



漢能薄膜發電集團有限公司

HANERGY THIN FILM POWER GROUP LIMITED

(Incorporated in Bermuda with limited liability)

(於百慕達註冊成立之有限公司)

(Stock Code 股份代號：566)



2016
ENVIRONMENTAL SOCIAL
AND GOVERNANCE REPORT
環境、社會及管治報告

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About This Report

Report Brief

This is the first released environmental, social and governance report of Hanergy Thin Film Power Group Limited. This report reviewed the main work of operation management of the Company in 2016. It disclosed the concept, practice and performance of its economic, social and environmental responsibility in Hanergy Thin Film Power Group Limited.

Reporting Reference

This report is prepared with reference to The Environmental, Social and Governance Reporting Guide issued by The Stock Exchange of Hong Kong Limited and the G4 Sustainability Reporting Guidelines issued by the Global Reporting Initiative (GRI).

Reporting Period

The reporting period is from January 1st 2016 to December 31st 2016, but some content and data may exceed this period.

Scope of the Report

Unless otherwise stated, this report includes the headquarters and internal institutions of Hanergy Thin Film Power Group Limited and all its subsidiaries and branches.

Report Data

Financial data of this report are from the 2016 financial statements of Hanergy Thin Film Power Group Limited prepared pursuant to International Financial Reporting Standards, which have been independently audited by Ernst & Young. Other data are sourced from relevant regulators and statistics.

Reporting Specification

For the convenience of expression, Hanergy Thin Film Power Group Limited hereinafter is referred to as "We", "Hanergy Thin Film Power" or "the Company". The Group Company of Hanergy Holding Group Limited is referred to as "Hanergy Holding Group".

關於本報告

報告簡介

本報告為漢能薄膜發電集團有限公司發佈的第一份環境、社會及管治報告，回顧了公司2016年營運管理的主要工作，披露了漢能薄膜發電履行經濟、社會和環境責任的理念、實踐和績效。

編制依據

報告參照香港聯合交易所《環境、社會及管治報告指引》編製，同時參考全球報告倡議組織(GRI)《可持續發展報告指南》G4標準。

時間範圍

2016年1月1日至2016年12月31日。部分表述及資料可能超出上述年份。

報告範圍

報告覆蓋漢能薄膜發電集團有限公司總部、內設機構，及所有分、子公司。

資料來源

報告中的財務資料來自漢能薄膜發電集團有限公司2016年度財務報告，並經安永會計師事務所獨立審計；其他資料來自監管機構及公司相關統計制度。

指代說明

為便於表述，「漢能薄膜發電集團有限公司」在報告中分別用「我們」、「漢能薄膜發電」和「公司」指代；集團公司「漢能控股集團有限公司」用「漢能控股集團」指代。

1 About Us

1.1 Company Profile

Hanergy Thin Film Power Group Limited is a high-tech energy enterprise listed on the Hong Kong Stock Exchange. Its principal activities include the development and design of turnkey production lines for thin film power generation, as well as the development, operation and sales of downstream thin film power generation projects and application products.

Since entering into the thin film power generation industry in 2009, the Company has been actively involved in the investment and research of the most advanced thin film solar energy technology which was adopted as the Company's core business. Through continual acquisition of overseas thin film technologies, including Solibro in Germany, MiaSolé in the U.S., Global Solar Energy in the U.S., and Alta Devices in the U.S., we have acquired copper indium gallium selenium (CIGS) and gallium arsenide (GaAs) technologies which are currently the most advanced in the world, and at the same time has mastered the globally advanced equipment production line manufacturing technology and its Research and Development capabilities. These technologies have become the main sources of competitive advantage for us. Meanwhile, We deploy teams of scientists at various locations around the globe, including the United States, Germany and Sweden, and Beijing and Sichuan in China,, etc, for continuous improvement in the performance of thin film power generation technology, which enables us to provide our customers with the most advanced and cost effective solutions in turnkey production lines.

In the future, we will continue to maintain our position as the world's most advanced thin film power generation and high-tech energy company and adopt the "One Base and Two Fronts" as our long term strategic deployment. That is, we base ourselves on the continuous innovation of thin film solar technology. On the one hand, we deliver "turnkey solutions" for high-end equipment and production lines as one of the fronts, and on the other hand, we provide distributed energy and mobile energy "one-stop" solutions as the other front. The upstream equipment production line business will be maintained as our core, and the downstream distributed energy business will be our strategic direction, with an aim to vigorously fostering mobile energy as the Company's main direction.

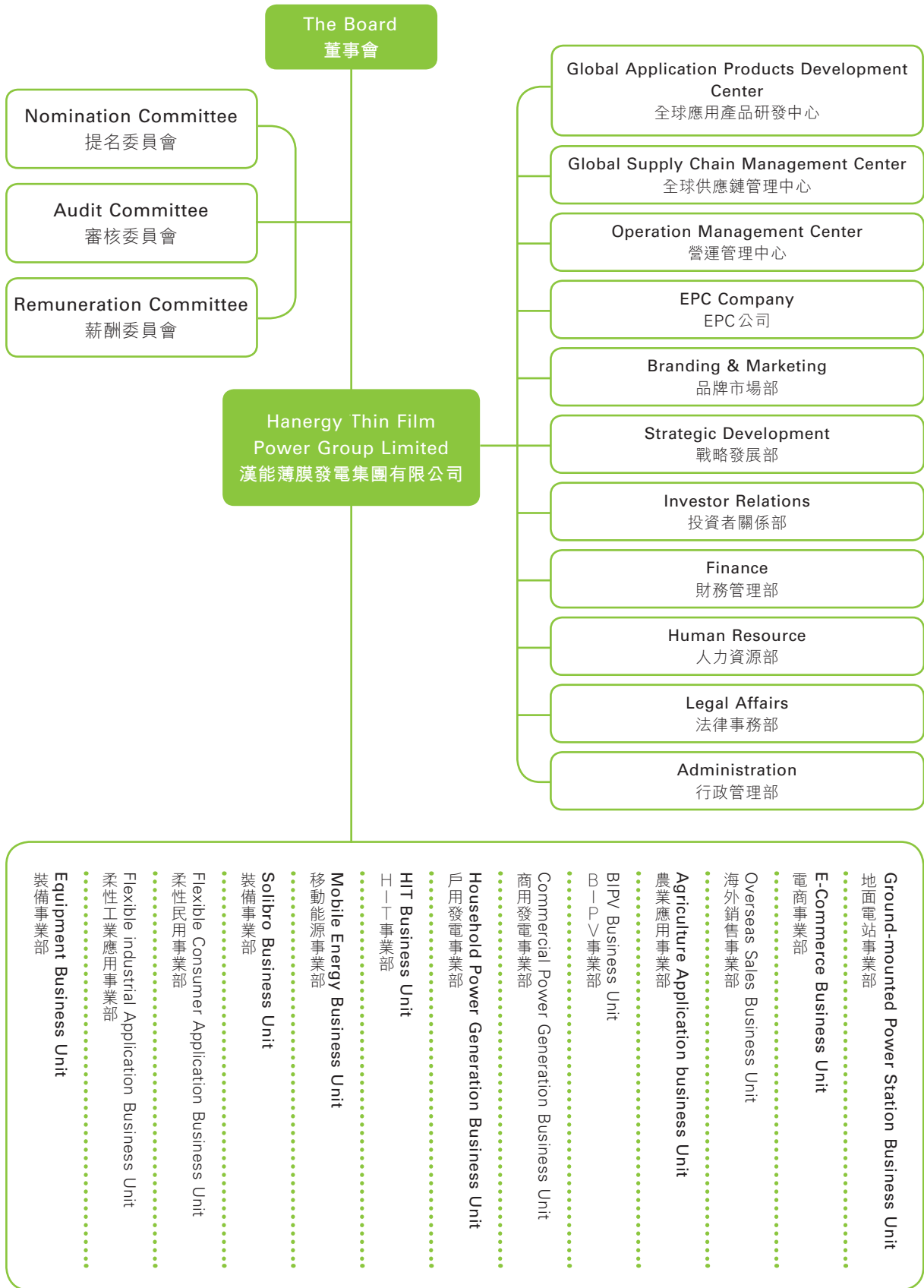
1 關於我們

1.1 公司概况

漢能薄膜發電集團有限公司是一家在香港交易所上市的高科技能源企業，主要業務包括研發和設計薄膜發電整線生產線，以及開發、營運及銷售下游薄膜發電項目和應用產品。

自2009年進入薄膜發電行業以來，公司積極投入與研發最先進之薄膜太陽能技術，以此作為公司核心業務。通過持續併購多間具領先薄膜技術之海外企業，包括德國Solibro公司、美國MiaSolé公司、美國Global Solar Energy公司及美國Alta Devices公司，我們掌握了全球最領先的銅銦鎵硒(CIGS)和砷化鎵(GaAs)技術，同時也掌握了全球領先的裝備產線製造技術及其研發能力，成為公司競爭優勢的重要來源。同時，公司科學家團隊遍佈全球，包括美國、德國、瑞典及中國北京、中國四川等，持續提升薄膜發電技術的表現，為客戶提供最先進且具有成本優勢的整線生產線解決方案。

未來，我們將致力繼續保持全球最領先薄膜發電高科技能源公司的位置，以「一基兩翼」為長遠佈局：即以薄膜太陽能技術的持續創新為基礎，以高端裝備及產線的「全包式」解決方案為左翼，以分散式能源及移動能源的「一站式」解決方案為右翼，以上游裝備產線業務為核心，下游分散式能源業務為戰略方向，積極培育移動能源作為公司的大方向。



1.2 Core Value

In accordance with the culture and philosophy of Hanergy Holding Group Ltd., we are driven by our mission of “Changing the World by Thin-Film Solar”. We are dedicated to serving our society, community, economy and culture by practicing the “18 Hanergy Mottoes” and firmly rooting corporate culture values in every employee.

Our Mission:

Change The World By Thin-Film Solar

- To seek the ultimate solution of energy use and ensure the shift from indirect to direct energy use;
- To break the energy monopoly and address the energy crisis for a new global energy landscape;
- To ensure a better and different way of life through safer, more convenient and cost-effective access to energy;
- To achieve sustainable development of the world for a better course of the global civilization.

Our Vision:

To Become the Most Influential Company in the World

- Exercise social, community, economic and cultural influences;
- Promote development of the industry as a leading innovator;
- Contribute to the rejuvenation of the country as a leading Chinese company;
- Operate as a trustworthy partner;
- One of the best employers.

1.2 核心價值

公司秉承漢能控股集團有限公司文化理念，以「用薄膜太陽能改變世界」為使命，致力於發展公司社會、社區、經濟、文化全方位影響力，深入貫徹「漢能司訓十八條」，並將我們的公司文化根植在每一位員工心中。

公司使命

用薄膜太陽能改變世界

- 改變人類利用能源的方式：間接利用變直接利用，能源利用的終極方式；
- 改變世界能源的格局：打破能源壟斷，化解能源危機；
- 改變人類的生活方式：能源更安全、更便捷、更低廉，提高生活品質；
- 改變人類文明的進程：實現世界文明可持續發展。

公司願景

全球最有影響力的公司

- 社會影響力、社區影響力、經濟影響力、文化影響力；
- 致力於推動產業發展，成為創新的領袖；
- 致力於為國家強盛做貢獻，成為民族企業的楷模；
- 致力於成為可信賴的合作夥伴；
- 致力於成為最佳僱主之一。



18 Hanergy Mottos

- It is our faith to change the world by thin-film solar.
- Integrity, generosity, intelligence and inclusiveness are our characters.
- Foresight and pragmatism are our qualities.
- Loyalty, responsibility and ambition are our basic requirements.
- Cutting-edge technology ensures longevity.
- The secret of development is to beat expectations.
- Success is determined by these three factors: people, people and people.
- The absence of ethics negates everything.
- Integrity is essence.
- Communicate openly and frankly.
- United we triumph.
- Passionately begun, halfway done.
- Growth is a process of overcoming adversities.
- Be curious.
- Be grateful.
- Execution without any excuses.
- Hanergy, no impossibility!
- Hanergy grows with nations.

漢能司訓十八條

- 用薄膜太陽能改變世界是我們共同的信仰
- 正氣、大氣、睿智、包容是我們的氣質
- 遠見、務實是我們的風格
- 忠心、責任心、上進心是我們的基本要求
- 生存的奧秘在於技術永遠領先
- 發展的奧秘是讓結果永遠比想像的好一點
- 成功的奧秘，第一靠人，第二靠人，第三還是靠人
- 品德問題就是零因子，零乘億萬等於零
- 誠信，是根
- 直接面對，坦誠交流
- 上下同心者，勝
- 充滿激情地工作，已成功了一半
- 成長的過程就是不斷克服困難的過程
- 永遠學習
- 永遠感恩
- 執行，沒有借口
- 漢能，沒有不可能
- 漢能，因祖國強大而強大

1.3 Operation with Incorruptibility

As it is a crucial task to prevent bribery, blackmail, fraud and money laundering, the Company has long persisted in carrying out anti-bribery and anti-fraud policies. There was no corruption cases reported in 2016.

We have strengthened our source management by requiring our employees to sign the Employees' Code of Conduct, holding anti-bribery and anti-fraud training and publicity activities for our employees, releasing and amending the Employees' Code of Conduct & Disciplinary Management System to clarify the Company's Human Resources Management System with an aim to eliminate bribery and fraud cases from the source.

Meanwhile, the Company actively strengthens its governance on clean work by strengthening its standardized procedures in business areas, such as formulating and implementing the Incorruptibility Contract, the Statement for Incorruptibility in Project Supervision, and the Supplier System Audit Implementation Management System. We continue to improve the corresponding terms and conditions in the model agreements, like the Dealer's Agreement for 2016, the Hanergy User System After-sale Service System, the Anti-Unfair Competition and Commercial Bribery Agreement, the Quality Assurance Agreement(Contract), and the Template for Project Construction Agreement.

In addition, the Company protects and upholds the rights of our employees to make a complaint and report an unlawful act by setting up an effective reporting procedure such as complaint/reporting boxes to intensify supervisions.

