

Observation report on carbon emission Information

Disclosure of A-share listed companies in cement industry



PECC
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Abstract

On September 22, 2022, the second anniversary of China's two-carbon goal, Caijing magazine held the second "Carbon Neutrality Summit Forum" in Beijing, at which it released the "Carbon Emission Ranking of China's 100 Listed Companies (2022)". The list covers 100 listed companies with high carbon emissions, including eight major industries. There are 29 listed companies in power generation, 18 listed companies in cement and 22 listed companies in steel and steel, with total carbon emissions of 2.064 billion tons, 1.126 billion tons and 634 million tons respectively, accounting for 75% of the total emissions of the list.

Power generation and cement accounted for all of the top 30 in the carbon intensity rankings. Taking 10,000yuan revenue as the unit of strength, the carbon intensity of power generation and cement revenue is 16.50 tons / 10,000 yuan and 11.65 tons / 10,000 yuan respectively, much higher than the average of 2.74 tons / 10,000 yuan in the list.

Cement is an important basic raw material for national economic construction. Due to its products, production materials, technological characteristics and huge consumption, the total amount of carbon emission and carbon emission reduction are very difficult. On November 8, 2022, the Ministry of Industry and Information Technology, the National Development and Reform Commission, the Ministry of Ecology and Environment, and the Ministry of Housing and Urban-Rural Development jointly issued the Implementation Plan for Achieving Carbon Peak in the Building Materials Industry, requiring that the unit energy consumption and carbon emission intensity of key products such as cement, glass and ceramics should be continuously reduced, and the comprehensive energy consumption level of cement clinker per unit product should be reduced by more than 3%.

In this environment, the disclosure of carbon emission information will be the long-term focus of policy and the underlying data foundation to help realize the dual-carbon goal. Listed companies in the cement industry should do a detailed and active job of carbon emission information disclosure, and actively implement the requirements of carbon peak and carbon neutrality.

1. Disclosure requirements and scope of research

From 2013 to 2016, nine provinces (municipalities) including Beijing, Tianjin, Shanghai, Chongqing, Hubei, Guangdong, Shenzhen, Sichuan and Fujian successively carried out carbon emission trading trials, and successively issued relevant regulations on the disclosure of greenhouse gas emissions by enterprises. Key carbon emitters in energy-intensive industries, including power, steel, chemicals, cement, petrochemicals and paper, are required to submit annual carbon emission data to local ecological environment departments.

In 2016, The State Council's 13th Five-Year Plan for Controlling Greenhouse Gas Emissions encouraged state-owned enterprises, listed companies and enterprises included in the carbon emission trading market to voluntarily disclose carbon emission information.

On June 28, 2021, China Securities Regulatory Commission issued "Standards on Information Disclosure Content and Format of Publicly Issued Securities Companies No. 3 -- Content and Format of Semi-Annual Report (Revised 2021)" and "Standards on Information Disclosure Content and Format of Publicly Issued Securities Companies No. 2 -- Content and Format of Annual Report (Revised 2021)". Listed companies are encouraged to voluntarily disclose carbon emission information during the reporting period.

In February 2022, the Measures for the Management of Corporate Environmental Information Disclosure in Accordance with the Law and the Guidelines on the Format of Corporate Environmental Information Disclosure in Accordance with the Law were released, which detailed the disclosure contents of the annual corporate environmental information report and clearly required that the report should include carbon emission information. At present,

some state-owned enterprises and listed companies have responded to the call to voluntarily disclose carbon emission data in industry annual reports, social responsibility reports and other carriers.

