



WWF

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HONG KONG

35 YEARS
OF CONSERVATION

低碳制造计划报告2016 LOW-CARBON MANUFACTURING PROGRAMME (LCMP) REPORT 2016

低碳制造计划乃世界自然基金会的项目，
旨在减少制造业的碳排放

A WWF initiative to reduce carbon
emissions in manufacturing



2016年取得低碳制造计划标签的公司

COMPANIES ATTAINING LCMP LABELS IN 2016



白金 PLATINUM

Regent Garment Factory Ltd.	Regent Garment Factory Ltd.
华宏达精密五金制造(深圳)有限公司	Spintec Precision (Shenzhen) Ltd.
超捷织造(深圳)有限公司	Super Performance Textile (Shenzhen) Co., Ltd.
中山益达服装有限公司	Zhong Shan Yida Apparel Ltd.



黄金 GOLD

大鑫灯饰(惠州)有限公司	Dayssan Lighting Industrial Ltd.
珠海市骏威制衣有限公司	Jun Wei Apparel Co., Ltd.
K+K Fashion Company Limited	K+K Fashion Company Limited
Maxturn Apparel Company Limited	Maxturn Apparel Company Limited
宁波禾隆新材料有限公司	Ningbo Helong New Material Co., Ltd.
宁波凯耀电器制造有限公司	Ningbo Klite Electric Manufacture Co., Ltd.
中山市广业五金电器制造有限公司	Zhong Shan Guang Ye Hardware and Electric Production Co., Ltd.



纯银 SILVER

佛山市亮雅建材有限公司	Foshan Longart Building Decoration Materials Co., Ltd.
广东奥特龙电器制造有限公司	Guangdong Atlan Electronic Appliance Manufacture Co., Ltd.

低碳制造计划目标

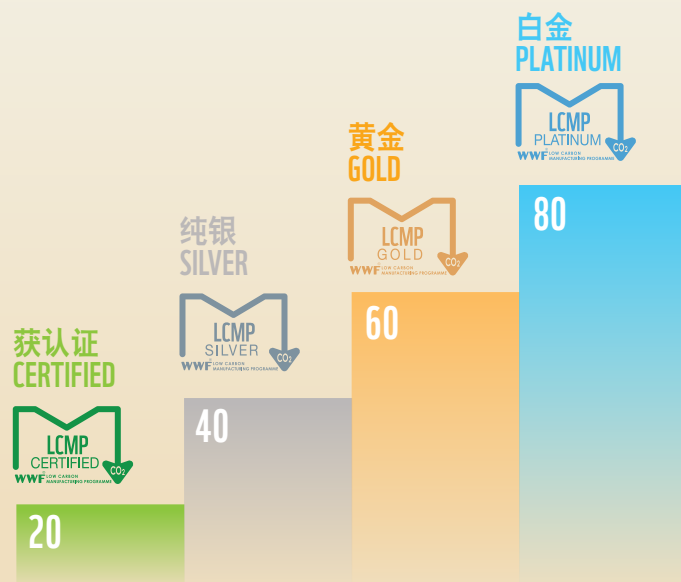
LOW CARBON MANUFACTURING PROGRAMME (LCMP) OBJECTIVES

世界自然基金会香港分会的低碳制造计划 (LCMP)，旨在减少厂房的碳排放量，并鼓励企业提高供应链碳排放的透明度，及找出资源运用效率不足的地方。

WWF-Hong Kong's Low Carbon Manufacturing Programme (LCMP) aims to reduce carbon emissions generated by manufacturing facilities. The LCMP also encourages companies to increase the transparency of supply chain carbon emissions and uncover inefficiencies in overall resource use.

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建立盟友，携手应对气候变化

DEVELOPING ALLIES TO HELP FIGHT CLIMATE CHANGE

不管哪个行业或产品，品牌公司的碳排放只占整个供应链的14%（当中不包括消费者使用或弃置产品所引起的碳排放）¹。品牌公司正在与供应商进行更多的联系，了解气候变化对他们带来的影响，并提高碳排放的透明度，务求把气候变化相关的业务风险减到最低。过去几年，低碳制造计划一直保持与品牌合作，协助他们的供应商制定减排方案及减少碳排放。巴黎协定于2016年11月4日生效，品牌及其供应商将进一步加强对气候变化的工作，齐心协力建构具气候弹性的供应链。

Across all industries, a brand's own emissions average only 14% of its supply chain emissions prior to consumer's use and disposal of products¹. Companies are increasingly engaging with their suppliers to understand the impact of climate change and to improve transparency of carbon emissions, with the aim of minimizing climate-related business risks. Over the past few years, the LCMP has helped many brands and their suppliers to implement low-carbon energy saving measures and reduce carbon emissions. With the Paris Agreement going into effect on 4 November 2016, brands and their suppliers are expected to increase mitigation and adaptation efforts, so they can collectively build a climate resilient supply chain.