1.3 廉潔從業

防止賄賂、勒索、欺詐、洗黑錢是一項長期工作，公司多年來堅持貫徹反賄賂、反欺詐的廉潔政策，2016年未發生貪腐個案。

公司加強源頭管理，通過與員工簽署《員工行為準則》，對員工進行反賄賂、反欺詐培訓及宣傳活動，發佈並修訂《員工行為規範與違紀處理管理制度》，明確集團人事管理制度的相關規定，從根源上杜絕賄賂、欺詐情況的發生。

同時，公司積極加強規範業務領域中的廉政管理，在採購與工程招標的業務環節制定並實行《廉政合同》、《工程監理廉政責任書》以及供應商體系審核實施管理制度，並不斷增強完善合同範本中的相應條款，如《2016年度經銷商協議》、《漢能戶用系統售後服務協定》、《反不正當競爭和商業賄賂協議》、《品質保證協議(合同)》、《工程施工合同範本》等。

此外，公司維護並支持員工的投訴舉報權利，設立舉報郵箱等有效的舉報流程及方法以加強監督。



2 Responsibility Management

To further implement our responsibility management, the Company continues to maintain and strengthen our effective communication with various stakeholders. We identify the expectations and concerns of stakeholders in terms of corporate social responsibility. In addition, we integrate the concept of corporate social responsibility into every aspect of the Company's management and operation.

2.1 Materiality Analysis

To enhance the pertinence and responsiveness of the report, with reference to the Environmental, Social and Governance Reporting Guide released by the Hong Kong stock exchange and G4.0 Sustainability Reporting Guidelines issued by the Global Reporting Initiative (GRI), we have identified sustainable development issues, evaluated the material issues, and ensured that this report could fully disclose the important information of corporate development and prioritize issues of stakeholders concern.

2 責任管理

公司深化落實責任管理，加強與各權益人權益人的溝通交流，辨析權益人對公司社會責任的期望與訴求，並堅持將社會責任理念融入公司管理營運的各個層面。

2.1 重大性議題分析

為提升報告的針對性與回應性，公司依據香港聯合交易所《環境、社會及管治報告指引》及全球報告倡議組織《可持續發展報告指南》(G4)的要求，識別可持續發展議題並進行重大性判定，確保報告披露的資訊全面覆蓋公司發展和權益人關注的重點議題。

Screening Flow on Material Topics of Environmental, Social and Governance 環境、社會及管治議題篩選流程

Issue Sources 議題來源

- Corporate management suggestions 公司管理層建議
- Internal and external experts' analysis and suggestions 內外部專家分析建議
- Media information analysis 媒體資訊分析
- National and international peer companies bench marking study 國內外同業對標研究
- Social responsibility guidelines 社會責任標準指南

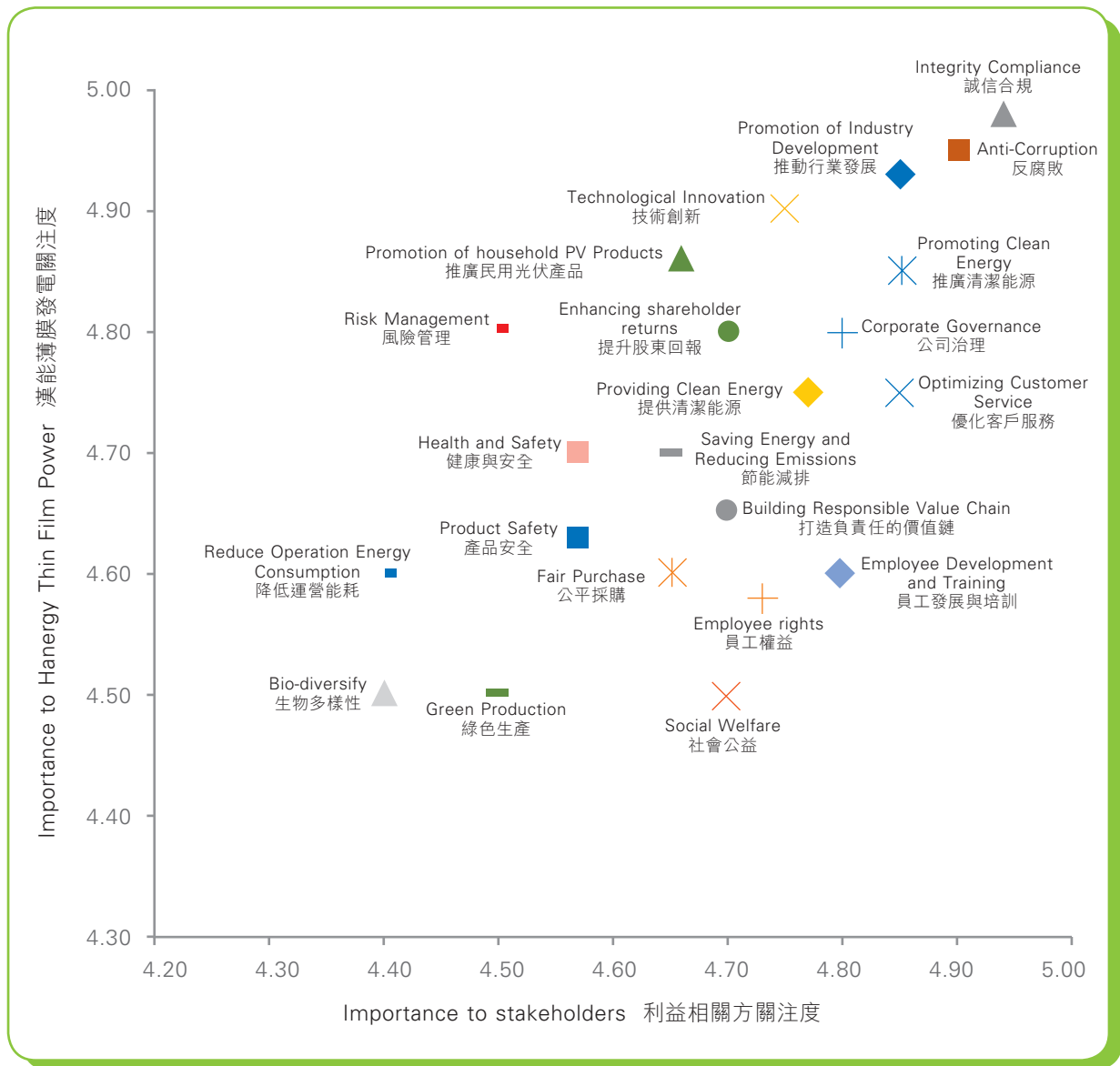
Screening Standard 篩選標準

- Contribution to sustainable development 對可持續發展的貢獻
- Stakeholders' concerns 權益人普遍關注
- Focuses of social responsibility guidelines 社會責任相關指南重點強調
- Accordance with the needs of corporate strategic development 符合公司戰略發展需要

Results of Materiality Analysis 重大性判定結果

Through the evaluation process above, we have identified 22 important issues of social responsibility in Hanergy Thin Film Power and prioritized these issues. They are part of the content of this report, which cover many areas, such as corporate governance, environment, products and services, employee, community. We will disclose the detailed contents in this report.

通過以上評估過程，我們識別出漢能薄膜發電22個重要的社會責任議題並進行重要性排序，涵蓋企業管治、環境、產品與服務、員工、社區等多個領域，構成本報告內容的組成部分，我們將會在本報告內詳細披露有關內容。



- ◆ Promotion of Industry Development 推動行業發展
- Anti-Corruption 反腐敗
- ▲ Integrity Compliance 誠信合規
- × Technological Innovation 技術創新
- ✕ Promoting Clean Energy 推廣清潔能源
- Enhancing shareholder returns 提升股東回報
- + Corporate Governance 公司治理
- Risk Management 風險管理
- Saving Energy and Reducing Emissions 節能減排
- ◆ Providing Clean Energy 提供清潔能源
- Product Safety 產品安全
- ▲ Promotion of household PV Products 推廣民用光伏產品
- ✕ Optimizing Customer Service 優化客戶服務
- × Fair Purchase 公平採購
- Building Responsible Value Chain 打造負責任的價值鏈
- + Employee rights 員工權益
- Reduce Operation Energy Consumption 降低運營能耗
- Green Production 綠色生產
- ◆ Employee Development and Training 員工發展與培訓
- Health and Safety 健康與安全
- ▲ Bio-diversify 生物多樣性
- × Social Welfare 社會公益



2.2 Stakeholder Engagement

The Company pays high attention to communication with stakeholders and understanding stakeholders' requirements. We adopt countermeasures to meet the reasonable expectations and concerns of stakeholders.

2.2 權益人溝通

公司高度重視與權益人的溝通交流，瞭解權益人的要求，並採取應對措施，滿足權益人合理期望與訴求。

Stakeholders 權益人	Expectation and requirements 期望與要求	Communication and response approaches 溝通與回應方式
Government and regulatory authorities 政府與監管機構	<ul style="list-style-type: none"> • Implementing national policies and regulations 貫徹落實國家政策及法律法規 • Promoting local economic development 促進地方經濟發展 • Promoting local employment 帶動地方就業 • Leading industry development 引領產業發展 • Strengthening independent innovation 強化自主創新 	<ul style="list-style-type: none"> • Report the relevant document 上報文件 • Advice and suggestions 建言獻策 • Special report 專題匯報 • Establishing industry standards 制定行業標準 • Participating in the formulation of industry policies 參與行業政策制定
Shareholders 股東	<ul style="list-style-type: none"> • Return on investment 收益回報 • Compliance operation 合規營運 • Improving corporate governance 完善公司治理 • Risk management 風險管理 	<ul style="list-style-type: none"> • Company announcement 公司公告 • Special report 專題匯報 • On-site visit 實地考察 • Shareholder decision-making 股東決策
Customers and cooperative partner 客戶及合作夥伴	<ul style="list-style-type: none"> • Performance contract in accordance with law 依法履約 • Honest operation 誠信經營 • Green operation 綠色營運 • Products and services of high quality 優質產品與服務 • Protecting customer rights 保護客戶權益 	<ul style="list-style-type: none"> • Business communication 商務溝通 • Customer feedback 顧客回饋 • Communication and discussion 交流研討 • Discussion of the cooperation 洽談合作

<p>Environment 環境</p>	<ul style="list-style-type: none"> • Promoting society to concern environmental protection 帶動社會環保 • Compliant emission 合規排放 • Saving energy and reducing emissions 節能減排 • Ecological conservation 保護生態 	<ul style="list-style-type: none"> • Work report 工作匯報 • Report submission 報表報送 • Investigation and inspection 調研檢查
<p>Employee 員工</p>	<ul style="list-style-type: none"> • Maintenance rights 權益維護 • Occupational health 職業健康 • Remuneration and benefits 薪酬福利 • Career development 職業發展 	<ul style="list-style-type: none"> • Workers congress 職工代表大會 • Collective negotiation 集體協商 • Democratic communication platform 民主溝通平台
<p>Community and Public 社區及公眾</p>	<ul style="list-style-type: none"> • Improving community environment 改善社區環境 • Participating in public welfare activities 參與公益事業 • Advocating volunteer service 宣導義務工作 • Open and transparent information 資訊公開透明 	<ul style="list-style-type: none"> • Company website 公司網站 • Company announcement 公司公告 • Interview and communication 採訪交流 • Information disclosure 資訊披露



3 Environmental Protection: A Road to Solar Energy

With the dream of “To Change The World By Thin-Film Solar” harbored in our hearts, Hanergy Thin Film Power drives the society to carry out low carbon and emission reduction and promote green development in society as a whole by providing the clean energy product and service — thin film solar power. At the same time Hanergy Thin Film Power also strengthens our own operation and management, fulfills the philosophy of green operation, makes rational use of resources and energy, and controls impacts on the environment we may impose in order build an environment-friendly enterprise.

3 環境保護：我們的太陽能之路

漢能薄膜發電心懷「用薄膜太陽能改變世界」的夢想，通過提供薄膜太陽能發電這一清潔能源產品與服務，帶動社會低碳減排，推動全社會的綠色發展。同時加強企業自身的營運管理，踐行綠色營運理念，合理使用資源和能源，管控自身對環境造成的影響，建設環境友好企業。

Hanergy Thin Film Power’s “Green Development” Footprint 漢能薄膜發電的「綠色發展」地圖

Green Transport 綠色交通



Case: “SolaRoad” Extension Project, Krommenie, Netherlands

代表：荷蘭克羅默尼——「太陽能路」延伸項目

Green Office 綠色辦公



Case: Integrated Project of Thin-film Solar Building for SPIC Headquarters, Beijing, China

代表：中國北京——國電投總部大樓薄膜太陽能建築一體化項目

Green House 綠色住宅



Case: Aida “Health Residence” Villa Showroom, Shanghai, China

代表：中國上海——愛韻達「健康住宅」別墅樣板間項目

Green Sports 綠色體育



Case: Khalifa Stadium Project, Doha, Qatar

代表：卡塔爾多哈——哈里發體育場項目

Green Agriculture 綠色農業



Case: Roof Thin-film Power Station Project for Huifeng Agrochemical, Jiangsu, China

代表：中國江蘇——輝豐農化屋頂薄膜電站項目

Protection of Water Resources 保護水資源



Case: Full Solar Powered Ship Project, Amazon River Basin, South America

代表：南美亞馬遜河流域——全太陽能動力船項目

3.1 Green Development

Faced with the impact of global climate change, the environmental awareness of governments, entrepreneurs, and the general public are pushed to a new level. They are transforming the production cycle and everyday lifestyles, using more clean energy and reducing environmental and ecological impacts. Under the rapid development of science and technology and the constraints of our carrying capacity and ecological environment, development that incorporates environmental protection has become the new norm and an important pillar for sustainable development.

As a clean energy enterprise, Hanergy Thin Film Power deeply feels the heavy responsibility it should shoulder. Hanergy Thin Film Power is committed to advocating and promoting the use of solar energy so that more people will understand thin film power is an advanced and environmental friendly technology. It will be able serve all aspects of public life and promote the green development of all walks of life.

3.1.1 Green Traffic

Green traffic focuses on the environmental friendly attributes of urban traffic with aims to reduce traffic congestion, environmental pollution, promote social fairness and make rational use of resources. Specific measures include the selection of low-carbon transportation tools and improved rationality of road network construction. As indicated in the Opinions of Implementation for Accelerating and Promoting the Application of New Energy Vehicles in the Transport Industry issued by the Chinese government, the application of new energy vehicles are to be promoted in the key areas including urban bus, taxi and urban logistics distribution. By 2020, is the government aims to have up to 200,000 new energy buses and 100,000 new energy taxis, vehicles for urban logistics distribution.