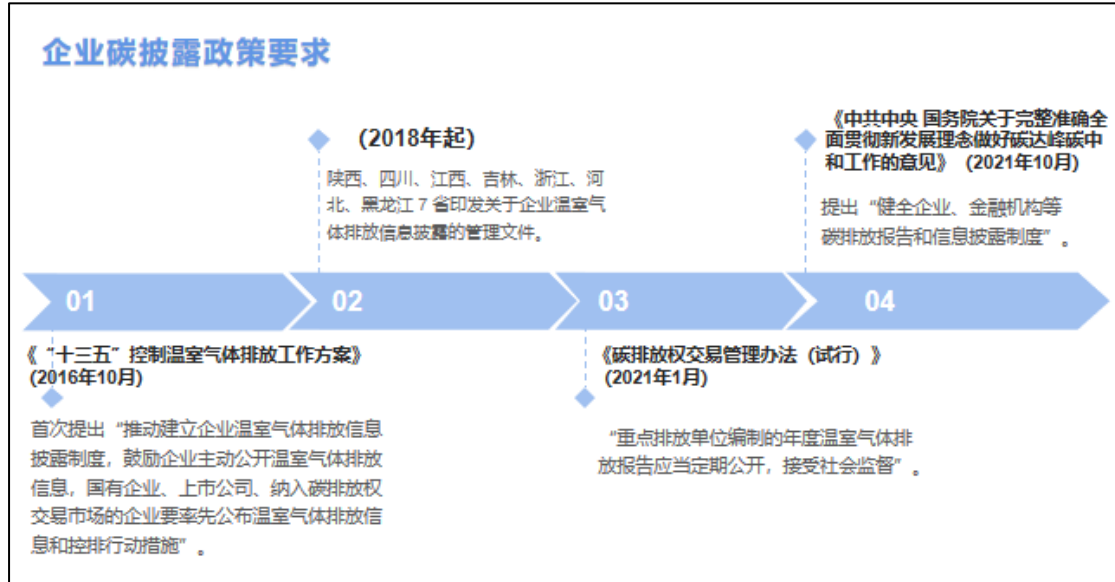


Figure 1 Development history of corporate carbon disclosure policy requirements

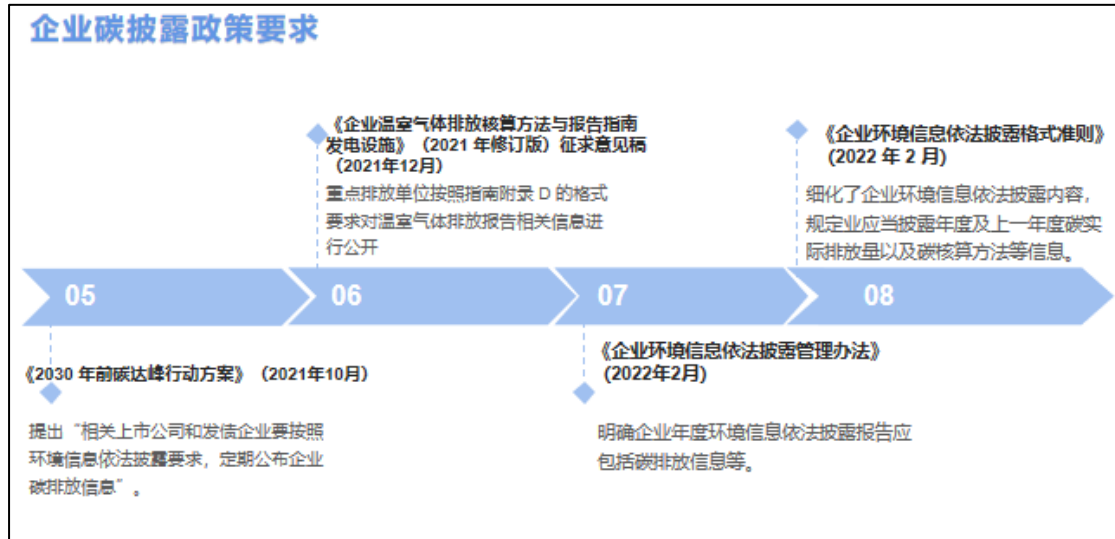


Figure 2 Development history of corporate carbon disclosure policy requirements

The carbon emission information disclosure requirements of listed companies are becoming stricter. Based on the above, Lvse Jiangnan Public Environmental Concern Center (hereinafter referred to as Lvse Jiangnan) conducted research on cement manufacturing companies (including affiliated

enterprises with equity ratio of more than 50%) listed in the A-share market and listed in the list of key polluters published by environmental protection authorities. This paper analyzes the current situation of carbon emission information disclosure in 2021 annual reports, annual social responsibility reports and annual environmental, social and governance reports of 16 listed companies, hoping to find good practice cases of listed companies implementing the double carbon target, point out the problems existing in corporate disclosure and put forward suggestions, so as to improve the level of carbon emission information disclosure in the cement industry in the future.

Table 1 Objects to be observed in the current report

Listed company code	Abbreviation	Bourse
601992	BBMG Group	Shanghai Stock Exchange
600585	Conch cement	Shanghai Stock Exchange
600802	Fujian cement	Shanghai Stock Exchange
600720	Qilianshan	Shanghai Stock Exchange
600801	Huaxin cement	Shanghai Stock Exchange
600668	Jianfeng Group	Shanghai Stock Exchange
600326	Xizang Tianlu	Shanghai Stock Exchange
600425	Qingsong Building Materials	Shanghai Stock Exchange
600449	Ningxia Building Materials	Shanghai Stock Exchange
600678	Sichuan Jinding	Shanghai Stock Exchange
600883	Bowen Technology	Shanghai Stock Exchange
000877	Tianshan Stock	Shenzhen Stock Exchange
000789	Wannianqing	Shenzhen Stock

		Exchange
000672	Shangfeng cement	Shenzhen Stock Exchange
002233	Tapai Group	Shenzhen Stock Exchange
000401	Jidong cement	Shenzhen Stock Exchange

Lvse Jiangnan takes GRI's Sustainable Development Reporting Standards, Stock Exchange of Hong Kong's Environmental, Social and Governance Reporting Guidelines, Chinese Academy of Social Sciences' Guidelines for Preparing Corporate Social Responsibility Reports, TCFD Guidelines, Shanghai Stock Exchange's Environmental Information Disclosure Guidelines and other methods as the basis for the key performance indicators of corporate carbon emission information disclosure. Specific indicators are described as follows.

Table 2 Key performance indicators of carbon emission information disclosure

Indicator	Definition
Total greenhouse gas emissions	Whether the enterprise has released total greenhouse gas emission information
Whether it has been checked	Whether the greenhouse gas emissions released by the company are verified by a third party
Range 1 emissions	Does the company publish Range 1 emission information (direct emissions, such as those from burning fossil fuels)
Range 2 emissions	Does the company publish Range 2 emission information (indirect emissions, such as those generated by outsourced electricity, heat, etc.)
Range 3 emissions	Whether the enterprise has released Scope 3 emission information (emissions from upstream and downstream activities of the enterprise's production and operation)
Carbon emission intensity/density	Whether the greenhouse gas emission intensity or density information is disclosed in the report
Energy usage	Whether the report discloses information about energy consumption by category
Carbon emission target	Whether greenhouse gas emissions targets are disclosed in the report

Environmental protection investment/input	Whether the report discloses information about environmental investment
Subsidiary level	Whether the emission information of the subsidiary is disclosed in the report

2. Carbon emission information disclosure performance of listed companies

Through the analysis of the carbon emission information disclosure content in the annual reports and corporate social responsibility reports of these 16 A-share listed companies, 2 of them have effectively disclosed and relatively complete information, 13 have not fully disclosed information, and 1 has not disclosed.

