cement has always been researching and exploring the application of industrial waste in cement production. Industrial waste processed includes de-sulphur gypsum, phosphogypsum, fly ash, wet coal slag, furnace slag and mineral slag. Currently, all cement production plants of CR Cement can consume a considerable amount of industrial waste. In 2017, over 21,470,000 tons of industrial waste had been consumed.

矿山复绿行动

Ecological restoration to the mine

华润水泥确立了科学规划、合理开采、节约资源、促进人与自然和谐发展，建设绿色生态型、环境友好型矿山企业的工作思路。将矿山恢复纳入公司生产运营及长期发展规划，为转变单纯以消耗资源、破坏生态为代价的开发利用方式提供了现实途径。

公司矿区采用无废或少废工艺，基本无废水排放。废渣、夹石全部综合利用，实现废渣零排放，部分堆存含泥石料后期可全部搭配生产。在矿山开采结束后进行覆土，种上藤类植物，逐步恢复植被，使地表的植被覆盖率达到或基本接近矿山开发前的植被覆盖率，逐步恢复生态平衡。

2017 年，华润水泥（贵港）有限公司、华润水泥（富川）有限公司、华润水泥（罗定）有限公司、合营公司广州市越堡水泥有限公司通过了省级绿色矿山的现场评审工作。

CR Cement has confirmed the approach of building a green ecological and environment-friendly mining enterprise through scientific planning, reasonable mining, resources conservation, promotion of harmonious development between human beings and the nature. Restoration of mine is included in production operations and long-term development plans of the Company, offering a practical solution to transforming from development and exploitation at the expense of simply consuming resources and destrying the ecology.

We adopt waste-free or less-waste technology at our mines with virtually no discharge of wastewater. In order to achieve zero discharge of waste residue, we compositely utilize all waste slag and stones, and some argillaceous aggregates stacked up could be completely mixed and used in production later on. After completion of mining, the soil shall be recovered by planting rattan plants for gradual restoration of vegetation such that the surface vegetation coverage rate reaches or is basically close to that prior to mining for restoration of ecological balance.

In 2017, China Resources Cement (Guigang) Limited, China Resources Cement (Fuchuan) Limited, China Resources Cement (Luoding) Limited, and our joint venture Guangzhou Heidelberg Yuexiu Cement Company Limited passed the on-site assessment of provincial-level green mines.

（三）推动节能环保 / Promoting Energy Saving and Environmental Protection

· 环保技术研发及应用 / R&D and application of environmental protection technology

华润水泥一直努力提升研发水平及应用新环保技术，在节能、减排、管控等方向探索新的生产流程、策略和技术。

公司借鉴电力行业成熟的“石灰石－石膏湿法脱硫技术”，升级引进针对水泥行业特点的脱硫技术，研发出具有行业特色的湿法脱硫工艺。从 2016 年底开始，根据脱硫系统运行情况，升级引进复合脱硫技术。新复合脱硫技术的脱硫反应快且效率高，拥有工期短、建设、运行成本低等特点，有效控制二氧化硫排放强度，排放浓度进一步降低。

在协同处置技术方面，公司通过几年的探索与研究，充分借鉴欧洲、日本等发达国家固废处置经验，与国内、国外相关单位合作，开发出“机械生物法预处理＋热盘炉焚烧”“污水厂内干化＋水泥窑焚烧”“机械破碎搭配预处理＋成浆泵送入窑焚烧”协同处置生活垃圾、城市污泥和工业危险废弃物的三大技术路线。据此将城市废弃物“无害化、减量化、资源化”处理，使企业、社区及环境实现共赢发展。

CR Cement has been striving to improve the R&D standards and apply new environmental protection technologies to explore new production processes, strategies and technologies in terms of energy saving, emission reduction, management and control.