3.1 促進綠色發展

面臨全球氣候變化的影響，各國政府、企業家、公眾對環境保護的認知已經發展到新的階段，改進生產生活方式，更多使用清潔能源，降低對環境和生態的影響。在科技發展一日千里的快車道面前，建立在生態環境容量和資源承載力的約束條件下的綠色發展，是將環境保護作為實現可持續發展重要支柱的一種新型發展模式。

作為一個清潔能源企業，漢能薄膜發電深感責任重大，宣導和推廣使用太陽能，讓更多人認識薄膜發電技術的優越性和環保屬性，服務於公眾生活的方方面面，促進各行各業的綠色發展。

3.1.1 綠色交通

綠色交通強調的是城市交通的「綠色性」，即減輕交通擁擠，減少環境污染，促進社會公平，合理利用資源，具體措施包括選擇低碳出行工具以及提高道路網絡建設的合理性等。我國政府《關於加快推進新能源汽車在交通運輸行業推廣應用的實施意見》指出，城市公交、計程車、城市物流配送為新能源汽車推廣應用的重點領域。到2020年，新能源公交車力爭達到20萬輛，新能源計程車和城市物流配送車達到10萬輛。



Hanergy Thin Film Power believes that solar energy would be greatly developed and utilized as a form of new energy in building green traffic due to its clean, long lasting and universal advantages. With the continuous improvement of conversion efficiency of solar chips and declining costs, thin-film solar modules have joined the “armed force” of traffic reform in the automotive field and bids fair to large-scale promotion. At the same time, Hanergy Thin Film Power’s technology is also applied to highway construction, allowing the road not only to bear the responsibility of transportation but also to provide power to communities in its vicinity for energy-saving purpose.

漢能薄膜發電認為在綠色交通建設中，太陽能作為新能源的代表，因其清潔、長久、普遍的特點，將被越來越多開發利用。伴隨太陽能晶片轉化效率的不斷提高、成本的不斷下降，薄膜太陽能電池組件在汽車領域也將加入改革交通的「大軍」，有望得到大規模推廣。同時，我們的技術也應用於公路建設之中，使得公路不僅承載著交通運輸的任務，還能夠為所在社區提供電力，以節省能源。

Case: Thin-Film Power Technology Allows a Second Growth of the World’s First “SolaRoad”

案例：薄膜發電技術讓世界首條「太陽能路」二次生長

The world’s earliest “SolaRoad” lies in a town named Krommenie, which is tens of kilometers from Amsterdam, the Netherlands. It is a bicycle lane that can light and generate power by means of solar energy and has drawn much attention since the day of advent. Now this solar bicycle lane has ushered in a new progress – “a second growth”. On October 17, 2016 when the PowerFlex module provided by Global Solar Energy (GSE) was installed, the solar bicycle lane was further extended from the original 70 meters. GSE’s thin-film power technology featured by weak optical rotation fits the marine climate in the Netherlands perfectly. The application of thin-film power to the road generation system came true from a concept as well.

距離荷蘭阿姆斯特丹數十公里的克羅默尼 (Krommeie) 小鎮上，有著全世界最早鋪設的「太陽能路」。這條能發光、發電的太陽能自行車道，自問世之日起就備受關注。如今，這條太陽能自行車道又有了新的進展——「二次生長」。2016年10月17日，伴隨漢能薄膜發電子公司 Global Solar Energy(GSE)所提供的 PowerFlex 原件的安裝完成，這條原本 70 米的太陽能自行車道得以進一步延伸。GSE 薄膜發電技術所具備的弱旋光性發電非常適合海洋性氣候的荷蘭，薄膜發電應用到路面發電系統也從概念變成現實。



The world’s first solar bicycle lane
世界上第一條太陽能自行車道



The solar bicycle lane is luminous at night
太陽能自行車道在夜晚可以發光

Case: Thin-Film Power Application to the Rooftop of Bus Stations in Las Vegas

案例：拉斯維加斯巴士站頂應用項目

In March 2016, GSE succeeded in winning the bid issued by the Regional Transportation Commission of Southern Nevada, which was responsible for public transport in Las Vegas, USA. From 2016 onwards, Hanergy's flexible thin-film component was mounted to the roofs of 1,800 bus stations in Las Vegas, producing a total of 500kW. Hanergy's flexible thin-film component provides clean power for LED lights and advertising screens of the bus stations. This is of special value to bus stations for which municipal power supply is not available.

2016年3月，漢能薄膜發電子公司 Global Solar Energy (GSE) 在負責美國拉斯維加斯公共交通的南內華達地區交通委員會的招標過程中成功勝出。從2016年開始，拉斯維加斯的1,800個公車站頂將安裝漢能柔性薄膜組件，總計功率為500kW。漢能的柔性薄膜原件將為這些巴士站的LED燈及廣告屏提供清潔電力。對那些未接通市政供電的巴士站，這種方式具有特別的價值。

Case: Solar-Powered Cars

案例：太陽能動力汽車

In July 2016, Hanergy Holdings Group unveiled 4 types of Solar series fully solar powered cars. The 4 types of series are provided with enlarged solar panels on the basis of pure electric cars. They are also equipped with lithium battery packs of larger capacity and solar cells play a complementary role. It can increase the endurance mileage and reduce charging frequency. Under certain conditions (a relatively short daily travel distance and sufficient sunshine at daytime during parking), the solar powered cars might not even need extra charging.

2016年7月，漢能控股集團發佈了4款Solar系列全太陽能動力汽車。這4款太陽能汽車在純電動汽車的基礎上增加了大面積的太陽能面板，配備大容量的鋰電池組；太陽能電池起一個補充的作用，可以增加車輛的續航里程，減少充電的次數。在特定條件之下，如每次行駛較短，白天停車時日照充足等，太陽能汽車甚至可以做到一直不需要充電。



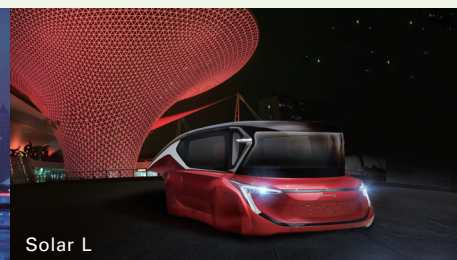
Solar R



Solar O



Solar A



Solar L



3.1.2 Green Office

Green office advocates resources conservation in office activities to reduce the generation and discharge of waste, reduce emission of pollutants and recover reusable waste products. It also incorporates the energy supply system in office buildings and calls for energy conservation and more use of clean energy. Today, it is a common problem that each skyscraper in the urban center's office buildings consumes high energy. It also constitutes an important factor for the urban heat island effect.

Hanergy Thin Film Power integrates the state-of-the-art thin-film solar power technology into office buildings. By mounting the thin-film solar modules to office buildings, such as the facade, roof, lighting ceiling, exterior sunshade, and window, a steady stream of green power can be provided. It not only plays an energy-saving and emission reducing role, but also functions in many other aspects including noise insulation, heat insulation and lighting. These features can effectively reduce the energy consumption of office buildings.

3.1.2 綠色辦公

綠色辦公宣導在辦公活動中使用節約資源、減少污染物產生和排放、回收可利用廢棄產品，其中對辦公建築的能源供應系統也提出要求，宣導能源節約並更多使用清潔能源。現今，在能耗高是每一棟位處城市中心的摩天大樓的通病，也是造成城市熱島效應的重要因素。

漢能薄膜發電把世界領先的薄膜太陽能技術融入到商業建築中，將薄膜太陽能組件安裝在商業建築的立面牆、屋頂、採光頂、外遮陽、窗戶等區域，可為商業建築提供源源不斷的綠色電力，實現節能減排的目的，同時還可以實現隔音、隔熱、採光、等多種功能。這些功能可以有效降低商業建築能耗。

Case: Thin-Film Solar-Powered Building Integration Project of SPIC Headquarters' Building

案例：國電投總部大樓薄膜太陽能建築一體化項目

The thin-film solar-powered building integration project of State Power Investment Corporation (SPIC) headquarters commenced in Q3 of 2016 and was officially completed in March 2017. With the joint efforts of Hanergy Thin Film Power, SPIC and State Nuclear Electric Power Planning Design & Research Institute Co., Ltd., the integrated project of thin-film solar building for SPIC headquarters composes a comprehensive smart march focusing on "solar energy & smart building". The project makes full use of the effective areas of the curtain walls and roof. It has realized a multipurpose energy use including lighting, heat insulation and power generation with the surface area of a building by means of solar power technology. It has also realized a multilevel clean use of energy and greatly improved the comfort in the building. The building therefore reaches an equilibrium state between energy conservation and solar power generation, successfully complementing each other.

The upgraded curtain walls with solar energy modules have a total installed capacity of 170.66 kilowatts, with an average annual power generation of 126,900 kWh in a 25-year period of use. In other words, it will reduce energy consumption of 709,000 kwh, which is equivalent to the annual power consumption of 1,000 households or traveling 4.4 million kilometers by an electric car – equivalent to circulating the earth 110 times. In addition to energy conservation, it also makes evident contribution to emission reduction. Compared with the conventional coal-fired power plant, the project saves 275.8 tons of standard coal consumption, reduces 99.84 tons of ash, 5.43 tons of sulfur dioxide, 12.53 tons of nitrogen oxides, 101.5 tons of particulate matter, and 825.9 tons of carbon dioxide per year. This is equivalent to planting 45,000 trees in Beijing 's Financial District and having disabling 150 cars.

國家電力投資集團公司(簡稱國電投)總部大樓薄膜太陽能建築一體化項目，於2016年第三季度動工，並於2017年3月正式竣工。在漢能薄膜發電、國電投、國核電力規劃設計研究院有限公司三方共同努力下，國電投總部大樓薄膜太陽能建築一體化項目譜寫出一部「太陽能+智慧樓宇」為核心的綜合智慧能源進行曲，該項目充分利用建築幕牆和屋頂的有效區域，採用太陽能發電技術，用一棟大樓的表面積，實現了採光、隔熱、發電等多重效果，實現了能源的多級綜合清潔利用，使樓宇內部舒適度大幅提高，使建築節能降耗與太陽能發電因此達到了有效互補的理想狀態。

改造後的太陽能原件幕牆，裝機總容量為170.66千瓦，在25年使用期內平均年發電12.69萬千瓦時；節約能耗70.9萬千瓦時，能夠滿足1000個家庭的年用電，可供一台電動汽車行駛440萬公里，相當於環繞地球110圈。除了節能，減排的貢獻也非常明顯。與常規燃煤電廠相比，該項目每年可節約標準煤耗275.8噸，減排灰渣99.84噸，減排二氧化硫5.43噸，減排氮氧化物12.53噸，減排PM10 1.5噸，減排二氧化碳825.9噸，相當於在北京金融街種下4.5萬棵樹，停用150輛小汽車。

SPIC headquarters after upgrade
國電投總部大樓改造後照片





Case: City Hall Roof Project of Zevenaar 案例：澤韋納爾市市政廳屋頂項目

In 2016, Hanergy Thin Film Power, Energievan Hollandsche Bodem and Sun Projects worked together to promote the Phase I 300kWp (kWp refers to the total peak power of photovoltaic cells) thin-film solar roof project in Zevenaar, the Netherlands. The project is for the roof of Zevenaar's City Hall, which provides green and clean power for government offices and an annual reduction of about 300 tons of carbon dioxide. Including the city hall roof project, a total of 600kWp MiaSolé thin-film solar modules will be mounted in Zevenaar.

"We always attach great importance on the issue of sustainable development. It is of great importance to the city government, our citizens and enterprises. Zevenaar will continue to be committed to the development of energy conservation and green energy in the years to come. The first part of the project will be used to solve the energy consumption of the City Hall and the second part will serve citizens with no suitable roof for the installation of photovoltaic components. We will work together to create a more green future."

—Ms. Tienke van de Werf,
the City Councilor of Zevenaar

2016年，由漢能薄膜發電、Energievan Hollandsche Bodem和Sun Projects合作推進荷蘭澤韋納爾市第一期 300kWp (kWp 指光伏電池的峰值總功率)項目。該項目位於澤韋納爾市市政廳的屋頂，將為政府辦公提供綠色清潔電力，每年可減排約 300 噸二氧化碳。包括市政廳屋頂項目在內，整個澤韋納爾市一共會安裝 600kWp 的 MiaSolé 薄膜太陽能組件。

「可持續發展一直是我們重點關注的問題，它對市政府、對我們的市民和企業、對每一個人來說都是至關重要的。所以，在接下來的幾年，澤韋納爾將繼續致力於節能和綠色能源的發展。項目的第一部分將用於解決市政廳的能源消耗，第二部分將服務於沒有合適屋頂可供安裝光伏原件的市民。我們將共同努力，締造更加綠色的未來。」

—澤韋納爾市議員
Tienke van de Werf 女士

3.1.3 Green Residence

Green residence is a new model which is designed and built based on the principles of 1) sustainable symbiosis between human beings and the nature and 2) efficient use of resources. Material and energy systems in and out of the residence create a virtuous circle; and therefore to some extent energy realize its self-sufficiency without waste and pollution generated. Hanergy Thin Film Power has worked together with residential designers such as Aida and brought thin-film solar technology to people's living space to improve the energy supply system, raise the public awareness of environmental protection, and continuously improve residential quality.

3.1.3 綠色住宅

綠色住宅是基於人與自然持續共生原則和資源高效利用原則而設計建造的一種能使住宅內外物質能源系統良性循環，無廢、無汙、能源實現一定程度自給的新型住宅模式。漢能薄膜發電先後攜手愛誼達等住宅建築設計商，將薄膜太陽能技術導入人們的居住空間，改進能源供應系統，傳播綠色環保理念，不斷提升住宅品質。

Case: Aida "Health Residence" Villa Showroom
案例：愛誼達「健康住宅」示範別墅

In 2016, the showroom of Aida Kenchiku Sekkei(Shanghai)Co., Ltd., erected in Changxi Industrial Park, Jiading District, Shanghai, was launched with the "film coat" provided by Hanergy Thin Film Power. The project has an installed capacity of 5 kilowatts. Hanergy Thin Film Power's Classic Series modules of Apollo solar are used for the project. It is expected that more than 5,000 kWh of green power will be provided to the power consuming terminals in the residence every year to provide a consistent, stable and reliable clean energy for the household. By doing so, the showroom can save 1.5 tons of standard coal and will reduce nearly 4 tons of carbon dioxide emissions per year, making contributions to the environmental protection cause.