2.1 1 listed company did not disclose carbon emissions related information

Lvse Jiangnan found in its observation that Bowen Technology (600883) only disclosed its 2021 annual report, and did not mention information about carbon emissions in the annual report.

1) Basic Information

The full name of Bowen Technology is Yunnan Bowen Technology Industry Co., LTD. It belongs to non-metallic mineral products industry and was listed on the Shanghai Stock Exchange in December 1995. Main cement grinding and sales.

2) Comparison of key performance indicators of carbon emission information disclosure

Total greenhouse gas emissions	×
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Whether it has been checked	×
Range 1 emissions	×
Range 2 emissions	×
Range 3 emissions	×
Carbon emission intensity/density	×
Energy usage	×
Carbon emission target	×
Environmental protection investment/input	×
Subsidiary level	×

Key performance indicators were not disclosed.

3) Corporate carbon emission information disclosure

After consulting the 2021 annual report of Bowen Technology, its carbon emission information disclosure made "not applicable" statement, or contrary to the current environment of carbon emission information disclosure.

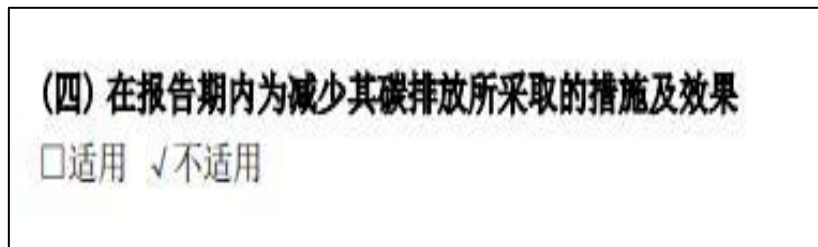


Figure 3 Information disclosure of Bowen Technology 2021 Annual Report

2.2 The information disclosure of 13 listed companies is not perfect, and the initiative and quality need to be improved

Lvse Jiangnan observed the annual environment-related reports of 16 listed companies, and found that 13 listed companies had similar topics of carbon emission related information disclosure. They all mentioned the measures and effects they had done to reduce carbon emissions during the reporting period,

and mainly explained the green office, equipment upgrading and transformation, environmental protection investment and other aspects of the company. Important data on carbon emissions are incomplete or not disclosed, so it is impossible to see directly the efforts of listed companies in dealing with the "dual carbon" target.

Lvse Jiangnan takes 3 of them as an example to illustrate, wherein the BBMG Group also disclosed the total amount of carbon emissions in the report, Shangfeng cement disclosure stage type targets and strategic planning.

Case 1: BBMG Group (601992)

1) Basic Information

BBMG Group, whose full name is Beijing BBMG Group Co., LTD., belongs to the non-metallic mineral products industry and was listed on the Shanghai Stock Exchange in March 2011. Main cement, new building materials, real estate development and property investment and management.

2) Comparison of key performance indicators of carbon emission information disclosure

Total greenhouse gas emissions	×
Whether it has been checked	×
Range 1 emissions	×
Range 2 emissions	×
Range 3 emissions	×
Carbon emission intensity/density	√
Energy usage	√
Carbon emission target	×
Environmental protection investment/input	√

Subsidiary level	×
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By comparing the annual report and social responsibility report of BBMG Group with the indicator table, we can see that the company disclosed about half of its key performance, such as total greenhouse gas emissions of 72,716,500 tons in 2021 and carbon emission density of 5.88 tons of carbon dioxide equivalent per 10,000 yuan.

3) Corporate carbon emission information disclosure

(四) 在报告期内为减少其碳排放所采取的措施及效果

√适用 □不适用

为切实相应国家碳达峰碳中和 3060 战略决策部署，金隅集团将绿色低碳作为可持续发展战略之一，积极应对气候变化，持续发掘内部节能降碳空间，提升节能降碳水平。

节能减碳设计、规划、实施水平持续提高。2021 年，编制《金隅集团碳达峰碳中和“十四五”规划》并上报北京市，明确了集团各产业十四五期间的节能降碳目标及重点措施，并成立领导专班。在此同时，各业务板块通过持续加大节能降碳改造、应用各类高效节能技术与装备、提升水泥熟料燃料替代率，实施超低能耗建筑及零碳建筑示范，布局可再生能源应用等一系列重要举措，节能降碳工作取得显著成效。二氧化碳排放总量 7271.65 万吨，较同期下降 9.39%。

水泥产业单位熟料能耗、煤耗、碳排放量持续下降。集团水泥板块 2021 年可比熟料综合煤耗完成 96.32kgce/t，同比下降 1.77%，日产熟料 3000 吨以上生产线的 88.68%可比熟料综合煤耗指标达到国标先进值水平；可比水泥综合电耗完成 72.94kwh/t，同比下降 1.81%，96.22%以上的有窑企业可比水泥综合电耗指标达到国标先进值水平。布局开展适用于水泥窑的多源多品种替代燃料技术开发，有序推进协同处置生物质垃圾、有热值固废等燃料替代技术，燃料替代率不断提高。水泥板块二氧化碳排放总量 7218.58 万吨，较同期下降 10.06%；吨熟料碳排放量较同期下降 1.08%。

建筑节能与环境品质持续提升。加速超低能耗建筑及零碳建筑技术体系等创新成果转化落地。全力推进上海杨浦超低能耗项目建设以及北京怀柔兴发低碳园区与零碳建筑方案设计。提升自持有住宅小区、公共建筑绿色运营水平，通过推进供热、供电供需耦合、智能调控升级、设备节能升级以及老旧小区节能改造等措施，建筑节能水平、居住环境品质同步不断提升。