低碳制造计划与品牌活动回顾 REVIEW ON LCMP ACTIVITIES WITH BRANDS AND THEIR SUPPLIERS:



低碳制造计划自学教育平台

THE LCMP SELF-LEARNING EDUCATIONAL PLATFORM

一般公司对于「什么是碳排放？什么是碳强度？碳排放来源是什么？」及有关减排的问题可能不太了解。即使公司获得减排资讯，但如何实践并最终达至减排仍须掌握各方面的市场技术及方案。有见及此，低碳制造计划设计了一个关于减排的简易自学平台，内容包括工厂的最佳守则、常见的温室气体排放源、低碳制造计划工具的使用方法、市场减排资讯及碳排放的相关信息等等。

如欲了解低碳制造计划自学教育平台详情，请参阅：<https://apps.wwf.org.hk/lcmp/hk>



Companies may still be unaware of their carbon footprint, carbon intensity, sources of carbon emissions and other related carbon-reduction issues. Even though many companies receive information about carbon reduction measures, they still face difficulties achieving significant reductions in carbon emissions due to a lack of skills in mastering market technologies and solutions. In view of this, the LCMP has designed a simple self-learning platform on carbon reduction where companies can read about factories' best practices, common GHG emissions sources, guidelines for using the LCMP tools, updates on market trends and other climate-related information.

For more information about the LCMP Self-Learning Educational Platform, please visit:
<https://apps.wwf.org.hk/lcmp/en>



1. Matthews, H.S., Hendrickson, C.T., Weber, C.L. 2008. The importance of carbon footprint estimation boundaries. Environmental Science and Technology 42, 5839-5842

减碳成效

CARBON REDUCTION ACHIEVEMENTS

验证年度 Year of verification	INCLUDES 2015 AND 2016 (包括2015及2016年度)												
取得低碳制造计划标签的公司数目 Number of LCMP-Accredited Companies ⁽ⁱ⁾	26												
业务的累计变动 (基准年与计算年间) Cumulative Change in Business Volume (Base year vs. Performance year)	这些企业的业务共增长了 These companies collectively grew by +96.5%												
碳绩效 Carbon Emissions Performance	<p>2015-16年度26家取得低碳制造计划标签公司的碳绩效 Carbon Emissions Performance of 26 LCMP-Accredited Companies in 2015-16</p> <table border="1"> <thead> <tr> <th>年份</th> <th>碳排放量 (Tonnes)</th> </tr> </thead> <tbody> <tr> <td>基准年 (Base Year)</td> <td>626,615</td> </tr> <tr> <td>“一切如常” (Projected BAU)</td> <td>757,011</td> </tr> <tr> <td>计算年 (Performance Year)</td> <td>614,282</td> </tr> </tbody> </table>	年份	碳排放量 (Tonnes)	基准年 (Base Year)	626,615	“一切如常” (Projected BAU)	757,011	计算年 (Performance Year)	614,282				
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碳排放范围 Carbon Emissions by Scope ⁽ⁱⁱⁱ⁾	<p>2015-16年度26家取得低碳制造计划标签公司的碳排放范围分布 Scope Distribution of Carbon Emissions of 26 LCMP-Accredited Companies in 2015-16</p> <table border="1"> <thead> <tr> <th>年份</th> <th>范围1 (Scope 1)</th> <th>范围2 (Scope 2)</th> <th>范围3 (Scope 3)</th> </tr> </thead> <tbody> <tr> <td>基准年 (Base Year)</td> <td>84.9%</td> <td>14.9%</td> <td>0.2%</td> </tr> <tr> <td>计算年 (Performance Year)</td> <td>77.3%</td> <td>22.6%</td> <td>0.1%</td> </tr> </tbody> </table>	年份	范围1 (Scope 1)	范围2 (Scope 2)	范围3 (Scope 3)	基准年 (Base Year)	84.9%	14.9%	0.2%	计算年 (Performance Year)	77.3%	22.6%	0.1%
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平均每家企业的碳强度年度变化 Annual Change in Carbon Intensity ^(iv) per Company	-5.9%												

⁽ⁱ⁾ 低碳制造计划要求公司每两年进行验证一次。因此，减碳成效按每两年相应的数据整理和报告。

The LCMP requires companies to conduct a verification every two years. Carbon reduction achievements are therefore calculated and reported according to the data available over the respective two-year period.

⁽ⁱⁱ⁾ 基准年：订立基准年是用以维持一致及有意义的比较。基准年一般是由有可核查数据记录的最早一年开始，可以是单年数据或多年数据的平均值。

“一切如常” BAU：BAU是在目前发展模式下，不采取减排措施造成的温室气体预测排放量。BAU的计算方法以基准年的碳排放吨数除以基准年的业务量，再乘以计算年的业务量。

计算年：计算年一般是距离验证日最近一年的可核查数据，可以是单年数据或多年数据的平均值。

Base Year：Setting a base year allows for meaningful and consistent comparisons of emissions over time. The base year is generally the earliest year that verifiable emissions data is available, and can be either a single year or a multi-year average.