2016，日本愛誼達建築設計公司上海分公司在上海市嘉定區長喜工業園區搭建的示範別墅正式亮相，漢能薄膜發電為其樣板間穿上「薄膜外衣」。該項目的裝機容量為5千瓦，採用的是漢能薄膜發電的鉑陽經典系列原件，預計每年將有5千多度綠色電力從屋頂流入家中各用電端，為家庭持續提供穩定可靠的清潔能源，由此，別墅每年可節約標準煤1.5噸，減少二氧化碳排放近4噸，為環保作出貢獻。



3.1.4 Green Sports

Hanergy Thin Film Power is actively engaged with sports organizers and participants around the world to provide clean energy in the construction of energy systems for sports facilities. This reduces carbon emissions and make contributions to the green development of the sports cause.

3.1.4 綠色體育

漢能薄膜發電積極與世界各地體育賽事主辦方進行接洽，參與體育場館設施能源系統建設，提供清潔能源，降低碳排放，共謀體育事業的綠色發展。



Case: Hanergy Thin Film Power Provides the World Cup Qatar with Clean Power

案例：漢能薄膜發電原件將為卡塔爾世界盃提供清潔電力

On March 10, 2016, ClearWorld, the US provider of renewable energy system solutions, announced that it would be an official supplier of the 2022 World Cup Qatar. According to its creative design for the World Cup Qatar, the ClearWorld RetroFlex System will provide upward lighting for the palm trees in the vicinity of the football field. This kind of lamps hardly requires any maintenance because they will be fully powered by the flexible lightweight solar panels produced by MiaSolé, a subsidiary of Hanergy Thin Film Power.

After the construction of 2022 World Cup's first football field, it will become the template for the remaining eight football fields. For each football field, ClearWorld will be responsible for two projects: landscape lighting for aesthetic effect and lighting for the road to the football field. In short, a total of nine football fields are to be completed in the five years to come, the first of which has duration of 14 months.

ClearWorld will provide about 450 sets of landscape lighting facilities and a considerable amount of road lamps for roads and parking lots around the football field. ClearWorld will also erect a solar rod in each football field to provide clean power for at least 20 LED lamps.

"We are very excited to be a part of project. The project will be another example of CW's lighting and renewable energy solutions on the other side of the globe."

—Larry Tittle,
CEO of ClearWorld

2016年3月10日，美國可再生能源系統解決方案提供商 ClearWorld 近日宣佈，該公司成為 2022 年卡塔爾世界盃足球賽官方供應商。按照該公司專門為卡塔爾世界盃制定的創意設計方案，ClearWorld RetroFlex 系統將為足球場附近的棕櫚樹提供向上照明。這種燈幾乎不需要維護，因為它的全部電力將由漢能薄膜發電子公司 MiaSolé 生產的柔性輕質太陽能電池板提供。

2022 年世界盃的第一座足球場正在施工建設，它將成為其餘八座足球場的範本。對於每座足球場，ClearWorld 將負責兩個項目：一是提供景觀照明，增強美學效果；二是為通向足球場的道路提供照明。總之，未來五年將有九座足球場落成，其中第一座的工期為 14 個月。

ClearWorld 將提供約 450 套景觀照明設備，並為足球場周邊道路和停車場提供大量路燈。ClearWorld 還將在每座足球場內豎起一根太陽能杆，為至少 20 盞 LED 燈提供清潔電力。

「能夠參與這次項目，我們非常興奮。在地球的另一邊，該項目將成為 ClearWorld 提供照明和可再生能源解決方案的又一範例。」

—ClearWorld 首席執行官
拉裡·蒂特爾

3.1.5 Green Agriculture

In the agricultural field, Hanergy Thin Film Power has applied thin-film solar power technology to the whole process of agricultural production including planting, breeding, irrigation, pest control and agricultural machinery as well as the broader agricultural fields such as land desertification control, saline-alkali transformation and ecological restoration. It has form a new comprehensive system of modern agriculture, integrating comprehensive development of agricultural economy, efficient use of resources, ecological and environmental protection.

As of the end of 2016, Hanergy Thin Film Power has successfully implemented a number of projects in China, such as Beijing Gold Wind Technology's "Smart Farm", "Shijiazhuang Modern Agriculture Experience Center for Youth", "Shelters for Date Trees" in Yonghe, Shanxi, "Photovoltaic Greenhouse" in Shenmu County, Shaanxi, and "Multi-Span Greenhouse for Flower Nursery" in Jiuquan, Gansu. Hanergy Thin Film Power's clients cover agricultural leading enterprises, private growers, innovative technology enterprises, research institutes, and the government. Plants and crops involved include fruits and vegetables such as cucumber and tomato, leafy vegetables such as lettuce and cabbage as well as flowers, fruit trees (jujube), and seedling.

3.1.5 綠色農業

在農業領域，漢能薄膜發電已經將薄膜太陽能發電技術應用到了種植、養殖、灌溉、病蟲害防治、農業機械動力等農業生產的全過程，以及土地荒漠化治理、鹽鹼地改造、生態修復等更廣義的農業領域，形成一個集農業經濟綜合開發、資源高效利用、生態環境保護等為一體的新型綜合現代農業體系。

截至2016年末，漢能薄膜發電已經在中國國內成功實施了北京金風科技智慧農莊項目、石家莊青少年現代農業體驗中心、山西永和棗樹避雨棚項目、陝西神木縣光伏溫室項目、甘肅酒泉花卉育苗連棟溫室項目等諸多項目案例，客戶包括農業龍頭企業、民營大種植戶、創新科技企業、研究院、政府等，種植作物涉及黃瓜、番茄等果菜、生菜、甘藍等葉菜以及花卉、果樹(大棗)、育苗等。



Thin-Film Solar Greenhouse

Tips: In greenhouse applications, the thin-film solar panel is previous to red light and infrared ray and uniformly previous to light. It does not affect the growth of crops in the greenhouse. Its weight is equivalent to general cover materials of agricultural greenhouses and may be perfectly applied to greenhouses to provided heat insulation, sun shield and increase income for power generation.

薄膜太陽能農業大棚

小知識：在溫室大棚應用中，薄膜太陽能發電板可透紅光、紅外線，且透光均勻，不影響棚下作物生長，其重量也與一般農業大棚覆蓋材料相當，可與大棚完美結合，保溫遮陰、增加發電收入。



3.1.6 Protection of Water Resources

As to the protection of water resources, Hanergy Thin Film Power's technology and products give full play to a "preventive role". For example, solar ships can replace traditional energy-powered ships and realize zero pollution emission while traveling on water surface.

3.1.6 保護水資源

在保護水資源方面，漢能薄膜發電的技術和產品充分發揮了「預防作用」，例如太陽能船可以取代傳統能源動力船，在水面行駛過程中實現零污染排放。

Case: Full Solar-Powered Ships Contributes to Basin Development in South America

案例：在南美，全太陽能動力船有助於流域發展

At the request of KARA Solar, a company from Ecuador, South America, Hanergy Thin Film Power and KS worked together to build full solar powered ships. Hanergy Thin Film Power and KS exchanged product information and analyzed the environmental needs for application many times to jointly design a viable installation program. Considering the environment of the Amazon Basin, the habit of population who live in this area, the load and cost of photovoltaic ship and other factors, the design program for the first full solar powered ship and its photovoltaic system design are ultimately determined. The full solar powered ship was completed and successfully launched in the end of 2016. This is a solar powered ship that is powered entirely by solar modules. The daily generation of the solar powered ship is 19 kWh. It is estimated that the annual power generation capacity is up to 7200 kWh or more, which is able to provide the power for ship to travel 67 km, serving the local residents in 9 districts.

"The solar powered ship is an exploration in the mobile energy era between Hanergy and us. We hope that in the future Amazon Basin, fuel power can be gradually replaced by clean energy."

—Positive comments from KARA Solar on Hanergy's technology and related services

漢能薄膜發電美洲公司應厄瓜多爾 KARA SOLAR 公司要求，共同建造全太陽能動力船。雙方多次交流產品資訊，分析應用環境需求，共同設計可行的安裝方案，綜合考慮亞馬遜河流域的環境、生活在這一流域的人群習慣及光伏船的載重和成本等因素，最終確定首支全太陽能動力船的設計方案和光伏系統設計。2016年底，全太陽能動力船建造完成並成功下水。這是一艘完全由太陽能原件提供動力，為電池充電的太陽能船。太陽能船日發電量19度，測算年發電量可達7200度以上，能夠滿足小船在67公里流域行駛，為當地9個社區的人們提供服務。

「這艘太陽能船是漢能和我們在移動能源時代的一次探索，我們取得了成功。我們希望，在未來的亞馬遜河流域，燃油動力能夠逐漸被清潔能源動力代替。」

——KARA SOLAR 公司對漢能的技術和相關服務表示肯定



The full solar-powered ship travelling on the Amazon
行駛在亞馬遜河上的全太陽能動力船

3.2 Green Products

With the advantage of flexibility, lightweight, good performance in low light, adjustable color and plastic shape, the thin-film power generation technology can be widely used in distributed generation, mobile 3C products, wearable equipment and solar full powered vehicles, solar unmanned aerial vehicles, satellite and other fields.

3.2 提供綠色產品

薄膜發電技術產品具有柔性可彎曲、品質輕、弱光性好、顏色可調、形狀可塑等優勢，可廣泛應用於分散式發電、移動3C產品、可穿戴設備以及太陽能全動力車、太陽能無人機、衛星等領域。

Technical directory 技術目錄	Features 特點
Gallium arsenide flexible film 砷化鎵柔性薄膜	Ultra-light, ultra-thin, flexible, easy to shape, high conversion efficiency, especially good performance under high temperature and low light conditions 超輕、超薄、可彎曲、易賦型、轉換效率高，特別是高溫及弱光條件下表現優
Copper indium gallium selenium glass base film 銅銦鎵硒玻璃基薄膜	Beautiful appearance, outstanding performance under high temperature, easy installation, excellent self-cleaning function, easy to maintain 外形美觀、高溫性能卓越、安裝便捷、有卓越的自清潔功能、易於維護
Copper indium gallium selenium flexible film (sputtering method) 銅銦鎵硒柔性薄膜(濺射法)	High conversion efficiency, light weight, ultra-thin, flexible, can be directly pasted, low installation costs, suitable for light loads, curved roof and the combination with civilian products 轉換效率高、品質輕、超薄、可彎曲、可直接粘貼、安裝成本低；適合於輕荷載和曲面屋頂，以及適用與民用產品結合
Copper indium gallium selenium flexible film (co-evaporation method) 銅銦鎵硒柔性薄膜(共蒸發法)	Light weight, ultra-thin, flexible, can be directly pasted, low installation costs, suitable for light loads, curved roof and the combination with household products 品質輕、超薄、可彎曲、可直接粘貼、安裝成本低；適合於輕荷載和曲面屋頂，以及適用與民用產品結合
Silicon germanium film 矽鍺薄膜	Beautiful appearance, stable and reliable, high temperature well-adapted, good occlusion resistance, not fight with plants for red light (the transmission rate of red light is high) 外形美觀、穩定可靠、高溫適應性強、耐遮擋性好、不與植物爭紅光(紅光透過率高)



3.2.1 Mobile Energy

With the popularity of mobile Internet, portable electronic equipment has become the necessity in people's lives. Meanwhile, with the constant fluctuation of traditional fossil energy reserves and the environmental pressures increase, the electric car industry will grow exponentially, followed by the huge demand for mobile energy supply. Solar energy thin-film power generation technology, which is characterized as mobile, intelligent and networked, will provide the best solution for such demand and bring about the rapid development of strategic new industries such as new energy, new energy vehicles, new materials, high-end equipment manufacturing, energy saving and environmental protection. It will finally form the new economic growth pole of China under the "New Normal".

Based on the strategic judgments of global energy development trend, Hanergy Thin Film Power proposed the concept of mobile energy for the first time. Mobile energy is based on the mobile distributed power generation technology, through the organic combination of energy storage, control, information and communication technology, to achieve mobile, all-weather, high-efficiency power supply, that is, to provide energy with thin-film power generation, making the idea of "energy is everywhere" to come true.

In the era of mobile energy, with the solar energy thin-film power generation technology characterized as mobile, intelligent and networked, Hanergy Thin Film Power brings about the rapid development of strategic new industries such as new energy, new energy vehicles, new materials, high-end equipment manufacturing, energy saving and environmental protection. With advantages in various fields, especially in the commercial field, Hanergy Holding Group's thin-film solar power products have unlimited tremendous potential. As of the end of 2016, Hanergy Holdings Group had launched full solar powered cars, solar unmanned aerial vehicles, portable charging products, wearable equipment and other mobile energy products.

3.2.2 Building Integrated Photovoltaic

In modern society, people's pursuit of a comfortable building environment is getting higher and higher, resulting in the ever increasing of the building heating and air conditioning energy consumption. China is a country of huge energy consumption and data have showed that the total building energy consumption in our country is

3.2.1 移動能源

隨著移動互聯網的普及，可攜式電子設備成為人們生活中的必需；同時，隨著傳統化石能源儲量不斷減少和環境壓力不斷增大，電動車產業必將長足發展，隨之而來的是對移動能源供給的巨大需求。以可移動、智慧化、網路化為特徵的太陽能薄膜發電技術將為此提供最佳解決方案，並帶動新能源、新能源汽車、新材料、高端裝備製造、節能環保等戰略性新興產業的快速發展，形成「新常態」下中國經濟新的增長極。

基於對全球能源發展趨勢的戰略判斷，漢能薄膜發電率先提出移動能源這一概念。移動能源是以可移動的分散式發電技術為基礎，通過儲能、控制、資訊通信等技術的有機結合，實現能源的可移動、全天候、高效率供應，即用薄膜發電隨時隨地提供能源，實現能源的無處不在。

在移動能源時代，漢能薄膜發電以「可移動、智慧化、網路化」為特徵的太陽能薄膜發電技術解決方案，帶動新能源、新能源汽車、新材料、高端裝備製造、節能環保等戰略性新興產業的發展。漢能薄膜太陽能發電產品，在各領域尤其在民用領域的優勢，具有不可限量的巨大潛力。截至2016年末，漢能控股集團已經發佈全太陽能動力汽車、太陽能無人機、可攜式充電產品和可穿戴設備等移動能源產品。

3.2.2 光伏建築一體化

現代社會中，人們對舒適的建築環境的追求越來越高，導致建築採暖 and 空調的能耗日益增長。我國是能耗大國，資料顯示，我國建築能耗的總量逐年上升，在能源總消費量中所佔的比例已從二十世紀七十年代末的10%上升到27.45%，逐漸接近三成。隨著城市化

increasing year by year. The proportion of total energy consumption rises from 10% in the end of the 1970s to current 27.45%, gradually accounting for 30%. With the accelerated process of urbanization and the improvement of people's quality of life, the building energy consumption proportion in China will eventually rise to about 35%. With such a big proportion, building energy consumption has become the soft underbelly of China's economic development. And in developed countries, building energy consumption accounts for 30% – 40% of the total energy consumption, forming a certain restriction on the economic development.