Figure 4 Information disclosure of BBMG's annual report 2021.d

指标	单位	2021 年	2020 年
燃煤消耗量	万吨	1,026.04	1,128.89
柴油消耗量	吨	25,301.63	25,093.28
汽油消耗量	吨	877.56	820.37
天然气消耗量	万标准立方米	6,058.91	4,991.80
外购电力消耗量	万千瓦时	665,967.19	716,449.12
外购热力使用量	百万千焦	151,363.88	130,162.64
综合能源消耗折标煤总量	吨标准煤	8,271,383.68	9,132,298.36
综合能源消耗折标煤密度	吨标准煤/万元	0.67	0.85
温室气体排放量	万吨二氧化碳当量	7,271.65	8,025.63 (经重列)
温室气体排放密度	吨二氧化碳当量/ 万元	5.88	7.43 (经重列)
总用水量	吨	28,516,246.04	27,368,987.59
包装材料消耗量	吨	28,228.05	20,175.61
包装材料消耗密度	吨/万元	0.0023	0.0019

Figure 5 BBMG social responsibility Report disclosure in 2021

Case 2: Shangfeng Cement (000672)

1) Basic Information

Shangfeng Cement, full name of Gansu Shangfeng Cement Co., LTD., belongs to non-metallic mineral products industry, listed in Shenzhen Stock Exchange in December 1996. Main cement clinker and cement products production.

2) Comparison of key performance indicators of carbon emission information disclosure

Total greenhouse gas emissions	×
Whether it has been checked	×
Range 1 emissions	×
Range 2 emissions	×
Range 3 emissions	×
Carbon emission intensity/density	×

Energy usage	√
Carbon emission target	×
Environmental protection investment/input	√
Subsidiary level	×

In the disclosure of key performance indicators, Shangfeng Cement is not excellent, only in its annual report and social responsibility report to disclose the use of energy and environmental protection investment, in the specific data has not been effectively disclosed, but the enterprise for the future development and possible risks to make phased strategic planning, conducive to the enterprise's own identification and response to climate risks. We are committed to accelerating green transformation.

3) Corporate carbon emission information disclosure

<p>环境治理和保护的投入及缴纳环境保护税的相关情况</p> <p>2021 年公司各子公司投入 11,575 万元进行环境治理和保护，缴纳环境保护税 669.39 万元。</p> <p>在报告期内为减少其碳排放所采取的措施及效果</p> <p>2021 年，公司利用余热发电 4.48 亿度，比上年增长 0.9 亿度，平均单位发电量 30.79 度/吨，折合节约 5.51 万吨标煤，减少二氧化碳排放量 14.86 万吨，解决了熟料窑 55% 以上的生产自用电量。</p>

Figure 6 Information disclosure in the 2021 annual report of Shangfeng Cement

技术改造与节能降耗

公司是安徽省首家实施 SNCR（选择性非催化还原法）脱硝工艺技术的企业，公司有四项环保技术被列入中国水泥行业标准示范案例。

2021 年公司结合新的能效等级限额标准，围绕节能、降耗、减排、智能化建设、安全达标和绿色工厂建设等方面积极引进新工艺、新技术，加大技术改造投入，主要应用了包括低氮燃烧技术、电改袋除尘技术、余热发电技术、节能变频等技术。

公司积极采用新技术对现有生产线进行技术改造

各子公司实施了精准脱硝和复合脱硫技术，脱硝脱硫成本明显下降。

新疆、宁夏、贵州等公司利用煤矸石、燃煤炉渣、金属冶炼废渣等工业废渣配料，熟料标准煤耗下降明显。

各子公司还积极采用了空压机变频改造、罗茨风机更换为高效磁悬浮风机、预热器降阻改造等技术手段，降低了单位熟料能耗。

各公司粉磨车间积极优化粉磨工艺参数，并对辊压机系统做了优化改造，使系统产量均有所提高，单位产品粉磨综合电耗较上年度有所下降。

宁夏上峰公司投资 2,260 万元将 2# 窑第三代篦冷机升级改造为第四代篦冷机，技改后吨熟料标准煤耗下降了 1.2kg.cl/t。

- # 低氮燃烧技术
- # 电改袋除尘技术
- # 余热发电技术
- # 节能变频技术

Figure 7 Shangfeng Cement 2021 social responsibility report disclosure

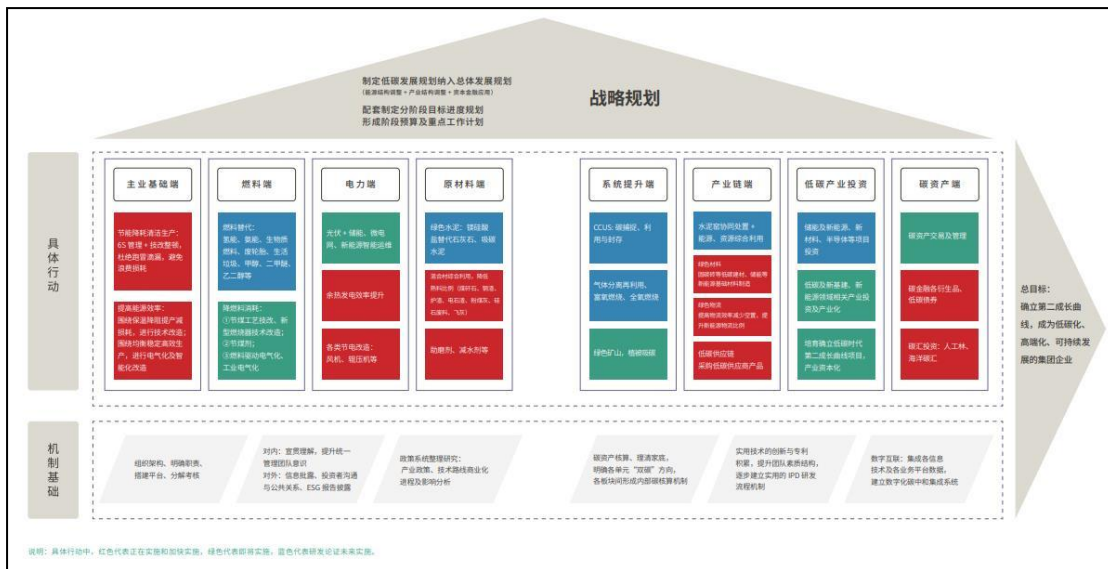


Figure 8 Shangfeng Cement 2021 social responsibility report disclosure



Figure 9 Shangfeng Cement 2021 social responsibility report disclosure

Case 3: Tapai Group (002233)