With reference to the mature "Limestone - Gypsum Wet Desulphurisation Technology" in the power industry, the Company upgrades and introduces the desulphurisation technology by R&D of wet desulphurisation technology which caters the features of

the cement industry. Since the end of 2016, we upgraded and introduced composite desulphurisation technology based on the operation of our desulphurisation systems. The new composite desulphurisation technology is swift and highly efficient in desulphurisation, featuring with short construction period, low construction and operating costs, which effectively controls the emission intensity of sulphur dioxide and further reduces the emission concentration.

In terms of waste co-processing technology, through years of exploration and research and with reference to the experience of solid waste processing in developed countries such as Europe and Japan, the Company developed top three technological paths of "mechanical biological pre-treatment + HOTDISC incineration", "in-plant drying of sewage water + cement kiln incineration" and "pre-treatment with mechanical crushing + pumping slurry into kiln for incineration" in co-operation with domestic and international relevant organizations to co-process municipal waste, urban sludge and industrial hazardous waste. In this regard, municipal waste is treated in a "hazard-free, mass-reducing and recyclable" manner so that enterprises, communities and the environment achieve development with mutual gain.

· 节约能源消耗 / Reducing energy consumption

华润水泥建立了能源管理系统以及《节能减排监督管理》制度，对公司生产过程中所耗能源、所耗资源均计量统计，用于评估生产表现及找出可改善空间。2017 年，华润水泥综合能源消费量为 773.2 万吨标煤，万元产值可比价综合能耗及万元增加值可比价综合能耗分别为 3.03 吨标煤／万元人民币及 8.61 吨标煤／万元人民币，指标持续改善。2017 年，公司还持续推进能源节约工作，主要包括能源的运用、节约和循环利用，节能环保技术投资，减排技术改造、研发与创新等。

CR Cement established an energy management system and the policy "Supervision and Management of Energy Saving and Emission Reduction". All energy and resources consumed during the production process of the Company are measured for the assessment of production performance and identification of room for improvement. In 2017, CR Cement's comprehensive energy consumption was 7.732 million tons of standard coal. The consolidated energy consumption per RMB10,000 output and consolidated energy consumption per RMB10,000 value addition was 3.03 tons of standard coal/RMB10,000 and 8.61 tons of standard coal/RMB10,000 respectively, which had been continuously improving. In 2017, the Company also continued to promote energy conservation, which mainly included utilization, conservation and recycling of energy, investment in energy-saving and environmental protection technologies, technological transformation, R&D and innovation of emission reduction.

2017 年，华润水泥综合能源消费量

773.2 万吨标煤

In 2017, CR Cement's comprehensive energy consumption was 7.732 million tons of standard coal

2017 年，公司生产过程温室气体排放

5,712.9 万吨二氧化碳当量

温室气体排放密度

0.8574 吨二氧化碳当量 / 吨熟料

The Company's total greenhouse gas emissions during the production process was 57,129,000 tons of carbon dioxide equivalent, and the greenhouse gas emission density was 0.8574 tons of carbon dioxide equivalent per ton of clinker.

· 减少温室气体排放 / Reducing greenhouse gas emissions

华润水泥通过配套余热发电系统、辊压机粉磨技术、实施窑炉技改、开展高压变频改造、提高水泥窑磨操作水平，以及开展各种节能降耗精益项目等方式实现节能减排。2017 年，公司生产过程温室气体排放合计为 5,712.9 万吨二氧化碳当量，温室气体排放密度为 0.8574 吨二氧化碳当量 / 吨熟料。

此外，华润水泥还积极配合广东省、福建省政府开展碳排放权配额管理试点工作（广东省从 2013 年开始试点、福建 2016 年开始试点），采用中国核证减排量（CCER）配额置换等方式实现低成本履约。所属广东省区域的工厂已全部完成 2013-2016 年度碳排放权配额的清缴，所属福建省区域的工厂已全部完成 2016 年度碳排放权配额的清缴。

CR Cement achieves energy saving and emission reduction by implementing residual heat recovery generation systems, roller press grinding technology, technological transformation of kiln furnaces, high-voltage frequency-conversion transformation, improvement on operation capabilities of cement kilns and grinding facilities, and various lean projects on energy saving and consumption reduction. In 2017, the total greenhouse gas emissions during the Company's production process was 57,129,000 tons of carbon dioxide equivalent, and the greenhouse gas emission density was 0.8574 tons of carbon dioxide equivalent per ton of clinker.