We believe that the application of solar energy in construction and the development of Building Integrated PV (BIPV) are of importance in promoting building energy efficiency level in China. BIPV is a technology solution that integrates solar power systems into buildings. When used in the construction, BIPV constitutes the active and passive energy-saving system for the building, which is able to realize the in situ power generation and local power consumption, thereby saving the power consumption in power station and power grid, easing the pressure of power supply. At the same time, it is able to adjust the building lighting, and the hollow thermal isolation design can reduce the heat conduction of the wall, thereby reducing the overall energy consumption of the building.

As of the end of December 2016, Hanergy Thin Film Power has close to a hundred BIPV projects around the world. Hanergy Thin Film Power's BIPV appears in the Beijing Olympic Forest Park— North Park, Yizhuang Economic and Technological Development Zone Administrative Committee government office building, Tongzhou State Grid Huashang Sanyou Charging Pile Manufacturing Park, Huairou Yanqi Lake-the host place of the 2014 APEC Summit, as well as Tianjin State Grid North Call Center, Shanghai Jiaotong University, Xinjiang Turpan New Area Longyuan Electric Power Group, Jiangsu Province Green Building Expo Park, and even in Germany's Thalheim Industrial Park, the Netherlands Alkmaar Football Club Home AFAS Stadium, Mexico Cancun City Morelos Hong Kong Dolphin Museum, Japan's Yokohama Jingji Railway Station and other places.

進程的加快和人民生活品質的改善，我國建築耗能比例最終還將上升至35%左右。如此大的比重，建築耗能已經成為我國經濟發展的軟肋。並且在發達國家，建築用能已佔全國總能耗的30%—40%，對其經濟發展形成了一定的制約作用。

我們認為將太陽能應用於建築，發展光伏建築一體化（Building Integrated Photovoltaic，簡稱BIPV）對提高我國建築節能水準有重要意義。BIPV是一種將太陽能發電系統集成到建築上的技術解決方案。BIPV產品應用在建築中，構成建築的主、被動節能體系，可實現建築的原地發電、就地用電，從而節省電站送電網的能耗，緩解供電壓力。同時，可調節建築採光，中空的絕熱設計能夠減少牆體的熱傳導，從而降低建築的能耗。

截至2016年12月末，在全球範圍內，漢能薄膜發電的BIPV項目已有近百處。在北京奧林匹克森林公園北園、亦莊的經濟技術開發區管委會政府辦公樓、通州的國家電網華商三優充電樁製造園區、懷柔雁棲湖的2014年APEC峰會舉辦地，以及天津國家電網北方呼叫中心、上海交通大學、新疆吐魯番新區龍源電力集團、江蘇省綠色建築博覽園，甚至是在德國的泰爾漢姆工業園、荷蘭阿爾克瑪律足球俱樂部主場AFAS球場、墨西哥坎昆城莫雷洛斯港海豚館、日本的橫濱京急地鐵車站等地，都出現了漢能薄膜發電BIPV的身影。



3.2.3 Solar Roof

Currently, most of the industrial plants, logistics warehouses, airports, stations, exhibition halls and sports venues are constructed with the low-load light steel roof and traditional photovoltaic component cannot be applied in these places due to its heavy weight. Hanergy's flexible thin-film component is able to solve this problem, as it is light, soft, thin and flexible, with the weight per square meter of less than 4 kg, causing a small load increase to the roof. This makes Hanergy's flexible thin-film component safe and an adaptable solar power solutions for all users.

As an important application area of solar energy, the solar roof is well accepted in foreign markets. At present, we can see Hanergy's flexible thin-film component in the fashion capital of Milan, Italy, the United States Hawaii resort, the romance capital of Paris, France and Sydney, Australia. In 2015, Hanergy's first solar photovoltaic roofing distributed generation project on the roof of UK Volkswagen Logistics Center was successfully grid-connected. In the same year, Hanergy signed the contract for Netherlands AFAS stadium roof photovoltaic project with Netherlands Alkmaar Football Club. Hanergy also announced in Amsterdam, the Netherlands, to work together with Rooftop Energy to install thin-film power generation components on the roof of the largest national flower plant trading center.

3.2.3 太陽能屋頂

當今的工業廠房、物流倉儲、機場、車站、展館、體育場館等，大多採用負載較低的輕鋼屋頂，傳統光伏原件往往因較重而無法在這些地方得到應用推廣。漢能柔性薄膜發電原件可解決這一問題，它具有輕、柔、薄、可彎曲等優勢，每平方米的重量不超過4公斤，對屋頂增加的恒荷載很小，可安全、輕鬆地為這些用戶提供太陽能電力。

太陽能屋頂作為太陽能應用的重要領域，在國外具有很高的市場接受度。目前，無論是時尚之都義大利米蘭、度假勝地美國夏威夷、還是浪漫之都法國巴黎、澳大利亞悉尼，都有漢能柔性薄膜發電屋頂的身影。2015年，漢能在英國大眾汽車物流中心屋頂的首個太陽能光伏屋頂分散式發電項目成功併網發電。同年，漢能與荷蘭阿爾克瑪律足球俱樂部合作的荷蘭AFAS體育場屋頂光伏項目順利簽約。不久前，漢能還在荷蘭阿姆斯特丹宣佈，將Rooftop Energy合作在荷蘭最大的國家花卉植物交易中心屋頂上安裝薄膜發電原件。

Case: Commencement of Hanergy Thin Film Power's "Golden Roof Action"

案例：漢能薄膜發電「金屋頂行動」全面啟動

In its "Golden Roof Action" kick-off meeting on March 18, 2016, Hanergy Thin Film Power announced to collect quality roof resources from the whole society, especially from industrial and commercial owners. Once met Hanergy's Standard, their quality roof resources would be incorporated into the "Golden Roof" Program. With the full support of Hanergy, "Golden Roof" owners will be able to open the "golden" wealth and make an important contribution to energy conservation. "Golden Roof Action" is a practical action by Hanergy to actively respond to the national's PV distribution policies. The Action follows the general trend of PV development and further realizes the Company's great vision of "changing the world with clean energy". The Action focuses on

2016年3月18日，漢能薄膜發電舉行了「金屋頂行動」啟動大會，隆重宣佈向全社會特別是工商業主徵集優質屋頂資源，一旦符合漢能標準將被納入「金屋頂」計畫。「金屋頂」業主將在漢能的全方位助力下順利開啟「金」色財富並對節能減排作出重要貢獻。「金屋頂行動」是漢能積極回應國家分散式政策、順應光伏發展大勢並進一步為實現「用清潔能源改變世界」這一偉大願景而採取的實際行動，重點包括國家對分散式電站諸多利好政策、「金屋頂」業主顯著的經濟收益和社會效益、漢能一站式綠色能源解決方案，以及漢能與央企、地方國企、上市公司等知名企業合作完成的分散式電站成功案例。啟動會場聚集了全國

aspects as follows: the country's various favorable policies for distributed power stations, "Golden Roof" owners' significant economic and social benefits, Hanergy's one-stop green energy solutions, and Hanergy's successful cases of distributed power stations working with central enterprises, local state-owned enterprises, listed companies and other well-known enterprises. There are totally more than 260 representatives from more than 70 major industry associations, 30 well-known large-scale enterprises and 20 financial institutions attending the commencement meeting.

"Golden Roof Action" is another major initiative of Hanergy Thin Film Power following the national clean energy advocacy activity and the creation of China's PV household marketing system in 2015. The action will take the lead in China's high-speed development of distributed energy, to mobilize industrial and commercial enterprise resources with large power consumption demand. It will make full use of Hanergy's strong brand influence and distributed investment trading platform, to provide one-stop green energy solutions including funding, energy consulting, product supply, system design, installation and construction, operation and maintenance management and after-sales service, to business owners.

70 餘家主要行業協會、30 多家國內知名大型企業、20 餘家金融機構代表，共計 260 餘人。

「金屋頂行動」是漢能薄膜發電繼 2015 年在全國範圍開展清潔能源宣導活動並開創中國光伏戶用行銷體系後的又一重大舉措，這一行動將率先抓住中國分散式高速發展的重大機遇，調動全社會用電需求較大的工業和商業企業資源，充分利用漢能強大的品牌影響力和分散式投資交易平台，為企業主提供包括資金提供、能源諮詢、產品供應、系統設計、安裝施工、運維管理和售後服務等一站式的綠色能源解決方案。



Commencement meeting site
啟動會議現場



“In the context of global energy-saving emission reduction, Hanergy launches the “Golden Roof Action” at the right time, making an example for the new energy industry once again. We hope that the action can act as the beginning to lead the trend of 2016 China’s distribution rapid development, and make distributed energy one of the important measures to relieve environmental pollution, ensure energy security, ensure energy supply and mitigate international dependence. This action benefits not only the business, but with greater benefit for the environment and climate-friendly beautiful China.”

—Zeng Shaojun,
Secretary-General of National Federation of
New Energy Chamber of Commerce

“The cooperation with Hanergy is our milestone in the development of new energy strategy, the two sides will uphold the principle of mutual benefit and win-win, give full play to their strengths, and jointly promote the landing of “Golden Roof Action “and the distribution of power plants in China. ”

— Liang Weihua,
Chairman of China Logistics Co., Ltd.

「在全球節能減排的背景下，漢能發起的金屋頂行動恰逢其時，再一次為新能源行業作了表率。希望由此為開端，引領2016年中國分散式高速發展之大趨勢，並使分散式能源成為解決環境污染、確保能源安全、保障能源供給、減緩對國際依賴的重要措施之一。這一行動受益的不僅僅是企業，更大的受益是環境和氣候友好型的美麗中國。」

——全國工商聯新能源商會秘書長
曾少軍

「此次與漢能的合作是我們在新能源發展戰略上的里程碑，雙方將秉承互惠共贏的原則，充分發揮各自優勢，共同推進『金屋頂行動』以及分散式電站在中國物流的落地。」

——中國物流有限公司董事長
梁偉華

3.3 Green Operation

The energy resources we use in our operations include electricity, water and paper. We strictly abide by the relevant national energy laws and regulations, and the relevant provisions are included in the provisions of the office and production operations management. We implement a variety of energy-saving emission reduction initiatives, such as using LED energy-saving lamps for office lighting, performing partition control of all lightening, installing water-saving toilets and using environmentally friendly paper and recycled paper.

Use of energy resources

The energy resources we use in our operations include electricity, water and paper. We strictly abide by the relevant national energy laws and regulations, and the relevant provisions are included in the provisions of the office and production operations management. We implement a variety of energy-saving emission reduction initiatives, such as using LED energy-saving lamps for office lighting, performing partition control of all lightening, installing water-saving toilets and using environmentally friendly paper and recycled paper.

3.3 踐行綠色營運

漢能薄膜發電為高新技術企業，對環境產生的直接影響較小。公司秉持綠色營運的理念，增強員工環保意識，開展節能減排，踐行綠色運營。

能源資源使用

我們在營運過程中使用的能源資源主要包括電、水和紙張。我們嚴格遵守國家能源相關法律法規，並將相關條款落實在辦公和生產營運管理條文中，實施多種節能減排舉措，比如辦公區照明統一使用LED節能燈管，對所有照明燈分分區控制，在洗手間安裝使用節水馬桶，使用環保紙張和循環用紙。

Emissions management

The emissions from our operations include waste gas, waste water and hazardous waste. We strictly abide by the laws and regulations such as the Environmental Protection Law, the Air Pollution Prevention Law, the Water Pollution Prevention Law, the Solid Waste Pollution Prevention Law and other laws and regulations. For waste water generated during the R & D process, R & D personnel will carry out collection, filtering and neutralization, and then discharge to the municipal pipe network after meeting the discharge standards. R & D personnel take measures of high-temperature combustion to decompose the waste gas produced in the R & D process into oxygen, water vapor and other gases, and then discharge to the ambient air after meeting the discharge standards. A qualified third party contractor is appointed to conduct harmless disposal of waste ink cartridges, waste toner cartridges, waste computers, waste lights, and other products to avoid leakage.

At the same time, Hanergy Thin Film Power's four overseas subsidiaries: Solibro and MiaSolé in Germany, Global Solar Energy and Alta Devices in United States, have established sound systems in accordance with local regulatory requirements. Full-time environmental health and safety (EHS staff earnestly implement the environmental standards required by local regulatory authorities. For example, Solibro in Germany needs to declare the company's EHS approach and specific measures to the government each year, and arrange qualified safety engineers to carry out a two-day safety training for new employees. We promote the applications of the green operation advanced experience of these overseas subsidiaries within the entire group.

In addition, we will choose to provide services for customers with more environmentally friendly management, such as obtaining designated environmental certification, wastewater and waste gas treatment design that is in strict compliance with safety regulatory standards.

排放物管理

我們在營運過程中產生的排放物主要包括廢氣、廢水及危險廢棄物。我們嚴格遵守《環保法》、《大氣污染防治法》、《水污染防治法》、《固體廢物污染環境防治法》等國家法律法規，針對在研發過程中產生的廢水，研發人員會把廢水集中、過濾、中和，達標排放到市政管網。針對在研發過程中產生的廢氣，研發人員採取高溫燃燒的方式，使其分解成氧氣、水蒸氣等氣體，達標外排至外界空氣中，避免毒氣洩漏。廢墨水匣、廢硒鼓、廢電腦、廢燈管等危險廢棄物全部交由有資質的第三方進行無害化處置。

同時，漢能薄膜發電所轄四家海外子公司德國 Solibro、美國 MiaSolé、Global Solar Energy 與 Alta Devices，均依照當地的監管要求建立了完善的系統，由專職的 EHS(即環境、健康、安全)員工認真落實當地監管部門的環保標準，比如德國 Solibro 每年都要向政府申報公司的 EHS 辦法和具體措施，安排合格的安全工程師對新進員工進行為期兩天的安全訓練等。我們在全集團推廣海外子公司在綠色營運方面的先進經驗。

此外，我們會選擇環保管理更為規範的客戶對其提供服務，比如通過指定的環保認證、廢水和廢氣的處理設計嚴格符合監管機構安全標準等。



4 Value to Share: Innovation and Cooperation

The success of an enterprise is inseparable from the prosperity of society. Our development was attached to social values and technological innovation as the main driving force in order to help customers save production costs and generate economic value. We help suppliers by improving their management level and ability to enhance their competitiveness in the industry, creating jobs for dealers and promoting a virtuous circle of ecology.