1) Basic Information

Tapai Group, whose full name is Guangdong Tapai Group Co., LTD., belongs to the non-metallic mineral products industry and was listed on the Shenzhen Stock Exchange in May 2008. Main cement production and sales.

2) Comparison of key performance indicators of carbon emission information disclosure

Total greenhouse gas emissions	×
Whether it has been checked	×
Range 1 emissions	×
Range 2 emissions	×
Range 3 emissions	×
Carbon emission intensity/density	×
Energy usage	√
Carbon emission target	×

Environmental protection investment/input	√
Subsidiary level	×

In its annual report and social responsibility report, Tapai Group only discloses energy use and environmental protection investment, including renewable energy utilization, energy efficiency improvement, process adjustment and other projects, which is not representative. The quality of report disclosure needs to be improved.

3) Corporate carbon emission information disclosure

<p>在报告期内为减少其碳排放所采取的措施及效果</p> <p>√ 适用 □ 不适用</p> <p>2021年，公司认真践行绿色低碳发展的社会责任，紧紧围绕国家实现碳达峰碳中和的中长期目标，贯彻新发展理念，构建新发展格局，加大绿色转型、智能升级力度，积极践行绿色低碳发展道路。主要通过技术升级、余热发电、光伏发电、替代燃料替代原料水泥窑协同处置等措施，实现生产工艺碳减排、生产能耗碳减排，全力推进发展循环经济。</p> <p>1、加大企业节能改造和技术创新工作。按照年初制定《2021年技术改造项目计划》要求，围绕节能、减排、降耗、协同处置、智能化建设、安全达标和绿色工厂建设等方面开展节能技术改造。不断完善生产自适应控制系统、智能专家系统、生料在线分析及自动配料系统、水泥在线分析系统，实现中控操作智能控制、品质控制智能化，推进智能化工厂转型升级，最大限度地降低单位产品能耗，促进水泥生产系统节能目标。同时，公司内部发挥能源管理中心作用，加强粉磨配制水泥技术研究；加强水泥生产企业使用替</p> <p>2、加强余热发电运行管理</p> <p>2021年，公司加强余热发电管理，优化窑系统稳定操作，稳定和提高AQC炉入口温度，加强烟风管道、汽水管道密封保温。优化机炉运行操作平衡运行参数，在保证安全前提下尽量缩短机炉启动时间，优化运行操作参数，提高系统运行效率，增加余热发电效能。按2021年余热发电供电量折算，相当于节约16.50万吨标煤。</p> <p>3、推进光伏发电储能一体化项目建设</p> <p>公司于2021年6月16日召开的第五届董事会第十三次会议审议通过了《关于对外投资开展分布式光伏发电储能一体化项目的议案》《关于在内部管理机构中增设新能源事业部的议案》，同意投资约13.39亿元建设分布式光伏发电储能一体化项目。公司投资开展分布式光伏发电储能一体化项目是积极部署实施水泥企业碳减排的有效措施之一，公司对该项目高度重视，迅速行动，加快项目建设。</p>

Figure 10 Tapai Group annual report information disclosure in 2021

1、加大企业节能改造和技术创新工作

公司按照年初制定《2021年技术改造项目计划》要求，围绕节能、减排、降耗、协同处置、智能化建设、安全达标和绿色工厂建设等方面不断积极引进新工艺、新技术，加强设备技术改造工作，优化设备综合性能，确保设备连续、安全、稳定运行。注重智能和精细化管理，不断完善生产自适应控制系统、智能专家系统、生料在线分析及自动配料系统、水泥在线分析系统，实现中控操作智能控制、品质控制智能化，推进智能化工厂转型升级，最大限度地降低单位产品能耗，促进水泥生产系统节能目标。同时，公司充分发挥技术中心作用，加强熟料综合能耗及水泥粉磨电耗的攻关；加强粉磨配制水泥技术研究；加强水泥生产企业使用替代燃料的研究和试验，包括生物质、城乡废弃物作为燃料的研究和试验，促进提高燃料替代，有效减少化石能源使用；推进研究开发低碳水泥；研究优化调整水泥产品原材料结构，减少熟料用量，降低碳排放。

公司技术中心系广东省级技术中心、省级工程技术研发中心，同时，公司长期与华南理工大学、水泥设计院等高等院校及科研机构进行技术合作，推动公司行业前沿技术的应用，不断推动公司持续健康发展。未来公司将充分发挥技术优势、规模优势、资金优势，推进智能化改造和环保创新工作更上新台阶。

2、加强余热发电运行管理

2021年，公司通过实施技术革新、技术改造等，有效完善汽轮发电机组的冷凝换热效率，提高余热锅炉对旋窑剩余烟气热值的综合利用效率。同时，加强余热发电管理，优化窑系统稳定操作，稳定和提AQC炉入口温度，加强烟风管道、汽水管道密封保温。在保证安全前提下尽量缩短机炉启动时间，优化运行操作参数，提高系统运行效率，增加余热发电效能。2021年余热发电供电量4.836亿kW.h，相当于节约5.9万吨标煤。