BAU：BAU (Business As Usual) refers to the estimated amount of greenhouse gas emissions that would be produced under a company's current business model, without employing any carbon reduction measures. BAU is calculated as the carbon emissions (in tonnes) produced in the base year divided by the business volume in the base year, multiplied by the business volume in the performance year.

Performance Year：The performance year is the latest year that verifiable emissions data

is available from date of verification, and can be either a single year or a multi-year average.

⁽ⁱⁱⁱ⁾ 碳排放范围 (依据国际标准“温室气体议定书”) 范围1：直接产生的温室气体排放
公司持有或者控制排放源直接产生的温室气体排放，例如锅炉、熔炉的燃料使用量，以及公司车辆运行产生的排放。
范围2：间接产生的温室气体排放
购买回来的电力、蒸汽或热力间接产生的温室气体排放。例如，工厂来自电网的用电量。
范围3：其他间接排放
其他间接排放，例如乘搭非公司拥有的车辆出差、外判第三方举办的活动等。

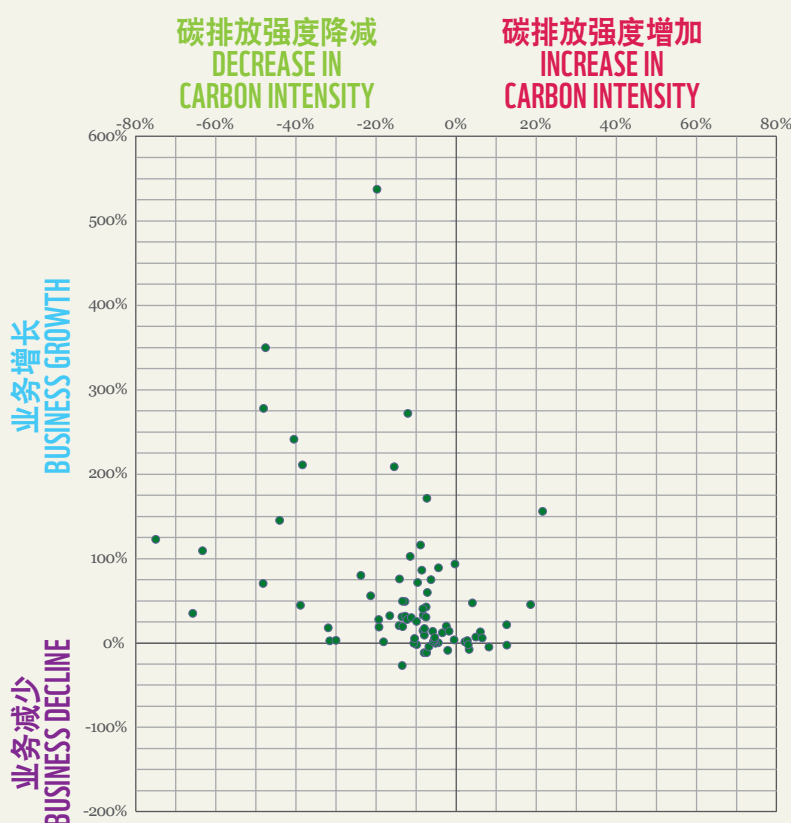
Carbon emissions by scope (According to the international standard Greenhouse Gas (GHG) Protocol)
Scope 1: Direct GHG emissions
Direct emissions from stationary or mobile combustion sources in or belonging to the manufacturing factory. For example, fuel consumption by boilers or furnaces and emissions from company vehicles.
Scope 2: Indirect GHG emissions
Indirect emissions from the generation of purchased electricity, steam or heat. For example, electricity consumed by a factory that is supplied via a local power grid.
Scope 3: Other indirect GHG emissions
Other indirect emissions could include emissions resulting from business travel in non-company owned vehicles as well as third-party outsourced activities, for example.

^(iv) 碳强度
碳强度是碳排放量除以业务量
Carbon intensity is carbon emissions divided by business volume

减碳和业务增长 CARBON REDUCTION AND BUSINESS GROWTH

右图探讨低碳制造计划认证公司的业务增长和碳排放强度降低的关系。百分比的变动代表基准年和计算年之间的比较。74%数据点位于左上方格，即业务增长的同时，碳排放强度也下降。碳排放强度减幅百分比越高，代表电力或资源利用效率越能提升，这种竞争优势是有益于企业的业务增长。


The scatter diagram on the right illustrates the relationship between business growth and a reduction in carbon intensity at LCMP-accredited companies. The percentage change represents a comparison between the base year and the performance year. As shown on the right, 74% of the data points lie in the upper left hand quadrant, which represents a scenario of business growth and a decrease in carbon intensity. A high percentage reduction in carbon intensity indicates efficiency improvements in electricity or resource usage. Increased efficiency is a source of competitive advantage, and could lead to further business growth.



低碳制造计划使业务增长与温室气体排放脱钩！ LCMP: DECOUPLING BUSINESS GROWTH FROM GREENHOUSE GAS EMISSIONS!