4.1 Strengthening Technology Innovation

Scientific and technological innovation is the driving force of the enterprise and the foundation of enterprise's progress. "The mystery of the enterprise's survival is that their technology is always in the leading place". We always adhere to technological innovation, using a series of the world's top thin-film power technology, through continual acquisition of overseas thin film technologies, gathering professionals from all over the world to accelerate the development of thin-film power technology.

4.1.1 Enhancement of R&D

Technological innovation is one of the core responsibilities of Hanergy Thin Film Power. With continuous investment and research and development, we continue to maintain our position a global leader in thin-film solar technology. In 2016, our R&D investment was 567,165,000 Hong Kong dollars.

We have a national title of "High-tech Enterprise" and a "Post-doctoral Scientific Research Workstation". We have set up 8 R&D centers located in Beijing, Sichuan, Jiangsu, Silicon Valley in America, Germany and Sweden and established a global R&D team led by top-level scientists in the semiconductor and photovoltaic industry. Our team also consists of overseas returning young and middle-aged scientists.

4 共用價值：我們的創新與合作

企業的成功離不開社會的繁榮。我們將自身的發展與社會價值緊密相連，以技術創新為主要推動力，明客戶節約生產成本，創造經濟價值；幫助供應商提升管理水準和能力，增強供應商在行業的競爭力；為經銷商創造就業機會，促成生態圈的良性循環。

4.1 加強技術創新

科技創新是企業長青的動力，是企業進步的基礎。「企業生存的奧秘在於技術永遠領先」，我們不斷堅持技術創新，利用一系列世界頂尖薄膜發電技術，通過持續併購多間領先的海外薄膜技術公司，聚合世界各地專業人士，加速薄膜發電技術發展。

4.1.1 增強研發實力

技術創新是漢能薄膜發電的核心責任之一，我們通過不斷的投入和研發，持續保持著全球薄膜太陽能技術的領先地位。2016年，我們的研發投入為567,165,000港元。

我們擁有國家級「高新技術企業」稱號和博士後科研工作站，在北京、四川、江蘇、美國矽谷、德國、瑞典等地設有八個研發中心，建立了由國內外半導體和光伏產業頂級科學家領銜，以歸國中青年科學家為骨幹的全球化研發團隊。



4.1.2 Integration of Global Technology

Thin-film and flexible solar cells represent the future of the PV industry. Based on this strategic thinking, since 2010, Hanergy has commissioned experts to select some thin-film power companies for a global technical integration. The company acquired the world's top thin film powers companies, such as German Solibro, American MiaSole, Global Solar Energy, Alta Devices, and others equipped with world class technology in the field. The company has got silicon thin films, copper indium gallium selenide (CIGS), gallium arsenide (GaAs) and other complete thin-film technology roadmaps. This was also a significant move for Hanergy to go global and become a multinational clean energy player.

We have acquired four overseas thin-film power generation enterprises, through which we obtain technology including:

- (i) Solibro's co-evaporation technology;
- (ii) MiaSolé's sputtering technology in the manufacturing of flexible thin-film modules;
- (iii) Global Solar Energy's integrated battery interconnect and packaging technologies; and
- (iv) Alta Devices' high conversion rate GaAs technology.

4.1.3 Innovative Achievement

The pursuit of innovation leads to many scientific research achievements. A series of technical breakthrough in CIGS and GaAs has made. All technique roadmaps of research and development and mass production efficiency hit a new record.

4.1.2 全球技術整合

薄膜化、柔性化是光伏產業發展的未來和總趨勢。正是基於這個重要的戰略判斷，自2010年起，漢能薄膜發電組織專家篩選了海外多家薄膜發電企業進行全球技術整合，先後併購了德國Solibro、美國MiaSole、Global Solar Energy與Alta Devices等擁有世界頂尖薄膜技術的薄膜發電企業，囊括整合了矽基薄膜、銅銦鎵硒(CIGS)、砷化鎵(GaAs)等完整的薄膜技術路線，不斷走向國際，成為全球性跨國清潔能源企業。

我們現已收購了四家海外薄膜發電企業，獲得的技術包括：

- (i) Solibro 的銅銦鎵硒(CIGS) 共蒸發技術；
- (ii) MiaSole 的銅銦鎵硒(CIGS) 濺射法技術及用於製造柔性銅銦鎵硒(CIGS) 薄膜組件；
- (iii) Global Solar Energy 的整合電池互聯和柔性銅銦鎵硒(CIGS) 組件封裝技術；
- (iv) Alta Devices 的高轉換效率砷化鎵(GaAs) 技術。

4.1.3 豐富創新成果

我們對創新的追求使我們在科研成果方面碩果纍纍，在銅銦鎵硒、砷化鎵等技術上取得了一系列的突破，各技術路線的研發和量產效率再創新高。



4 world records in flexible thin-film battery

漢能薄膜發電柔性薄膜電池獲4項世界紀錄

- The world's best efficiency in small dimension mass produced wafer of GSE's flexible co-evaporation thin film cells is 17.2%
- The efficiency of MiaSolé multi-element sputtering flexible single string module is 17.3%
- The conversion rate of Alta Devices' GaAs double junction solar cell is 31.6%
- The conversion rate of GaAs single junction solar cell is 28.8%
- GSE 柔性共蒸法薄膜電池量產晶片小尺寸冠軍效率 17.2%
- MiaSolé 多元素濺射法柔性單串組件效率 17.3%
- Alta Devices 公司砷化鎵雙結電池轉化率 31.6%
- 砷化鎵單結電池轉化率 28.8%

New Breakthrough in Mass Production Efficiency in 2016

2016年漢能薄膜發電量產效率新突破

- R&D efficiency of MiaSolé's chip reached 19.4%
- The efficiency of the winner module from the new generation technique in US reached 18% (which currently represents the highest efficiency in the world for sputtering CIGS flexible modules)
- Solibro's top mass production of winner modules had an efficiency of 16.97% and effective area reach 17.9% (the world record for the mass production of co-evaporation CIGS modules)
- The efficiency of Alta Devices mass production modules reached 24.8%
- The average efficiency of GSE mass production of modules reached 15.6%
- The Efficiency of mass production of winner modules is 16.2%
- MiaSolé 晶片研發效率達到 19.4%
- 美國新一代工藝量產冠軍原件效率達到 18% (目前全球濺射法 CIGS 柔性原件最高效率)
- Solibro 量產冠軍組件效率達到 16.97%，有效面積 17.92% (共蒸法 CIGS 組件量產世界紀錄)
- Alta Devices 量產組件效率達到 24.8%
- GSE 量產組件平均效率 15.6%
- 量產冠軍組件效率達到 16.2%

Hanergy Thin Film Power's Breakthrough in R&D Efficiency

2016年漢能薄膜發電量研發效率性突破

- R&D efficiency for GSE's chips is 18.7%
- HIT's cells have an R&D efficiency of 23%
- GSE 晶片研發效率 18.7%
- HIT 電池片研發效率達 23%

4.1.4 Promotion of Industrial Development

The solar PV industry in China has been developing rapidly in recent years, but without the core technology, the equipment has always been imported. We build a technology innovation research and equipment manufacturing system with technology acquisition and investment of a huge sum of money for many years. Part of the equipment are made in China with technology introduction, supplier development and sample making. We have the industry's leading film equipment manufacturing production line and delivery capacity which plays a support and positive driving role in further promoting China's PV industry's upgrade. We have mastered the world's leading CIGS and GaAs technology by planning ahead in the film solar industry, through the acquisition and integration of technology. We have introduced these foreign advanced technologies to China and then our country truly own the world's leading thin-film solar technology, which has realized the leap-forward development of China's solar core technology.

To promote the exchange in the whole industry and promote the improvement of the industry's level, we are actively organizing industrial exhibition, hosting the industry's BBS, and participating in the annual meeting of the tech industry. As for clients, we offer turn-key engineering services according to customer requirements. We will put forward optimizing suggestions for customers on EHS and quality. We devote to provide customers with products at the same time, improve customer EHS and quality management level.

4.1.4 推動產業發展

我國太陽能光伏產業近年來雖然飛速發展，但核心技術缺失，裝備一直依賴進口。我們憑藉技術併購及多年資投入建立起來的技術創新研發和裝備製造體系，通過技術引進、供應商開發、樣品試製等步驟，將部分設備國產化，形成業內首屈一指的薄膜裝備產線製造及交付能力，為進一步推動我國光伏產業升級起到了支撐和積極的帶動作用。不僅如此，我們在薄膜太陽能領域提前佈局，通過全球技術併購和整合，掌握了全球領先的銅銦鎵硒技術和砷化鎵技術。我們將這些國外的先進技術引入國內，讓我國真正擁有了世界最領先的薄膜太陽能技術，實現了我國太陽能核心技術的跨越式發展。

我們積極通過參與組織行業展會、主辦行業論壇、參與科技年會等方式，促進整個行業的交流，推動行業水準的提升。客戶方面，我們在根據客戶需求提供全包式工程服務時，會瞭解並對客戶在EHS、品質方面的管理情況提出優化改進建議，在為客戶提供產品的同時，提升客戶EHS及品質管制水準。



Case: Hanergy Thin Film Power's Participation in "Lighting Global"
& The 11th New Energy Science and Technology Annual Meeting
案例：漢能薄膜發電參與「點亮全球」國際論壇暨第十一屆新能源科技年會

On November 17, 2016, "Lighting Global" and The 11th New Energy Science and Technology Annual Meeting was held in Shenzhen to discuss how to solve the global shortage of electricity and energy. Former NDRC energy administration researcher Wang Sicheng, director of institute of solar system in Sun Yat-Sen University professor Shen Hui, "Lighting Global" team member Kristen Radecky and Elisa Lai, Hanergy Thin Film Power executive director, president of flexible industrial application division in China Xu Xiaohua, Hanergy Holding Group vice President Wang Junjuan and other government, industry and academic experts gathered to share the experience and achievements in solar technology. Mr. Xu Xiaohua made a speech entitled "The progress and market prospect of flexible film PV technology" and shared the development and market prospect of flexible film solar energy.

"Lighting Global" is an energy project that was set up by the world bank to help and improve the housing and living conditions in developing countries. It aims to make a contribution to improve the world's energy shortage by offering economic assistance to the less developed countries such as Africa and Asia, and purchasing off-grid lighting products around the world. 290 people from government, colleges and universities, industry organization and enterprises, detection, financial and trade organizations participated in "Lighting Global" and The 11th New Energy Science and Technology Annual Meeting. Through dialogue, presentation, communication, visiting, and other forms the intersection of technology and culture are presented, the new energy industry and the development and progress of science and technology are displayed, a voice of "Lighting Global" is issued in China.

2016年11月17日，「點亮全球」國際論壇暨第十一屆新能源科技年會在深圳隆重舉行，旨在討論如何解決全球無電人口和能源短缺的挑戰。原國家發改委能源局研究員王斯成、中山大學太陽能系統研究所所長沈輝教授，「點亮全球」項目組成員 Kristen Radecky 和 Elisa Lai、漢能薄膜發電執行董事及柔性工業應用事業部中國區總裁徐曉華、漢能控股集團副總裁王俊娟等政界、業界、學界專家齊聚一堂，分享了在太陽能技術方面的經驗和成績。徐曉華先生做了題為《柔性薄膜光伏技術的進步與市場前景》的演講，跟大家分享了柔性薄膜太陽能發展與市場前景。

「點亮全球」項目是世界銀行為援助和改善發展中國家居住和生活條件而設立的能源援助項目，通過世界銀行向非洲、亞洲等欠發達地區提供經濟援助，在全球範圍內採購離網照明產品，從而達到為改善世界能源短缺而作出貢獻。「點亮全球」國際論壇暨第十一屆新能源科技年會有政府、院校、行業組織、企業、檢測、金融、貿易等290多人參加，通過對話、演示、交流、參觀等多種形式呈現了科技與文化的交匯，展示了新能源產業和科技的發展進步，向世界發出了「點亮全球」的中國聲音。



4.2 A Rise in Service Value

Our core values are “customer-centric, providing the best products and best services for our customers”. We develop the Customer Complaint Handling Process to effectively handle customers’ complaints and provide customers with the best services. We have 400-hotlines, through which customers can tell us problems about the quality of the products, the attitude of the business people, and the response efficiency. Our customer service management center will take notes on the content of the complaint and the customer’s name, working place, address and phone number. We will arrange the corresponding departments to process the product quality complaints and non-product quality complaints.

In response to customer demand, on the basis of we also through the “golden roof action”, provide for the customer, including funding, energy consulting, product supply, system design, installation construction, operational management and after-sales service one-stop green energy solutions that address customer concerns, EPC construction problems of photovoltaic technology and assets operation management concern, for customers to create higher economic benefits. We designed and manufactured of silicon thin film the whole line production line, including plasma enhanced chemical vapor deposition (PECVD) technique, physical vapor deposition (PVD) device (all are independent research and development), and CIGS equipment based on the total evaporation and sputtering technology acquired from the world’s leading companies, by which customers can produce various kinds of thin film photovoltaic modules. These technologies not only provide customers with the superior performance of production equipment in the industry of thin-film power generation, but also make the cost of per watt the lowest, which greatly save money for customers and therefore create economic value.

4.2 提升服務價值

「以客戶為核心，為客戶提供最好的產品和最好的服務」是我們的核心理念。我們制定《客戶投訴處理》流程，以便及時有效地處理客戶的投訴，為客戶提供最優質的服務。我們設有400熱線。客戶可以通過400熱線向我們反映產品品質、業務人員態度、回應不及時等各類問題。我們客戶服務管理中心會詳細記錄投訴內容和投訴客戶的姓名、單位、地址及聯絡電話，針對產品品質類投訴和非產品品質類投訴，安排相應的負責部門進行專業化的處理。

在回應客戶訴求的基礎上，我們還通過「金屋頂行動」，為客戶提供包括資金提供、能源諮詢、產品供應、系統設計、安裝施工、運維管理和售後服務等一站式的綠色能源解決方案，解決客戶對光伏技術問題顧慮、EPC建設困擾和資產營運管理擔憂的問題，為客戶創造較高的經濟收益。我們設計製造矽基薄膜整線生產線，其中包括等離子增強化學氣相沉積(PECVD)、物理氣相沉積(PVD)裝置(均為自主研發)，以及從世界領先的海外公司收購而得的基於共蒸發技術和濺射技術的CIGS設備，令客戶可自行生產多種類型的薄膜光伏組件。這些技術不僅為我們的客戶提供了行業內薄膜發電生產設備中最優異的表現，同時每瓦生產成本亦為最低，為客戶節約生產成本，創造經濟價值。



Case: Hanergy Thin Film Power Built 1 Mega Watt Roof Film Power Station for a Pesticide Enterprise in Jiangsu Yancheng
案例：漢能薄膜發電為江蘇鹽城農藥企業建成1兆瓦屋頂薄膜電站

Huifeng Agrochemical Co., Ltd. is located in Dafeng district, Yancheng city, Jiangsu province. The company is a national famous pesticide enterprise which set research and development, production, domestic and foreign trade in one. Its annual electricity consumption is as high as 70 million degrees, resulting in more than 70 million a year in electricity costs. After learning about this situation, Hanergy's dealer, Chen Qingzeng, visited Huifeng Agrochemical Co., Ltd. and introduced the development of Hanergy Thin Film Power and the advanced technology of Hanergy products. Hanergy's team in Jiangsu made an elaborate plan, overall arrangement and design, equipment selection and intelligent operations to complete the project in just two month. Through this project, Huifeng Company gets to know the high executive ability, professional team and excellent after-sales service of Hanergy company in Jiangsu province.