In addition, CR Cement actively collaborated with Guangdong and Fujian provincial governments in carrying out the pilot work of carbon emission quota management (the pilot work has commenced since 2013 in Guangdong and since 2016 in Fujian) and achieved low-cost contract performance by adopting quota replacement of the Chinese Certified Emission Reduction (CCER). All our factories in Guangdong have completed settlement of carbon emission quota for years 2013-2016, while all our factories in Fujian have completed settlement of carbon emission quota for year 2016.

配套余热发电

Residual Heat Recovery Generation

华润水泥各基地均配置了余热发电机组，2017 年实现并网电量 20.47 亿千瓦时，相当于节约 25.15 万吨标准煤，减少排放二氧化碳 69.18 万吨，节能减排效果显著。

All the production plants of CR Cement are equipped with residual heat recovery generators. In 2017, our residual heat recovery generators generated 2,047 million kWh of electricity, representing a saving of 251,500 tons of standard coal and a reduction of CO_2 emission by 691,800 tons, with significant results in energy saving and emission reduction.

（四）开展协同处置 / Launching Waste Co-Processing

利用水泥窑协同处置固体废弃物，较传统填埋方式大幅节约土地资源，而且有效利用窑内高温去除二噁英等有毒污染物，实现“无害化、减量化、资源化”处置，为当地居民创造更健康的生活环境。

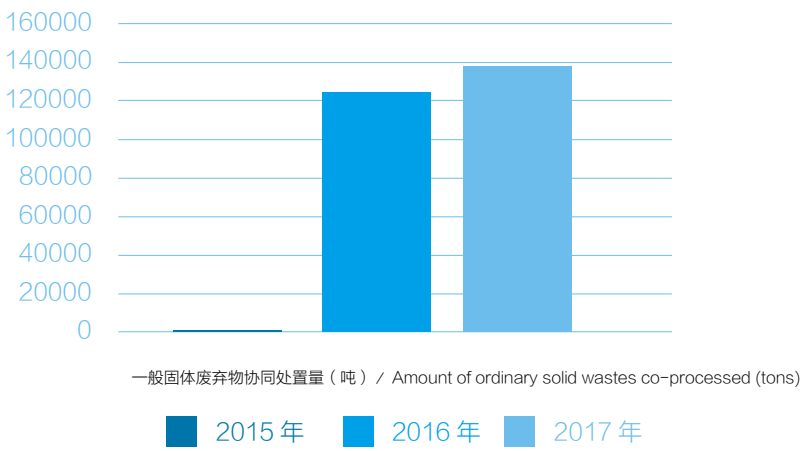
Compared to traditional landfilling, solid waste co-processing by use of cement kilns could substantially conserve land resources and eliminate poisonous pollutants such as dioxin by effective use of heat inside cement kilns for achieving waste treatment in a "hazard-free, mass-reducing and recyclable" manner and creating a healthier living environment for local residents.

· 开展协同处置，与城市共生共存 / Launching Co-Processing for Co-Existence with Cities

目前，位于广西宾阳县的生活垃圾协同处置项目，合营公司位于广东广州市的市政污泥协同处置项目、位于广西南宁市的市政污泥协同处置项目，位于海南昌江的危废协同处置项目已建成；位于广西田阳县和云南弥渡县的 2 个生活垃圾协同处置项目预计于 2018 年上半年建成。华润水泥成为了中国水泥行业同时拥有三类固废协同处置项目的企业之一。

Currently, the construction of the municipal waste co-processing project in Binyang County, Guangxi, the urban sludge co-processing project of joint venture in Guangzhou City, Guangdong, the urban sludge co-processing project in Nanning City, Guangxi and the hazardous waste co-processing project in Changjiang, Hainan have been completed.The two municipal waste co-processing projects in Tianyang County, Guangxi and Midu County, Yunnan are expected to complete construction in the first half of 2018. CR Cement has become one of the enterprises in the cement industry in China possessing three types of solid waste co-processing projects.