 ↓ 142,282 吨
TONNES

企业实施低碳制造计划后，纵使业务增长了96%，与“一切如常”的情况相比，碳排放减少了142,282吨，相等于6,186,000棵树整整一年的碳吸收量！
These businesses collectively grew by 96%, and after implementing the LCMP, they successfully avoided 142,282 tonnes of carbon emissions, according to a comparison of performance year data with projected business-as-usual (BAU) scenarios. To put that in perspective, it would take 6,186,000 trees one whole year to absorb that amount of carbon emissions!

 ↓ 11,886 吨
TONNES

在96%的业务增长情况下，26家公司的总碳排放量从基准年的626,615吨，减至计算年的614,729吨，共减少了11,886吨，为本年度计划的另一亮点。这是由于其中六家公司在设备或系统提高了能效率或改用更清洁的燃料，令总碳排放量显著减少。

Another LCMP highlight is the absolute reduction of 11,886 tonnes of carbon emissions from base year to performance year relative to the 96% business growth during the same period. Six companies either improved the efficiency of their facilities and systems or utilized cleaner fuels resulting in an absolute emissions reductions.

最佳守则表现

PERFORMANCE IN BEST PRACTICES

低碳制造计划的最佳守则手册涵盖三大范畴：温室气体管理、工厂设备【包括压缩空气系统、电力系统、HVAC（暖气、通风系统及空调）、照明以及蒸汽系统】的能源效益，和制造过程的能源效益。

取得低碳制造计划标签的公司，每隔两年需经第三方验证，以确定公司是否紧遵指引清单，评估公司目前的做法与最佳守则的差异，找出公司采纳的良好守则及判断公司有否持续作出改善。如认证公司在最新一次验证中希望提升或保持以往的标签水平，根据低碳制造计划的评分标准，公司必须在管理和能源效益方面作出改善。下面是18家在2015-16年度进行低碳制造计划验证的公司数据分析，这些公司已完成了两次或以上的验证，数据将每家公司最近一次验证的整体得分、温室气体管理、能源效益（包括工厂设备及制造过程）及标签水平范畴的表现，和第一次验证时进行比较。

A组包括18家认证公司第一次验证的数据。

B组包括18家认证公司在2015-16年度进行验证的数据。

下列图表的B组数据显示，认证公司无论在整体验证得分、温室气体管理或能源效益范畴的最高、最低和平均值，全部均高于A组数据，其中B组的平均值分别高于A组6%、20%及12%。此外，B组有15家认证公司所获得的标签水平得以提升或保持，占整体公司数目的83%，其中两家更能提升两级。在2016年度的验证中，更有公司在验证总分超过90分，是低碳制造计划的首例。这说明了低碳制造计划实能有效地提升公司在能源效益及温室气体管理方面的表现。

The LCMP handbook lists the best practices for three industrial aspects: greenhouse gas management, energy efficiency of general utilities [such as compressed air systems; electrical systems; heating, ventilation and air-conditioning (HVAC) systems; lighting systems and steam systems], and energy efficiency of manufacturing processes.

To identify corporate best practices and determine whether companies have made continuous improvement, the performances of LCMP-accredited companies are evaluated by third party verifiers on a biennial basis, using a set of best practice checklists. If accredited companies want to upgrade or maintain the previous LCMP label level then they must improve in the areas of GHG management practices and energy efficiency.

Below is an analysis of the 18 LCMP-accredited companies that underwent LCMP verification in 2015-16. These companies have completed a minimum of two verifications over the past 7 years. Thus the analysis compares each company's performance, according to the overall verification score, GHG management practices, energy efficiency (including general utilities and manufacturing processes) practices and LCMP label level, from first-time verification to the most recent rating.

Group A includes data from first-time verifications of the 18 LCMP-accredited companies.


Group B includes data from the 2015-16 verifications of the 18 LCMP-accredited companies.

According to the below diagrams, all of the performance scores – maximum, minimum and average scores in “Overall Verification Score”, “Greenhouse Gas (GHG) Management Practices”, “Energy Efficiency Practices” – are higher in Group B than in Group A. Across the three LCMP measurements, the average scores from the Group B dataset are higher than the Group A dataset by 6%, 20% and 12% respectively. Moreover, 15 companies in Group B, about 83% of the overall Group B companies, were able to maintain or upgrade their LCMP label levels. In the 2016 verification, one company even exceeded its overall verification score of 90, which is the first such improvement in the history of LCMP. This illustrates that the LCMP can effectively improve a company's energy efficiency and greenhouse gas management.

		最高分 Maximum Score	平均分 Average score	最低分 Minimum score
验证总分 Overall Verification Score	GroupA组	84.28	63.99	37.71
	GroupB组	90.41	68.14	44.33
温室气体管理守则分数 Score in Greenhouse Gas (GHG) Management Practices	GroupA组	93.88	65.35	28.57
	GroupB组	96.94	78.34	53.06
能源效益守则分数 Score in Energy Efficiency Practices	GroupA组	76.98	59.30	42.86
	GroupB组	83.52	66.29	51.92

以下是一些低碳制造计划认证公司的减碳措施实例分享：

The below tables outline many practical cases of carbon reduction measures found at LCMP accredited-companies:



电力系统 ELECTRICAL SYSTEM

安装省电机，平衡三相电压及稳定电压，减少谐波及启动电流，从而降低不必要的损耗及减少耗电量，设备寿命也得以延长。
Installing an energy saver, which balances the 3-phase voltage and stabilizes voltage while also decreases harmonic wave and cranking current, hence reducing unnecessary energy loss and electricity consumption, the lifetime of equipment can also be extended.