As the first large-scale project of Hanergy in Jiangsu province, Huifeng project has very strict index requirements on products and technologies. In order to maximize the efficiency of the plant, the project incorporates a number of unique techniques of Hanergy Thin Film Power. According to the data from power suppliers, power generation of projects which adopted Hanergy's Solibro technology is 16% higher than other products of peer companies. The indicators are beyond the customers' expectation, and exceeded the national technical requirements for PV "Leader" of the project.

"After installing the film power generation system, our company saved a large amount of electricity cost. From the site survey, project design, construction to after-sales service, each link is meticulous and strive for perfection. The project has been smoothly launched for three months, and operations have been very stable. Opportunities and risks coexist. Risk is the main concern of an investment. Hanergy let me drop this concern. Such an excellent brand, we need to work with!"

—Zhong Hangen
Chairman of Huifeng

輝豐農化股份有限公司位於江蘇省鹽城市大豐區，公司是集研發、生產、國內外貿易於一體的全國知名農藥企業，年用電量高達 7000 萬度，一年的電費就要花費 7000 多萬，用電成本很高。瞭解到這一情況後，漢能江蘇大豐的經銷商陳慶曾登門拜訪輝豐農化，詳細介紹了漢能薄膜發電業務的發展以及漢能產品的先進技術。漢能江蘇省公司團隊對該項目進行了精心策劃、統籌安排，從整體設計、設備選擇、智慧運維等方面進行全面規劃，使得項目僅僅用了兩個月便正式竣工，讓輝豐公司看到了漢能江蘇省公司高效的執行力、專業的團隊和優質的售後服務。

輝豐農化項目作為漢能江蘇省公司首個 1 兆瓦大型項目，對產品、技術均有著非常嚴格的指標要求。為了能最大程度地提高電站效率，該項目融合了多項漢能獨有技術。供電部門提供的資料顯示，目前這個採用漢能 Solibro 薄膜發電技術的項目發電量比同行業其他產品高出 16% 以上，各項指標均超出了客戶預期，並超過了國家對光伏「領跑者」項目的技術要求。

「安裝了薄膜發電系統後，公司節約了一大筆用電開銷。從現場勘測、項目設計、工程建設到售後服務等各個環節，漢能都一絲不苟，力求盡善盡美。項目已順利發電三個月，運行非常穩定。機遇與風險並存，投資最擔心的就是風險，漢能讓我打消了這個顧慮。扶君上馬，與君同行，如此優秀的品牌，我們必須與之合作！」

——輝豐董事長 仲漢根

Hanergy Thin Film Power was installing film power generation for Huifeng Company
漢能薄膜發電為輝豐農化安裝的屋頂薄膜電站



4.3 Building the Supply Chain

Suppliers and distributors are our important partners, and we focus on the sustainability, environmental and social risks of suppliers and distributors as well. We continuously devote to improve the overall social responsibility of the supply chain through supplier capacity building, dealer regular training and supplier auditing.

We have established the Procurement Management System, the Supplier Selection Measure, the Supplier Management Measure and the Implementation and Management System for Supplier Audit to standardize the behavior of suppliers. We take business ethics as an important standard to select our supplier and to continue further cooperation. We have made clear rules on unfair competition in the bidding document that it is strictly prohibited to bribe the workers who are involved in the bidding. We will sign the Incorruptibility Contract or the Statement for Incorruptibility in Project Supervision with our suppliers.

We also regularly audit the suppliers' management system, including social responsibilities, occupational health and safety system (OHSAS). We will put forward the improvement project and supervise and urge its improvement within a definite date. In order to improve the supplier management level of the social responsibility and effectively outspread to the supplier management level, we will arrange relevant personnel tracking their improvement situation.

We organize suppliers and distributors to communicate with them about the latest requirements and standards of Hanergy Thin Film Power. We regularly carry out trainings of installation and policies for suppliers and distributors and other aspects of knowledge ability training to help suppliers, distributors improve their management level, promote their competitiveness in the industry and win more business opportunities.

4.3 打造責任供應鏈

供應商和經銷商是我們重要的合作夥伴，我們關注供應商和經銷商的環境和社會風險，以及可持續發展的能力。我們通過供應商能力建設、經銷商定期培訓、供應商審核來不斷提升供應鏈整體的社會責任水準，打造責任供應鏈。

我們建立了《採購管理制度》、《供應商選擇辦法》、《供應商管理辦法》、《供應商體系審核實施管理制度》，以規範供應商的行為。我們將商業道德價值作為供應商選擇與持續合作的重要標準，在招標檔中對不正當競爭有明確的規定，嚴禁投標人向參與招標、評標工作的有關人員行賄，與供應商簽署《廉政合同》或《工程監理廉政責任書》。

我們還定期對供應商的體系實施審核，包括社會責任、職業健康與安全體系(OHSAS)，提出改進項目，督促供應商在限期內改進，並安排相應人員持續跟蹤整改情況，以提高供應商社會責任管理水準，切實地將社會責任延伸到供應商管理層面。

我們舉辦供應商和經銷商大會，積極向供應商、經銷商傳達與溝通漢能薄膜發電的最新要求和標準。我們定期為供應商和經銷商開展涵蓋安裝、政策等多方面知識的能力培訓，幫助供應商、經銷商改善自身的管理水準，提升供應商和經銷商在行業的競爭力，為供應商和經銷商贏得更多商業機會。



5 The Talent Highland: Our Outstanding Team

Long term and effective development and sustainable innovation of the Company are contingent upon building an outstanding team and the support from its excellent employees. We have long focused on building an image of a good employer by attracting respecting, promoting and caring for talents, so that we are able to introduce and retain these talents. Specifically, in order to motivate our employees' sense of belongings, bring together a larger group of high-end talents and build a talent highland for the Company, we have taken a variety of measures such as improving talent recruitment system, strengthening performance management, safeguarding employees' rights and benefits, keeping communication channels open, helping employees grow, and caring for their physical and mental health.

5.1 Establishment of an Employer's Brand

Establishing an employer's brand of the Hanergy Thin Film Power has long been our vision as it is one of the important measures for our development. While trying very hard to introduce talented people for the Company by improving its recruitment system and strengthening its performance management, we have also guided them to make substantial contributions to the development of the Company. Also, we have actively looked into the needs of talented people, made the Company more appealing to talents, and increased the Company's recognition amongst the public and employees as a good employer, thus providing a powerful guarantee for the future recruitment and retain of talented.

5.1.1 Recruitment of New Employees

In 2016, we continued to improve our recruitment system by promulgating the Recruitment and Employment Management System, specifically outlining the approval procedure of various recruitment plans, recruitment work flow, different recruitment channels and their management, on-campus recruitment and hiring process. The system also requires that the recruitment process must abide by the principles of "person to job matching" and "finding competent people to get things done" in order to guarantee that candidates have abilities and experience to fit in with the corresponding job requirements. In the meantime, the Company has encouraged its employees to recommend outside talented people with awards offered to those who make successful recommendations as applicable.

5 人才高地：我們的卓越團隊

公司的長效發展、持續創新離不開卓越團隊的建設、優秀員工的支持。我們以建立良好的僱主形象為核心，從引入人才、尊重人才、提升人才、關愛人才到最終留住優秀人才，通過優化員工招聘制度、強化績效管理、保障員工權益、暢通溝通管道、幫助員工成長提升、呵護員工身心健康等各項措施激發員工認同感，匯集高端人才，打造漢能薄膜發電的人才高地。

5.1 建立僱主品牌

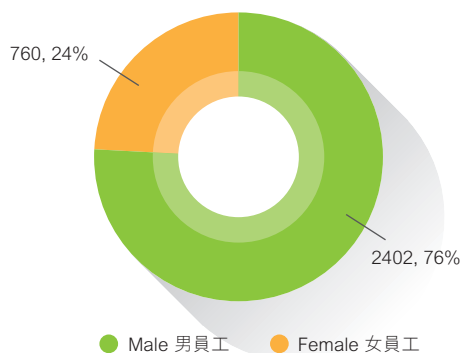
建立漢能薄膜發電的僱主品牌不僅僅是我們的長期訴求，也曷支援公司發展的重要措施之一。通過完善招聘制度，強化績效管理；我們在大力引進優秀人才的同時，也引導他們為公司做出積極的貢獻。我們積極探索優秀人才的需求，加強漢能對人才的吸引力，增進公眾和員工對漢能僱主形象的認可，為未來優秀人才的招募和保留提供強有力的保障。

5.1.1 員工招聘

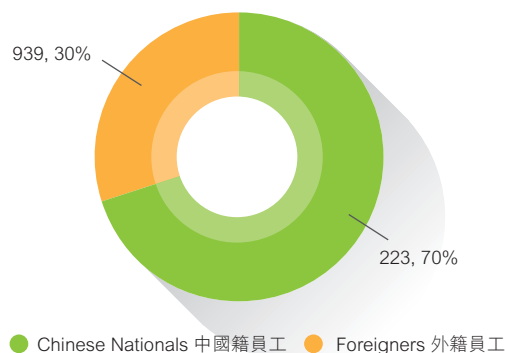
2016年，我們持續優化員工招聘的相關制度，發佈了《招聘錄用管理制度》，明確了各類招聘計畫的審批程序、招聘錄用流程、各類招聘管道及管道管理、校園招聘、錄用等相關規定，嚴格遵循「人崗匹配」和「成事」原則，保證候選人的能力、經驗須符合崗位要求。同時，公司鼓勵員工推薦外部優秀人才，並對成功推薦者給予適當獎勵。

As of the end of 2016, there are a total of 3,162 employees in the Company. 截至2016年末，公司員工總人數為3162人。

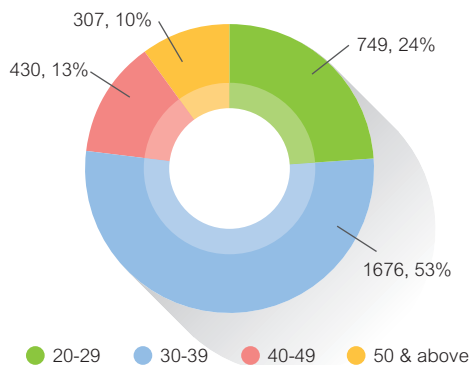
Number and Percentage of Employees by Gender
按性別劃分的員工總數



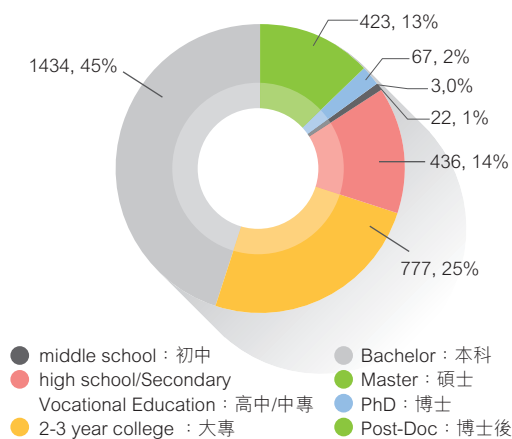
Number and Percentage of Employees by Nationality
按國籍劃分的員工總數



Number and Percentage of Employees by Age
按年齡劃分的員工總數



Number and Percentage of Employees by Education
按學歷劃分的員工總數





5.1.2 Performance Management

We respect and recognize the contributions made by each and every employee. By strengthening our performance management, improving and implementing the Individual Performance Management System, employees' performance plans, coaching, appraisals and results can be further clarified and monitored. At the same time, we propose a vitality curve principle of 20-70-5-5 distribution of its employees' performance grades (see below) to determine how the employees' grades performance level, number distribution meet their job requirements and performance objectives, so that we can reward the good and punish the bad, and form a withdrawal mechanism to maintain a long term vitality of the team.

The Company has established special performance management systems that target employees in different series. On January 1, 2016, the Sales Department of the Company released the Performance Management & Incentive Program for 2016 to set up a series of performance management indicator systems for different sales types and posts, clearly outlining the performance standards and objectives, and linking the organizational performance to the standards and objectives. By fulfilling monthly and quarterly performance appraisals, the Sales Department effectively leads the sales persons to work towards better performance and promote the Company's overall performance. During the performance appraisals, a number of sales stars have sprang up, and the Company has made good use of their comprehensive appraisals as one of the important promotion reference points so as to significantly enhance the Company's overall atmosphere in promotion of sales.