3、推进光伏发电储能一体化项目建设

公司结合水泥行业实现碳达峰、碳中和技术路径，充分利用属下企业闲置土地、建筑物屋面等资源，推进光伏发电储能一体化项目建设。2021年6月16日公司召开第五届董事会第十三次会议审议通过了《关于对外投资开展分布式光伏发电储能一体化项目的议案》《关于在内部管理机构中增设新能源事业部的议案》，同意投资约13.39亿元建设分布式光伏发电储能一体化项目。为加快推进光伏发电项目建设，公司新能源事业部组建专业团队，推进项目审批、设计、建设各项工作，积极与省市能源主管部门沟通协调，成功争取企业利用闲置场地建设分布式光伏发电项目可以通过多个并网点接入的政策支持。至2021年底，福建塔牌0.52MW光伏发电项目已建设完成，实现并网发电；金塔公司10MWp光伏发电项目建设完成，正在办理并网审批手续；蕉岭分公司、鑫达公司、惠州塔牌光伏发电项目建设正在有序推进。光伏发电储能一体化项目建设，可改善公司用能结构，实现清洁能源替换，有效降低碳排放，打造公司低碳竞争力。

Figure 11 Tapai Group 2021 social responsibility report disclosure

2.3 Carbon emission information of two listed companies was

effectively disclosed

In the investigation, it found that the two listed companies made relatively complete and effective disclosure through relevant reports.

Case 1: Tianshan Stock (000877)

1) Basic Information

Tianshan Cement Co., LTD., a non-metallic mineral products company, was listed on the Shenzhen Stock Exchange in January 1999. Main cement and clinker, commercial concrete and sand aggregate products production and sales.

2) Comparison of key performance indicators of carbon emission information disclosure

Total greenhouse gas emissions	√
Whether it has been checked	×
Range 1 emissions	×
Range 2 emissions	×
Range 3 emissions	×
Carbon emission intensity/density	×
Energy usage	√
Carbon emission target	√
Environmental protection investment/input	√
Subsidiary level	×

In the annual report and the annual environmental, social and governance report, Tianshan disclosed more effective information. In 2021, the total greenhouse gas emissions were 21,537, 16.8 million tons. Meanwhile, the company set a double carbon target, promising to reduce the total carbon

emissions and energy consumption by 2025. "Two high" elimination (reform) standards all meet the standards.

3) Corporate carbon emission information disclosure

环境治理和保护的投入及缴纳环境保护税的相关情况

2021年公司共投入24亿元，进行环保工艺改进、设备设施技术升级等提标改造。2021年支付环境保护税2.27亿元。

在报告期内为减少其碳排放所采取的措施及效果

适用 不适用

报告期内，公司持续加大环保投入，主要用于工业扬尘深度治理，收尘、脱硝脱硫设施提标等，从硬件基础为环保工作的及仪表提升提供保障。公司所属重点排污企业主要污染物为烟尘（颗粒物）、二氧化硫、氮氧化物，均采用对应的工艺技术、设备设施进行防治，主要排污口安装有在线监控系统，做到污染源在控、可控；各环保设施运行平稳正常，主要污染物排放浓度均符合排放标准限值要求。

2021年，公司持续加大环保投入，从硬件基础为环保工作的进一步提升提供有力保障。2021年环保硬件投入20亿元，主要涉及工业扬尘污染深度治理，收尘、脱硝、脱硫设施提标等。

Figure 12 Tianshan Shares 2021 annual report information disclosure

天山股份“十四五”“双碳”工作规划

到2025年：

总体目标 实现平均吨熟料二氧化碳排放量815千克，较2021年下降6.24%；平均吨水泥二氧化碳排放量612千克，较2021年下降11.10%；万元产值二氧化碳排放较2021年下降21.42%，单位产值综合能耗较2021年下降21.52%，一级能效（标杆）熟料产能占比超40%，“两高”淘汰（改造）标准全部达标；建成“零购电”工厂2个、“零碳”矿山6个

Figure 13 Information disclosure of Tianshan Stock's 2021 Environmental, Social and Governance Report

大气污染物及温室气体排放

<p>NO_x</p> <p>氮氧化物排放总量</p> <p>88,030.20 吨</p> <p></p> <p>工业颗粒物排放总量</p> <p>10,151.10 吨</p>	<p>SO₂</p> <p>二氧化硫排放总量</p> <p>6,516.60 吨</p> <p></p> <p>温室气体总排放量</p> <p>215,371,680 吨</p>
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Figure 14 Information disclosure of Tianshan Stock's 2021 Environmental, Social and Governance

Case 2: Conch Cement (600585)

1) Basic Information

Anhui Conch Cement Co., LTD., which belongs to non-metallic mineral products industry, was listed on the Shanghai Stock Exchange in February 2002. Main cement, commodity clinker and aggregate production, sales.

2) Comparison of key performance indicators of carbon emission information disclosure

Total greenhouse gas emissions	√
Whether it has been checked	×
Range 1 emissions	√
Range 2 emissions	√
Range 3 emissions	×
Carbon emission intensity/density	√
Energy usage	√
Carbon emission target	√
Environmental protection investment/input	√
Subsidiary level	×

Through the disclosure of 16 enterprises and the comparison of key performance indicators, it is found that Conch Cement has the most complete and effective disclosure of carbon emission related information in its annual report and social responsibility report. In addition to the disclosure of environmental protection and carbon reduction measures, it also discloses the total carbon emission, the specific values of scope 1 and 2, and puts forward future goals and plans. It is worth learning how to proactively identify and respond to the risks brought by climate change.