省电机 Energy saver

© Spintec Precision (Shenzhen) Ltd.




暖通空调系统 HVAC SYSTEM

以中央空调替代车床独立冷却系统，减少用电量，降低车间温度及延长机器及刀具寿命。
Transforming the individual cooling systems of lathes into a central air-conditioning unit, thereby reducing electricity consumption and workshop temperatures, and extending the lifetime of machines and tools.

车床中央空调 Central air-conditioning from lathes

© Spintec Precision (Shenzhen) Ltd.




压缩空气系统 COMPRESSED AIR SYSTEM

空压机进行变频改造及余热回收，为员工宿舍生活用水提供热能，每年可节省210,000度电或超过38%用电量。
Installing a variable-frequency air compressor. In this example, the recovered waste heat from the compressor is rerouted to the hot water supply in factory dormitories, saving the company 210,000 kWh or more than 38% of its annual electricity usage.

变频空压机及余热回收
Variable-frequency air compressor and waste heat recovery

© Spintec Precision (Shenzhen) Ltd.



蒸汽系统 STEAM SYSTEM

回收高温冷凝水，利用余热把保温软水缸预先加温，软水加温后才进入锅炉，从而减少锅炉的能耗及达致节能减排的成效。措施每年节省耗油量约60吨并降低能耗达14%。
Recovering energy from water condensate to preheat water in boilers, thus reducing the amount of energy consumed during the preheating process and lowering carbon emissions. The recovery system has cut annual oil consumption by 60 tonnes and lowered energy consumption by 14%.

锅炉 Boiler

© Jun Wei Apparel Co., Ltd.



照明系统 LIGHTING SYSTEM

走廊安装灯光自动开关感应器及LED灯，提升灯光系统能源效益。
Installing occupancy sensors and LED lamps in corridors to improve the energy efficiency of company lighting systems.

灯光开关感应器及LED灯
Occupancy sensor and LED lamp

© Guangdong Atlan Electronic Appliance Manufacture Co., Ltd.



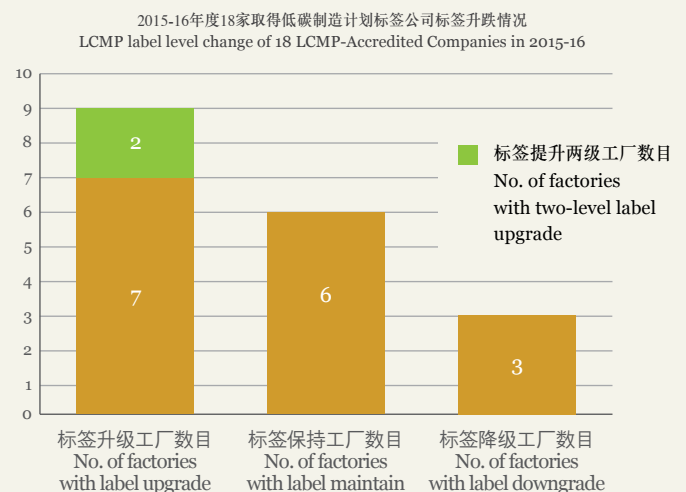
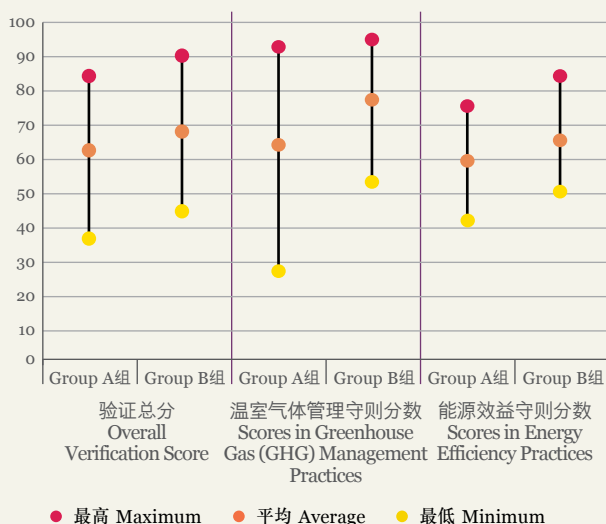
制造过程 MANUFACTURING PROCESSES

洗衣机及脱水机加装变频器，减少平均功率，令每台机器每年分别节省用电1,500及6,000度，降低能耗分别达25%及63%。
Installing variable-frequency drivers (VFDs) in washing machines and dehydrators, reducing the overall average power output. The VFDs have cut annual electricity consumption per machine by 1,500 and 6,000 kWh respectively, and lowered energy consumption by 25% and 63% respectively.