近三年协同处置固体废弃物量 / Amount of solid wastes co-processed in the past 3 years



广西田阳县日处置 500 吨生活垃圾协同处置项目（预计 2018 年上半年建成）
The municipal waste co-processing project in Tianyang County, Guangxi with a daily processing capacity of 500 tons (expected completion of construction in the first half of 2018)

合营公司位于广东广州市日处置 300 吨干化污泥的市政污泥协同处置项目（2017 年 9 月建成）
The urban sludge co-processing project of joint venture in Guangzhou City, Guangdong with a daily processing capacity of 300 tons of dried sludge (construction completed in September 2017)

海南昌江年处置三万吨危废协同处置项目（2018 年 2 月建成）
The hazardous waste co-processing project in Changjiang, Hainan with an annual processing capacity of 30,000 tons (construction completed in February 2018)

研究协同处置前沿技术 / Research on advanced technologies of waste co-processing

创新发展大会
Conference for Innovation and Development

作为协同处置领域的优秀企业代表，华润水泥应邀出席“首届全国水泥窑协同处置创新发展大会”。

会上，华润环保工程（宾阳）有限公司获大会颁发的“中国水泥工业水泥窑协同处置示范工程奖”，华润水泥与合作方共同获大会颁发的“中国水泥窑协同处置技术推广应用先进典型奖”。

As the outstanding corporate representative in the field of waste co-processing, CR Cement was invited to attend the "First National Conference for Innovation and Development of Co-Processing by Use of Cement Kilns".

In the conference, China Resources Environmental Protection Engineering (Binyang) Limited was honoured the "Pilot Project of Co-Processing by Use of Cement Kilns in the Chinese Cement Industry", while CR Cement and business partners were jointly awarded the "Advanced Model for Promotion and Application of Technologies in Co-Processing by Use of Cement Kilns in China".

行业交流
Experience Sharing within the Industry

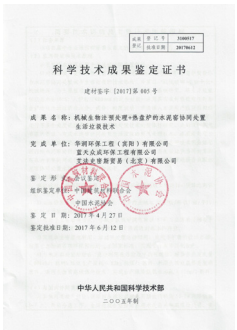
2017 年第十五届中国国际环保展览会上，华润水泥与合作方在展会上共同设置展位，以利用水泥窑协同处置城乡生活垃圾项目为依托，展示共同研发的具有国际先进水平的“机械生物法预处理 + 热盘炉焚烧”水泥窑协同处置城乡生活垃圾技术，并与参会的各单位、专家进行广泛技术交流，取得了良好的宣传推广效果。

In 2017, at the 15th China International Environmental Protection Exhibition, CR Cement and business partners jointly set up a booth to display the "mechanical biological pre-treatment + HOTDISC incineration" technology at a leading international position, which had been based on and applied in the municipal waste co-processing project by use of cement kilns.The Company had extensive exchange on technologies with all units, companies and experts in attendance, which achieved excellent effect on promotion.

科技成果鉴定
Technology Appraisal

4 月 27 日，中国建筑材料联合会与中国水泥协会在南宁市联合组织召开了科技成果鉴定会，“机械生物法预处理 + 热盘炉焚烧”水泥窑协同处置城乡生活垃圾技术通过科技成果鉴定，项目成果的整体技术达到国际先进水平。

On 27 April, China Building Materials Federation and China Cement Association jointly organized a technology appraisal meeting in Nanning City. The "mechanical biological pre-treatment + HOTDISC incineration" technology applied in the municipal waste co-processing project by use of cement kilns passed the appraisal and achieved a leading international positon.