3) Corporate carbon emission information disclosure

在碳减排方面，本集团认真研究并贯彻落实国家碳达峰、碳中和有关政策要求，研讨编制公司碳减排技术方案，研究制定中长期碳减排路线，同时积极参与《建材行业碳交易技术指南》的编制工作，并推进与科研院校的产学研合作。本集团于报告期内对 9 条熟料生产线实施了综合能效提升技改，并广泛开展篦冷机升级、分解炉扩容、高效风机使用等，同时积极探索天然气燃煤混合燃烧技术，通过运用水泥行业先进的节能减排技术装备，努力降低公司煤电耗指标，从而达到减少二氧化碳排放的效果。为减少化石燃料的使用，本集团在可再生能源领域积极探索，继续推进光伏发电、生物质替代燃料等清洁能源的使用。2021 年 4 月 17 日，本集团“农林生物质替代水泥窑燃料技术研发与综合利用”项目通过了中国建材联合会的科技成果鉴定会，该项目成果被认定为达到国内领先水平。此外，本集团创建了“二氧化碳资源化综合利用”联合实验室，并立项智慧农业大棚项目，以期通过将二氧化碳还原转化为可燃气体，及作为农业气肥使用，从而实现二氧化碳的资源化利用。

Figure 15 Conch cement 2021 annual report information disclosure

5.1.3 環保投入

我們堅持以科技創新、綠色發展為企業發展主線，多管齊下提升水泥生產的「綠色含量」。在企業全生命週期的綠色轉型道路上，把握關鍵工藝節點的環保技術突破，持續探索多種類環保技術，不斷加大環保技改的投入，實施多項環保技改項目。2021年，公司共計362個環保技改項目，全年累計環保技改投入約21.06億元，其中脫硝技改投入約9.7億元，收塵（顆粒物減排）技改投入約4.9億元，無組織排放管控、封閉及其他環保類技改投入約6.46億元。



5.2.1 溫室氣體排放和能源管理

煤炭和外購電力是我們能源的主要來源。此外，我們大力開展廢棄物的資源化，將部分廢棄物（如廢油、廢溶劑和廢渣等）作為替代燃料，減少傳統燃料的消耗。我們溫室氣體的排放主要來源於生產水泥熟料過程中產生的碳酸鹽分解、生料中非燃料碳燃燒的排放、化石燃料燃燒和電力消耗。海螺水泥將溫室氣體排放管理和能耗管理相結合，將低碳環保、節能降耗作為一項長期發展戰略，大力發展可再生能源。根據中國「十四五」規劃和2035年遠景目標綱要，我們制定了溫室氣體減排目標和能源效益目標，將對目標進行定期的檢討、追蹤和核驗，以期不斷提升海螺水泥在節能減排方面的環境表現。

海螺水泥堅持綠色低碳發展，從構建國家競爭新優勢的戰略高度出發，堅持發展和規範並重，處理好發展和減排、整體和局部、短期和中長期的關係，以全面綠色轉型為引領，促進水泥行業「雙碳」目標實現和我國綠色低碳產業及循環經濟發展。我們緊跟國家對中國工業企業實現碳減排和碳中和的方向指引，為了達成強有力的碳減排目標，規劃了綠色碳中和發展路徑。

溫室氣體減排目標：

公司2025年較2020年碳排放（熟料工序）強度（噸二氧化碳當量/噸熟料）下降6%



能源效益目標：

公司2025年較2020年能耗（熟料工序）強度（千克標準煤/噸熟料）下降6%



Figure 16 Conch Cement 2021 annual social responsibility report information disclosure



Figure 17 Conch Cement 2021 annual social responsibility report information disclosure

溫室氣體排放/2021年	能源使用/2021年
範疇一溫室氣體排放量 ¹ /噸二氧化碳當量 198,131,964	直接能源消耗量 ³ (億千瓦時) 2,115.7
範疇二溫室氣體排放量 ² /噸二氧化碳當量 13,010,677	間接能源消耗量(億千瓦時) 137.8
溫室氣體排放總量(範疇一+範疇二) /噸二氧化碳當量 211,142,641	能源消耗總量(億千瓦時) 2,253.5
單位熟料溫室氣體排放量(熟料工序) 噸二氧化碳當量/噸熟料 0.8392	單位熟料能源消耗量(熟料工序) (千克標煤/噸熟料) 110.20
單位營業收入溫室氣體排放量 噸二氧化碳當量/億元人民幣 125,715.3	單位營業收入能源消耗量 (億千瓦時/億元人民幣) 1.3

Figure 18 Conch Cement 2021 annual social responsibility report information disclosure

5.2.2 應對氣候變化

在《聯合國氣候變化框架公約》第二十六次締約方大會召開之際，中國通過堅強有力的宏觀政策發布，向世界彰顯了推動實現碳達峰、碳中和的堅定決心。海螺水泥作為一家面向國際的中國水泥行業代表，一直是生態文明的踐行者、氣候治理的行動派，致力於為應對氣候變化風險貢獻海螺力量。2021年，我們初步開展了氣候變化風險識別。未來，我們將持續圍繞氣候變化風險議題，識別和評估潛在的業務風險，未雨綢繆，制定應對氣候變化的戰略，並抓住機遇，不斷提高海螺水泥應對氣候變化風險的工作水平。