洗衣机变频器
VFD in washing machine

脱水机变频器
VFD in dehydrator

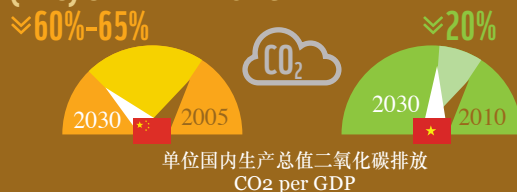
© Jun Wei Apparel Co., Ltd.





低碳制造计划扩展至越南 LAUNCH OF THE LCMP IN VIETNAM

巴黎协定国家自主贡献 NATIONALLY DETERMINED CONTRIBUTION (NDC) OF THE PARIS AGREEMENT



气候变化的影响 CLIMATE CHANGE IMPACTS



海平面上升 Sea level rise	2015年比常年 ¹ 2015 vs norm ¹	预计未来30年 in coming 30 years
长三角 (东海) YRD (East China Sea)	≈ 96mm	≈ 70 - 160mm
珠三角及湄公河 (南海) PRD & MKD (South China Sea)	≈ 82mm	≈ 75 - 165mm

长三角 YRD

在1957-2013年间，每十年的平均温度上升速率为：
Average temperature rising rate per ten years between 1957 and 2013:

庞大城市 Huge cities	人口稠密城市 Megalopolises	大型城市 Large cities	中型城市 Medium-sized cities	小型城市 Small cities
0.483°C	0.314°C	0.282°C	0.225°C	0.179°C

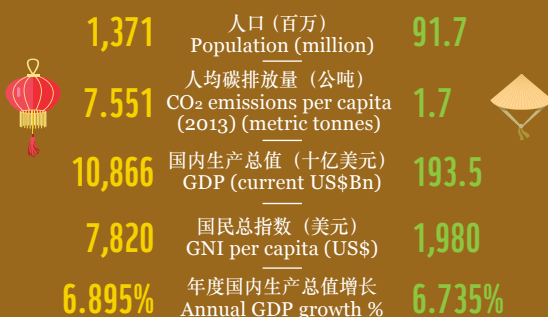
珠三角 PRD

每十年的平均温度上升速率为0.3°C
Average temperature rising rate is 0.3°C per ten years

湄公河 MKD

在过去五十年间，平均温度上升了0.5-0.7°C
Average temperatures have risen 0.5-0.7°C over the past 50 years

2015社会经济指标 SOCIO-ECONOMIC INDICATOR 2015



气候变化已成了国际间关注的议题，对素有世界工厂见称的中国影响固然深远，随著经济转型及工厂的迁移，越南也成了其中一个受影响最大的国家，湄公河亦成了全球三个受海平面上升影响最严重的区域之一。应对气候变化，除了制定政策，有效的减排项目亦非常重要，低碳制造计划致力协助工厂减少碳排放，计划的工具及最佳守则能广泛地应用于不同地域的工厂，其成效亦不会因地理的差异而有所影响。

越南已成了服装和鞋类的生产基地多年，近年更有不少电子产品制造商进驻。可持续发展在越南正逐步形成，低碳制造计划于本年度正式推展至越南，将帮助工厂减少碳排放，并为相关行业建立最佳实践守则的基准。目前已有三间纺织厂参与了此计划并进行了认证，它们的总部均设于香港，越南工厂在母公司的管理下，无论在基础建设、生产技术、节能设备、系统管理及对待员工等方面，都可以媲美其位于中国及东南亚的附属工厂。

Regent Garment Factory Ltd. 位于越南海阳省，是香港晶苑集团旗下生产毛衫及针织成衣的公

Climate change is a growing problem for every country on Earth. China, known as “the world’s factory”, is currently dealing with economic transition and factory relocation while its neighbour, Vietnam, is also heavily impacted by climate change. The Mekong Delta – the lifeblood of Vietnam – is considered one of the world’s top three deltas most vulnerable to sea level rises. To combat climate change, countries require not only comprehensive policies but also effective carbon reduction programmes. The Low Carbon Manufacturing Programme aims to help factories to reduce carbon emissions. The programme tools and best practice guidelines can be implemented wherever factories are located, and geographical differences will not constrain the programme’s effectiveness.

For many years now, Vietnam has been a major production base for the clothing and footwear industries. More recently, the country has encouraged electronic manufacturers to set up factories around the country. Sustainable development in Vietnam is evolving. The LCMP’s timely arrival in Vietnam will help factories reduce their carbon emissions and establish best practice benchmarks for similar industries. So far this year, three apparel factories in Vietnam have joined the LCMP and completed the verification process. With headquarters located in Hong Kong, these factories are managed in a well-organized and standardized way, from production technologies, factory infrastructure and energy saving facilities to management practices and treatment of workers.

(1) 常年/Norm: 中国海平面公报将1975-1993年的平均海平面定为常年平均海平面，简称常年
According to the China Sea Level Disclosure, norm is defined as the average sea level between 1975 and 1993.