科学技术成果鉴定证书

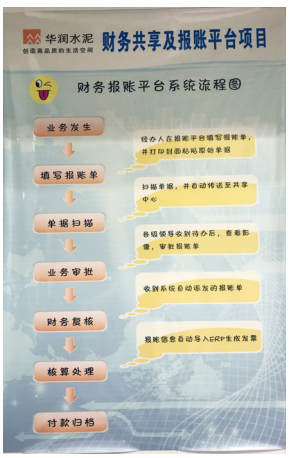
（五）践行绿色办公 / Implementation of Green Office

华润水泥在保护环境的每个细节上不遗余力，上至生产营运，下至一般办公均提倡节能理念。公司倡导员工在日常工作中积极践行绿色办公，发出《关于提倡绿色环保办公的温馨提示》，呼吁员工多使用环保纸、双面打印，鼓励无纸化网络办公，多利用电子邮件、视频会议，减少一次性办公用品消耗等；公司公文审批及流转也主要通过公司 OA（办公自动化）、SRM（供应商关系管理系统）等信息化系统实现。

其他措施包括倡导 4 楼以下步行上下楼、维持空调温度设置为摄氏 26° 、离开前检查照明“人走灯灭”等节电生活方式；以及提醒员工定时检查水龙头滴漏情况，坚决避免“长流水”现象发生。

CR Cement devoted great effort in every details to promoting the concepts of environmental protection and energy saving, from production and operation to general offices. The Company advocated proactive implementation of green office in daily operation by issuing "Kind Reminder on the Promotion of Green Office", and promoting the use of environment-friendly paper, double-sided printing, paperless and Internet office, frequent use of email and video conference, and reducing consumption of disposable office supplies.The Company also used digital systems like OA (Office Automation) and SRM (Supplier Relationship Management) for internal approval and operation.

The Company also advocated other measures for power saving including use of stairs to/from the fourth floor or below, setting the air conditioning temperature at 26 degrees Celsius and switching off lights before leaving our office. Employees are reminded to conduct regular inspection on dripping taps to prevent "persistent water dripping".



无纸化办公
Paperless office

节电温馨提示
Kind Reminder for Energy Saving

（六）环保公益倡导 / Environmental Protection Advocacy

· 内部环保意识增进 / Stimulating internal awareness of environmental protection

华润水泥充分调动全体员工积极参与节能减排绿色低碳活动，在全公司范围内宣传节能低碳意识，广泛宣传生态文明、绿色低碳发展理念，努力建设绿色华润。

CR Cement fully mobilise all employees to proactively participate in green and low-carbon activities for energy saving and emission reduction. In striving to build a green China Resources, we promote the awareness of energy saving and low carbon across the Company and widely advocate the concept of ecological civilization, green and low-carbon development.

1. 强化宣传力度 / Strengthening promotion efforts

根据公司环保现状，结合节能宣传周和全国低碳日宣传主题，各基地组织员工开展了形式多样的节能环保宣传活动。通过深入生产现场、制作横幅标语、张贴宣传画、撰写板报海报、编制 EHS 简报节能低碳宣传特刊、张贴节电节水标识、发放宣传单，借助 LED 显示屏、QQ 和微信平台，员工班前班后讨论、电视推送知识及视频等多种方式，深化宣传力度，使得各层级员工均能通过不同的渠道获知节能降碳、工业低碳发展的理念和意义；时刻提醒员工，合理使用资源，保护环境，倡导节约光荣、浪费可耻的观念，全面提高员工的节能环保意识。

Based on the Company's current status of environmental protection, and incorporating the promotion themes of the energy conservation week and the National Low Carbon Day, each production plant organized a wide variety of publicity activities of energy saving and environmental protection. We acquaint staff of every level with the concepts of significance of energy saving and industrial low-carbon development through difference channels including intensive visits to production sites, producing banner with slogans, posting promotion materials, preparing display boards of news and posters, compiling special issues for EHS briefings on energy saving and low carbon, posting energy-saving and water-saving signs, distributing leaflets, leveraging on LED display, QQ and WeChat platforms, discussions among staff before and after work, knowledge provided on TV and videos etc. Staff are constantly reminded to use resources reasonably for environmental protection. We advocate the virtue of saving and discourage shameful wastage, so as to raise the staff’s all-rounded awareness on energy saving and environmental protection.