風險類別	項目	風險描述	應對舉措
轉型風險	 政策及法律	政府碳排放相關政策、法律法規漸趨嚴格，全國碳排放權交易市場建設正積極推進。	健全碳研發體系，加強對公司碳資產的管理和內部調劑。海螺與上海環境新能源交易所簽訂了碳交易市場能力建設和碳管理體系建設合作協議，共同推動碳資產的高效、專業化管理，促進水泥行業企業「雙碳」目標實現和我國綠色低碳產業和循環經濟發展。
	 技術	對各項低碳環保技術的要求不斷提升	推行多項環保技改項目，包括餘熱發電技術、綜合節能降耗技改、使用替代燃料和原料等。
	 市場	客戶消費偏好逐漸趨向於低碳足跡的產品和服務	全面分析產品的替代風險，並通過研發創新，大力發展高品質的低碳水泥產品。
實體風險	 急性	極端天氣（暴雨、台風、大雪、洪澇、高溫、嚴寒等）	全面、系統地分析近年來防台防汛工作典型案例，科學地總結經驗，制定應急災害應變計劃，進一步統籌本集團各子公司有力有序有效防範，應對台風、暴雨、洪水等突發性自然災害，不斷提升海螺水泥台風洪澇災害科學防控水平。
	 慢性	原材料、交通等易受氣候變化影響	持續性監控相關氣候變化風險。

Figure 19 Conch Cement 2021 annual social responsibility report information disclosure

Summary

According to the overall disclosure of the objects observed in this report, the awareness of carbon emission information disclosure of listed companies is gradually forming and the environment is improving. Most of them will disclose the emission reduction effect achieved by the application cases of energy-saving and emission reduction technologies or the environmental contribution made to the society. However, it should be noted that such indicators often do not represent the overall situation of the company. It is difficult to compare and measure the performance of corporate carbon emission performance horizontally.

At the same time, as an industry with high energy consumption and high emission, Green Jiangnan has conducted carbon emission report and verification for many years since 2013, and denied its behavior of incomplete or even non-disclosure of carbon emission information. Listed companies should have the ability to calculate carbon emissions in Scope 1 and Scope 2, but the disclosure of carbon emissions in scope 1+2 still lacks initiative and progress is slow, and the disclosure of carbon emissions in scope 3 is also in its infancy. The awareness and quality of active disclosure of carbon emissions information of A-share listed companies need to be improved.

3. Recommendation

Along with the gradual improvement of Chinese carbon emission data reporting mechanism, the accumulation of domestic carbon data is gradually improving. In this context, the public goods attribute of mandatory carbon data disclosure should be actively played, the openness, transparency and sharing of mandatory carbon data disclosure should be strengthened, so that it can be

more widely used in commercial and research fields such as carbon accounting, carbon verification, green certification and ESG rating. By improving the application scenarios of mandatory carbon emission data disclosure, To form better support for achieving the "30·60" goal.

In order to promote the healthy development of enterprises, identify and cope with climate risks, Lvse Jiangnan has sent letters to the above 16 enterprises, urging them to actively cope with climate change, carry out climate information disclosure, fulfill the main responsibility of reducing pollution and carbon, and accelerate the green and low-carbon transition. At the same time, we put forward the following suggestions for the disclosure of carbon emission information of enterprises:

3.1 Establish a professional carbon emission information management team to enhance the professionalism of the team

The establishment of a full-time professional team is the premise for enterprises to carry out climate information management. In our research, we found that most companies made clear that the board and management were responsible for ESG/ sustainability issues, but did not specify carbon emissions or climate change issues. China's double carbon "1+N" policy system is being introduced one after another. In addition, some company management teams have just been established. Therefore, Lvse Jiangnan suggests that enterprises set up a full-time management team to clarify the specific responsibilities of the board of directors for climate information management, refine positions, and make special people responsible for it. At the same time, capacity reserve and construction should be done well to improve the professionalism and execution of the team.

3.2 Look at yourself, evaluate properly, and set solid, realistic "two-

carbon" goals

Everything in advance is successful, planned, purposeful work often get twice the result with half the effort. Carbon neutral targets and carbon reduction targets can clearly reduce emissions, and the peak target of carbon emissions usually means that emissions will increase. We believe that listed companies should seriously evaluate their own strength and development needs, and reasonably set overall carbon reduction targets and carbon neutral targets. In addition, various preconditions and conditions of carbon emission targets should be clarified, such as emission scope, year, etc. In addition to long-term goals, multiple phased goals and sub-goals (such as energy intensity goals) should be set, so as to enhance the transparency of carbon emission targets and increase the authenticity and reliability of carbon emission information disclosure.

In addition, leading companies should actively play a leading role, while guiding employees and the public to reduce carbon, help the industry to reduce carbon and enhance the industry's overall disclosure awareness, encourage other companies to benchmark, narrow the gap; To do a good job in carbon emission information disclosure, listed companies can carry out more work exchanges with their counterparts and learn from each other's good experience.

3.3 Broaden our horizons and connect with the international community

Annual ESG, social responsibility or sustainable development reports, as the mainstream way of corporate climate information disclosure, reflect the response of Chinese listed enterprises to carbon emission, carbon management and carbon strategy information disclosure under the guidance of the national two-carbon policy and capital market rules. China's ESG

information disclosure rate develops slowly, and has a large room for improvement compared with the overall international level. At present, most of the regulations are "voluntary" disclosure, and the content of mandatory disclosure is less. Compared with the seven pillars of the ESG information disclosure system proposed by the European Union, China's ESG information disclosure system still has room for improvement. Green Jiangnan suggests that enterprises should go beyond compliance while embracing compliance, pay attention to new domestic policies, strengthen cooperation between markets, learn from excellent experience, and connect with international standards.

3.4 Regulators have improved regulatory requirements for information disclosure, and mainland regulatory requirements need to be strengthened

Foreign and Hong Kong stock exchanges have strong supervision on the disclosure of carbon emission information, and provide relatively detailed framework guidelines. On the other hand, although mainland regulators pay significantly more attention to carbon emission issues, they have not put forward formal and clear requirements yet, and listed companies still make voluntary disclosure. Lvse Jiangnan suggests that mainland regulators formulate strategies based on China's national conditions, strengthen regulatory requirements and improve disclosure guidelines.

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