司，产品主要出口欧美和日本。秉承母公司的环保理念，Regent不仅致力生产高质量的产品，还确保所有活动对社会有正面的影响。公司于2016年参加低碳制造计划，同年进行LCMP审核并获得最高级别的白金标签。

K+K Fashion Company Limited 及 **Maxturn Apparel Company Limited** 分别位于越南的河内市及北宁省，均是香港罗氏集团旗下的附属公司。K+K 及 Maxturn 分别成立于2008年及2007年，主要生产针织成衣，产品主要外销到欧美国家。两家公司一直非常重视环保节能生产及社会责任，于2016年参加低碳制造计划并于同年进行LCMP审核，无独有偶，两家公司同时获得黄金标签。

Regent Garment Factory Ltd. is one of the subsidiary factories of Hong Kong-based Crystal Group, whose clients are based mainly in the U.S., Europe and Japan. Located in Hai Duong Province, Vietnam, the factory specializes in the manufacture of sweaters and cut-and-sewn knitwear. In accordance with its parent company's environmental philosophy, Regent is committed to producing high quality products while also ensuring that all of its activities impact the community in a positive way. Regent joined the LCMP in 2016 and received a Platinum Label the same year.

K+K Fashion Company Limited and **Maxturn Apparel Company Limited** are subsidiary factories of the Hong Kong-based Lawsgroup and they are located in Hanoi and Bac Ninh, Vietnam, respectively. K+K and Maxturn were established in 2008 and 2007 respectively, and both factories specialize in the manufacture of knitted garments for clients located mainly in Europe and the U.S. In their business practices the factories have always paid attention to both environmental protection and social responsibility. K+K and Maxturn joined the LCMP in 2016, and both factories received Gold Labels the same year.

REGENT GARMENT FACTORY LTD. 减碳措施 CARBON REDUCTION MEASURES AT REGENT:



生物质锅炉 BIOFUEL BOILER

锅炉采用再生能源的生物质燃料，取代柴油锅炉，节省成本及减排接近100%，每年减少超过1,100吨碳排放。

Replacing their diesel-driven boilers with biofuel boilers, reducing costs and lowering carbon emissions by almost 100%, or more than 1,100 tonnes annually.



蒸汽回收 HEAT RECOVERY FROM STEAM

安装储水箱和管道，回收干衣机的蒸汽及冷凝水并用于洗衣流程，每月节省14,700吨蒸汽。

Installing a hot water tank and pipeline to utilize return steam and condensate water from garment dryers for heating water in washing machines, saving 14,700 tonnes of steam monthly.

© Crystal Group

K+K FASHION COMPANY LIMITED 减碳措施 CARBON REDUCTION MEASURES AT K+K:



吊挂系统 HANGING SYSTEM

引进吊挂系统，实现半自动化生产，节省货物转运时间，同时提高生产效率。

Installing a hanging system to achieve semi-automatic production, saving time and improving energy efficiency.



衣车吸风咀及软管 SUCTION DUCT IN SEWING MACHINE

衣车吸风使用压缩空气，替代独立小型马达抽取剩馀线头，节省电量达35%，预计每年可减少约70吨碳排放。

Using compressed air instead of electric motors to extract thread ends from sewing machines. This change is expected to reduce annual electricity consumption by 35% and lower annual carbon emissions by more than 70 tonnes.

© K+K Fashion Company Limited

MAXTURN APPAREL COMPANY LIMITED 减碳措施 CARBON REDUCTION MEASURES AT MAXTURN:



自动裁床设备 AUTOMATIC CUTTING MACHINE

使用先进化自动裁床设备，提高裁剪的精准性，大大降低生产过程中的次品率，并节省人力资源。

Using automatic cutting machines to improve accuracy, which reduces defect rates and saves labour costs.



太阳能热水器 SOLAR WATER HEATER

员工宿舍使用太阳能热水器，提供热水予员工洗澡，节约运行成本并提升能源效益。

Installing a solar water heater for employee showers in the dormitory, saving operating costs and improving energy efficiency.

© Maxturn Apparel Company Limited

再下一城，宁波凯耀 2016全面启动太阳能发电 START UP SOLAR POWER IN 2016 - NINGBO KLITE



© Ningbo Klite Electric Manufacture Co., Ltd.

宁波凯耀电器制造有限公司位于浙江省宁波市，主要生产LED灯、节能灯、LED驱动器、电子镇流器及变压器。公司本着人人参与及人人有责的方针，除了满足市场的需求外，还大力支持绿色环保，积极落实国家节能减排的产业政策。凯耀在2012年参加低碳制造计划，继而开展及推动节能减排项目，尤其注重节能灯及太阳能的使用，在2014年及2016年的LCMP审核中获得黄金标签。

Ningbo Klite Electric Manufacturing Co., Ltd. is located in Ningbo city, Zhejiang Province and specializes in the manufacture of LED and energy-saving lamps, LED drivers, electronic ballasts and transformers. Adhering to the principle of active participation and environmental responsibility, the company not only fulfills its market mandate but also strongly supports green activities and actively implements national policies aimed at energy-saving and carbon emissions reduction. The company joined the LCMP in 2012 and received a Gold Label in its 2014 and 2016 verifications. Over the years, the factory has adopted numerous carbon reduction measures, most notably by using energy saving lamps and solar energy.