廉江水泥环保宣传栏
Environmental Protection Billboard at Lianjiang Cement

2. 开展环保知识培训 / Lauching training on environmental protection knowledge

各基地结合“安全生产月”活动，组织员工及家属参与安全环保知识有奖竞赛等活动，在活动的设计中，巧妙加入日常生活、工作中涉及的节能降耗、污染物排放相关设备和行为，强调节约环保意识的重要性和必要性。通过增强活动的趣味性和参与度，增强员工对国家节能减排相关政策的认知，提高节能、环保、低碳意识。

Incorporating the "Work Safety Month" event, each production plant organized its staff and their families to participate in activities such as safety and environmental protection quiz competitions. In designing the activities, each production plant skillfully incorporated energy saving and consumption reduction in daily lives and at work, as well as equipment and behavior relating to pollutant emission, with emphasis on the importance and necessity of the awareness for conservation and environmental protection. Through enhancing fun and participation level in the activities, we have facilitated staff's awareness of the national policies on energy saving and emission reduction, which help to raise their awareness on energy saving, environmental protection and low carbon.

基地安全开放日活动
Safety Open Day Event at production plant

EHS 知识竞赛
EHS Quiz Competition

· 助力社区环保公益 / Assisting in environmental protection and community charity

1. 组织环保活动 / Organizing environmental protection activities

倡导从身边的小事做起，倡导步行、骑自行车、乘坐公司班车或公共交通工具等低碳出行方式；组织开展“绿色出行、低碳生活”为主题的徒步远足宣传活动；在厂区、矿区、生活区等地开展植树活动，宣传倡导绿色环保理念。

The Company encourages its staff to start with minor daily matters by promoting low-carbon commuting modes such as walking, cycling, taking the Company' s shuttle bus or public transportation. We also organize jogging and hiking promotional activities themed with "Green Commute, Low-Carbon Life" and tree planting activities at factory areas, mining areas and living areas for advocacy of the green concept of environmental protection.

贵港水泥员工绿色出行活动

Staff of Guigang Cement in Green Commuting Event

龙岩水泥员工义务植树活动　　Staff of Longyan Cement in the Voluntary Tree-Planting Event

2. 参加当地活动 / Participating in local activities

组织员工参加所在市县的节能宣传周、世界环境日等相关活动。如华润水泥（昌江）有限公司与当地环保局共 80 人到海边捡拾垃圾和植树等，体现出企业对节能低碳环保工作的重视，同时积极宣传了公司的环保理念，提高公司的影响力。

The Company organises staff to participate in relevant activities of energy-saving promotion weeks in their cities and counties, as well as world environment day. A total of 80 people from China Resources Cement (Changjiang) Limited and local environmental protection bureaus collected rubbish at the seaside and planted trees, which reflected the Company' s keen attention to energy saving and low-carbon environmental protection. At the same time, the Company proactively promoted our environmental protection concept for enhancing the Company' s influence.

3. 参加低碳行动 / Participating in low carbon activities

华润水泥持续践行水泥行业“低碳技术合作伙伴倡议”，积极参与由水泥可持续发展倡议行动组织和联合国工业发展组织共同发起的“水泥可持续发展知识中心”项目，并成功承办水泥可持续发展倡议行动组织中国区联络代表工作会议，努力推动水泥行业的转型发展和可持续发展，提升中国水泥工业在世界水泥工业中的地位和影响力。

CR Cement persistently puts into practice the "Low-Carbon Technology Partnerships Initiative" of the cement industry and actively participates in the project of "Cement Sustainable Development Knowledge Centre" jointly initiated by Cement Sustainability Initiative and United Nations Industrial Development Organization. We successfully organized work conferences for the representatives of Cement Sustainability Initiative in China, and have been committed to fostering the transforming and sustainable development of the cement industry as well as enhancing the positions and influences of the Chinese cement industry in the global cement industry.

CSI 中国区联络代表会议

Conference for the Representatives of Cement Sustainability Initiative in China