太阳能光伏发电系统项目简述及成效

近年，中国政府大力推动节能减排，倡议企业使用再生能源，促使凯耀与投资方的能源开发公司合作，开发厂房屋顶太阳能光伏发电项目。项目于2015年尾动工，在厂房屋顶安装2,200片太阳能板，每片电池功率270瓦，2016年中经调试合格后并网发电，所有发

PROJECT DESCRIPTION AND OUTCOMES

In recent years, the Chinese government has actively promoted carbon reduction and advocated the use of renewable energy. This led to a collaboration between Klite and an energy company to develop a rooftop solar PV project. Beginning in late 2015, the company installed 2,200 solar panels, with each panel's capacity of 270W. After a thorough set of tests, the solar PV system began to generate electricity for production in mid-2016. The project covers



凯耀LCMP宣传报
Klite LCMP newsletter



生产线自动化
Production lines automation

电量均用于内部生产使用。此项目占用的屋顶面积约10,000平方米，装机容量为600千瓦。凯耀负责提供屋顶安装场地，优先使用其所发电量，按公司向电力局采购电价的85%支付其使用部分的电费。

在项目开展初期，根据实际发电量的估算，太阳能光伏发电预计年发电量约66万度，占公司每年用电量约8.8%，为公司减少每年约460吨碳排放。善用天然资源，不仅为公司节省成本，更能应对国家的环保政策，为可持续发展奠定了扎实的基石。

拥抱可持续发展

企业要成功推行节能减排，管理层的参与是不可或缺的。集团副总张益军一直非常重视环保，他凭着对环保的那份执著及永不放弃的精神，带领凯耀于年间实施了一系列的节能减排措施，如广泛采用LED灯及生产线自动化等等。在培养员工环保意识方面，企管部从2014年7月开始，每季定期出版“LCMP宣传报”，宣传低碳理念及良好守则，让员工在推行改善措施时添加低碳元素，从而达到节能减排。在社会责任方面，凯耀协助倡导和制定关于教室健康照明标准，举办相关研讨会并邀请省市节能负责人、教育部及学校代表、照明领域专家出席，让他们了解实际情况并提出对策，期望孩子们最终能在健康的照明环境下学习。此外，凯耀亦推出健康照明样板教室，并自行研发及生产没有频闪、眩光及蓝光的教室灯，以实际行动回馈社会。

approximately 10,000 square metres, and the system has a capacity of around 0.6MW. Klite provides the rooftop space and is given priority usage of the electricity generated by the facility at a discount of 15% off local electricity charges.

According to the amount of electricity produced in the project's initial stage, the solar panel system will generate an estimated total of around 660,000 kWh annually, which amounts to about 8.8% of Klites' total consumption and helps the company to reduce its carbon emissions by 460 tonnes. Making good use of natural resources, the project not only reduces operating costs but also aligns with national environmental policy. The Klite solar panel system is now part of a firm foundation for future sustainable development.

EMBRACING SUSTAINABLE DEVELOPMENT

Management participation is indispensable in successfully implementing carbon reduction programmes. Mr. Zhang Yijun, the Group Vice President of Klite, consistently focuses on environmental protection. In recent years, his persistence and “never give-up” spirit regarding sustainable development lead the company to implement a series of carbon reduction measures, such as adopting LED lamps and automating production lines. To cultivate the staff's environmental awareness, the Corporate Administration Department has published a quarterly “LCMP newsletter” since July 2014 to promote low carbon concepts and best practices. Employees can then incorporate low carbon practices into their own innovations, resulting in effective energy saving and carbon reduction. In the area of social responsibility, Klite has advocated for and helped to establish “classroom lighting and lighting health standards”. The company has sponsored various seminars and invited a range of people to attend, including provincial and municipal officials in charge of energy saving, representatives from the Ministry of Education and various schools, and professional lighting experts. Seminars helped participants to understand the practical aspects of classroom lightings and to consider countermeasures aimed at providing a healthy learning environment for children. The company also designed and built a demonstration classroom in compliance with national lighting health standards and produced their own classroom lighting system that had no strobe, glare or blue light.

有关低碳制造计划 (LCMP) ABOUT THE LCMP

74

已参与低碳制造计划工厂数目*
Number of factories in the LCMP*

142,282

26家低碳制造计划标签认证公司减少的碳排放吨数 (与“一切如常”比较)*
Tonnes of carbon emissions that were avoided by 26 LCMP-accredited companies* versus the “business-as-usual” scenario



110,200

参与低碳制造计划企业的员工数目*
Total number of employees in companies participating in the LCMP*

-6.7%

2016年13家取得低碳制造计划标签公司的年均碳强度变化
Annual Change in Carbon Intensity of 13 LCMP-accredited companies through 2016

* 截至2016年10月31日
As of 31 Oct 2016



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