5.1.2 績效管理

我們尊重並認可每一位員工對公司作出的貢獻；通過加強績效管理，優化落實《個人績效管理制度》，對員工的績效計畫、績效輔導、績效考核、考核結果等環節進行進一步明確與管控。同時，我們提出2755績效等級人數分佈的活力曲線原則，確定考核成績、績效等級、人數分佈與崗位要求和績效目標間的關係，獎優罰劣，形成淘汰退出機制，保持團隊長期活力。

公司針對不同序列人員建立了專項績效管理體系。2016年1月1日，銷售端發佈《二〇一六年績效管理及激勵方案》，建立了不同銷售類型、不同崗位的績效考核指標體系，明確考核標準與績效目標，並將其與組織績效掛鉤。銷售端通過月度或季度進行績效考核，有效增強了銷售人員業績導向，促進了整體業績發展。在業績考核過程中也湧現了一些銷售明星，公司將他們獲得的綜合評價作為銷售管理幹部提拔的重要參考依據之一，顯著提升了公司的整體銷售氛圍。

Performance Results (for reference) 考核成績(參考)	Performance Grade 績效等級	Percentage of Distribution (obligatory) 人數分佈 (強制)	Notes 說明
Score \geq 90% 考核成績 \geq 90%	A	20%	If the employees have achieved or partially exceeded their performance objectives in high quality, and a variety of their abilities have met or exceeded their job requirements, they would be categorized as "Excellent". 高品質達成或部分超出績效目標，各項能力均達到或超過崗位要求，被認定為「表現優秀」
90 > Score \geq 80% 90 > 考核成績 \geq 80%	B	70%	If the employees have achieved their performance objectives, and a variety of their abilities have met their job requirements, they would be categorized as "Qualified". 按要求達成績效目標，各項能力滿足崗位要求，被認定為「合格」
80 > Score \geq 75% 80 > 考核成績 \geq 75%	C	5%	If the employees have partially achieved their performance objectives, and some of their abilities have met their job requirements, they would be categorized as "Improvement-Required". 部分達成績效目標，部分能力達到崗位要求，被認定為「有待改進」
Score < 75% 考核成績 < 75%	D	5%	If the employees have significantly missed their performance objectives and their abilities obviously have not met their job requirements, they would be categorized as "Incompetent". 與績效目標存在明顯差距，能力較崗位要求有明顯不足，被認定為「不勝任工作」

The specification of 20-70-5-5 Performance Grades and
Number of Their Distribution
2755 績效等級說明及人數分佈



5.2 Care for the Employees' Rights and Benefits

The protection of employees' rights and benefits is the foundation for building a talent highland for the Company as well as its response to the basic appeal of its employees. We respect the individual differences of our employees, tries our best to deepen our understanding of various expectations of the employees all the time, and safeguard their complaint and communication channels through our own system and mechanism with equality, respect, cooperation and win-win as the common appeal between us and our employees.

5.2.1 Employees' Rights and Benefits

We always strictly adhere to the relevant articles and regulations in the Labor Law of the People's Republic of China and the Corporate Law of the People's Republic of China by persisting in equal employment, eradicating the use of child labor or forced labor, signing labor contracts with our employees according to law and paying all kinds of social insurances. We also respects and upholds the international conventions on human rights and labor standards, and would not discriminate against any employees based on their religion, race, sex, political views, nationality, marriage status, disability, sex identification or orientation, so as to fully safeguard all of their legal rights and benefits.

5.2.2 Communications with the Employees

The Company attaches great importance to the opinions of ours employees, and continues to expand our employees' complaint channels and its communications with the employees. In 2016, the Company promulgated the Employees' Code of Conduct and Disciplinary Management System and the Individual Performance Management System, clarifying our employees' complaint channels and settlement issues. In building our employees' communication channels, the Company releases all kinds of our systems and policies on our OA platform. All the changes on systems and policies involving the employees' benefits would not be made and released without consultations with all the employees. In addition, in 2016, the Company had launched an Employee Stock Ownership Scheme to incentivize our employees. To keep all the employees informed and be able to take part in this scheme, the Company' HQ had required its Human Resources Departments of various companies to inform its employees of this scheme and organized a total of 17 workshops on this scheme in their companies across the nation.

5.2 關注員工權益

員工權益保障是我們構建人才高地的基礎，也是對員工最基本訴求的回應。我們尊重員工的個體差異，始終堅持加強瞭解員工各類期望，並通過制度保障和機制建設維護員工的申訴和溝通權利，以平等、尊重、合作、共贏作為我們與員工的共同訴求。

5.2.1 員工權益

我們始終嚴格遵守《中華人民共和國勞動法》和《中華人民共和國公司法》等法律法規的相關規定，堅持平等僱傭，杜絕使用童工或強制勞動。公司依法與員工簽訂勞動合同，繳納各項社會保險，尊重並維護國際人權公約與勞工標準，不因宗教、種族、性別、政見、國籍、婚姻狀況、殘疾、性別認同或性取向而對員工產生任何歧視，充分保障員工各項合法權益。

5.2.2 員工溝通

公司重視員工意見，持續拓展員工申訴管道及員工溝通管道建設。2016年，公司發佈《員工行為規範與違紀處理管理制度》與《個人績效管理制度》，對員工申訴及申訴處理等內容進行了明確說明。在員工溝通管道建設上，公司通過OA平台發佈各項制度、政策。凡涉及對員工利益的相關制度、政策作出修訂，都會先向全體員工進行意見徵詢，再進行修訂並發佈。此外，2016年度公司為有效激勵員工，推出2016年全員持股計畫，並安排各單位人力資源部進行宣貫，同時公司總部在全國各地共組織17場專項溝通會以保證全體員工均能有效知悉並參與本次持股計畫。

5.3 Building a Platform for Employees' Development

The long term development of an enterprise depends on the growth and progress of its employees. The Company deeply understood the development needs of various employees in different job positions and in different ranks, and has established a perfect pipeline for the professional development of its employees in accordance with the employees' specific circumstances and their position' features. Hence, the Company is able to guide the overall development of its employees, maintain their physical and mental fitness at work through capacity assessment, education and training, occupational health security, etc. As a result, a stable and robust growth of the Company can be surely followed by its employees' healthy development and positive mental outlook.

5.3.1 Career Development

To keep its professional development channels for the employees open, the Company, based on the differences of the positions and their corresponding responsibilities and duties, has established a "management + profession" dual development path, clarified the promotion paths for management, profession, technique, sales, and operation positions, and outlined a specific development path of all the ranks from grass-roots employees to management. The Company also set up an employee competency model for key job series and positions, by which quantitative grading methods would be applied to an overall evaluation on its employees' efficiency in different positions in terms of their cultural identity, inner drive, diligence, conscientiousness, positive energy, self-management, personality soundness, EQ, interpersonal communication, psychological health, age, educational background, experience, and past successes... It helps employees develop comprehensively both in promotion of their professional abilities required by their positions and in maintenance of their personal active mentality and positive development.

5.3 構建發展平台

企業的長遠發展有賴於員工自身的成長與進步，公司深入瞭解各崗位、職級員工的發展訴求，根據員工所處的具體情況和崗位特點建立了完善的員工職業發展通道，並通過能力測評、教育培訓、職業健康保障等方式引導員工全面發展，在工作中保持身體健康和良好的心理狀態，以員工的健康發展和積極向上的精神面貌帶動企業的穩健成長。

5.3.1 員工職業發展

公司為暢通員工職業發展管道，根據員工所處崗位和工作職責的差異，建立了管理+專業雙通道發展路徑，確定了管理、專業、技術、銷售、操作等相關職位的晉升通道，明確了各類崗位從基層員工向管理階層發展的具體路徑。同時，公司建立了重點崗位的能力質素模型，以量化評分方式，從文化認同度、內驅力、勤奮、責任心、正能量、自我管理、人格健全、情商、人際交往、心理健康、年齡、教育背景、經驗、成功經歷等方面全面評價員工在不同崗位的勝任程度，幫助員工全面發展，在提升職位所需專業能力的同時也引導自身保持積極心態，正向發展。



The Table of Positions and Ranks of Hanergy Thin Film Power 漢能薄膜發電職位職級表



5.3.2 Employee Training

We continue to implement 1) the Employees' Training and Development System, which outlines the responsibilities and requirements of the employees' training and learning; 2) the In-house Trainer System to incentivize part-time trainers to develop their curricula and share them; and 3) the E-learning Management and Online Learning Platform Management System, which defines the self-directed learning management and credit management of the employees who make good use of fragmented time to learn.

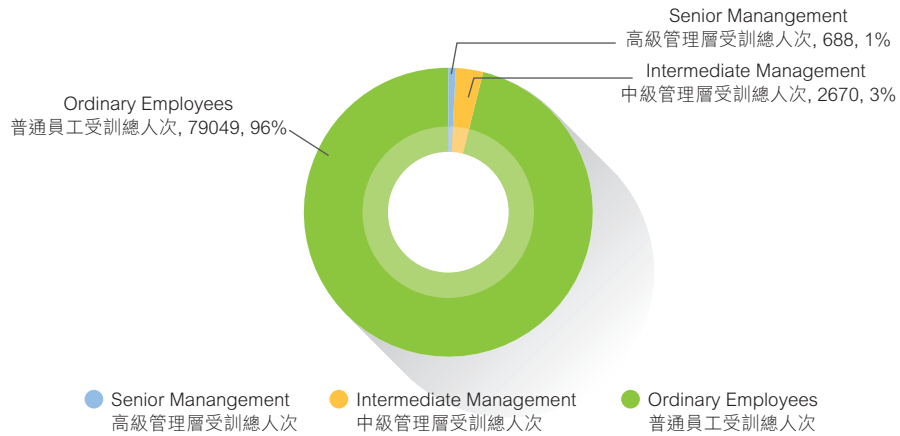
In the meantime, the Company continues to improve its overall training system. In 2016, the Company had differentiated its training system based on the characteristics of its trainees, dividing its training system into four categories: the new employees' quick start induction training, senior employees' professional advanced training, management's workshops and workshops on systems. In addition, we had designed and carried out a number of cultural building activities, and held workshops on the topics such as business issues, shared reading and the concise expression of value. In 2016, a total of 82,407 people participated in these training.

5.3.2 員工培訓

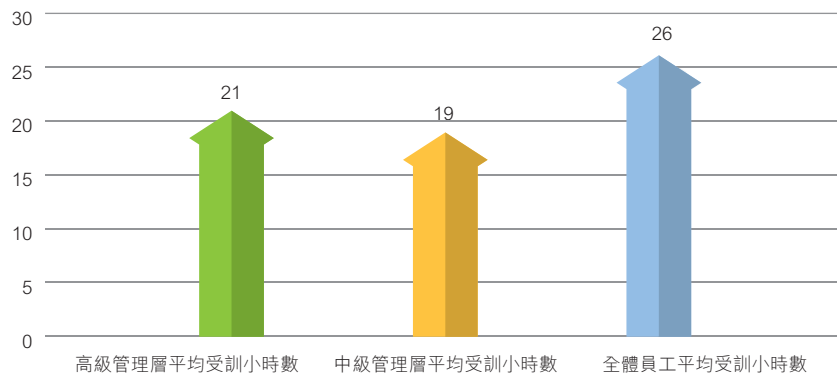
我們持續深化落實《員工培訓發展制度》，明確員工培訓與學習發展的責任義務及要求；推行《內部講師制度》激勵兼職講師進行課程開發及分享；堅持《電子化學習管理暨網路學習平台管理制度》，明確員工利用工作時間進行自主學習管理及學分管理的相關規定。

同時，公司持續優化整體培訓體系，2016年根據受眾特點將培訓體系進行了差異化設置，共分為新員工快速上崗培訓、老員工專業提升培訓、管理人員專項培訓及制度學習四大類。除此之外，我們還設計、開展了多場文化建設活動，進行業務研討、讀書分享、價值觀凝練等相關主題的培訓。2016年度，共計有82407人次參與公司培訓。

Number and Percentage of Employees Participating in Training
員工參與培訓總人次及占比



Average Hours of Employee Training
員工平均受訓小時數





The Company's Featured Training Programs in 2016

公司2016年開展的特色培訓項目：

<p>1-30-60 Training System 136培訓體系</p>	<p>The Company set up a 1-30-60 training system for its new employees in 2016, which provides an ongoing and targeted training for the new employees separately on the 1st day, 30th day, and 60th day of their reporting to the company, helping them get to know the corporate business, integrate into the corporate culture, so as to become qualified Hanergy employees as soon as possible.</p> <p>公司2016年針對新員工建立了1-3-6培訓體系，為新員工入職第1天、第30天、第60天提供持續有針對性的培訓，幫助新員工熟悉公司業務、融入公司文化，使新員工們能快速成為一名合格的漢能人。</p>
<p>CEIBS Online Courses 中歐線上學習課程</p>	<p>In 2016, the Company had purchased the CEIBS online courses, and introduced a number of professional courses including <i>miniMBA</i>, <i>Marketing Innovation Camp</i>, <i>Leadership in Successful Organizations</i>, <i>Yang's Triangle in the Organizational Capacity Building</i>, <i>Platform Strategy</i>, <i>New Manager's Boot Camp</i>, and <i>Highly Effective Managers</i>. The business units were entitled to select the above courses for their employees to learn online on a weekly basis.</p> <p>公司2016年購買了中歐線上學習課程，引入了包括《miniMBA》、《行銷創新營》、《成功組織中的領導力》、《組織能力建設的楊三角》、《平台戰略》、《新經理成長營》、《高績效經理人》在內的各項專業課程，並由各事業部選擇相應課程並每週組織員工展開集中線上學習。</p>
<p>CEO University Program CEO大學項目</p>	<p>The Company had designed and implemented a CEO university program, which is targeted to the intermediate management with the job titles of CEO and above in sales divisions in provincial-level companies, senior management in supporting divisions such as human resources, finance, etc in HQ, and some excellent grass-roots management and future management candidates. The program, opened on a quarterly basis, is dedicated to comprehensively enhancing the leadership's quality and level of the Hanergy Thin Film Power's management by sharing their business experience, conducting case analyses, holding training on leadership, corporate culture and team-building.</p> <p>公司針對銷售事業部省公司CEO以上中層管理幹部，人力、財務等總部支持部門相關高管以及一部分特別優秀的基層管理幹部和未來儲備幹部人選等設計開展了CEO大學項目。通過按季度召開CEO大學項目，進行業務經驗交流與分享，典型案例分析，領導力、企業文化培訓，團隊建設等相關培訓全方位提升漢能薄膜發電管理幹部的能力素質，提升領導水準。</p>

Hanergy University
E-Learning Platform
漢能大學電子化學習平台

In April 2016, the Company launched a pilot run of its Hanergy University E-Learning Platform (the Platform). A customized product based on the “cloud classroom” by an online learning provider, the Platform developed a series of courses including corporate culture, code of conduct, business knowledge and comprehensive skills, etc, trying to make no employee excluded from the e-learning. Any new employees, without exception, upon reporting to their companies, would have full access to the new employees’ self-directed learning courses sent automatically by the Hanergy University. And the various units of the Company have the discretion to develop and record their own courses based on their needs, which would be uploaded into the learning bank upon approval. The Platform has not only effectively complemented its offline training during the Company’s business adjustment, but also provided an effective learning platform to meet the training needs of the employees at different levels and in different business divisions.

2016年4月，公司啟動試運行漢能大學電子化學習平台。該平台是基於網路學習提供商「雲學堂」進行定製化打造，企業文化、行為規範、業務知識、綜合技能課程等課程，切實實現培訓的全員覆蓋：新員工在入職後將接收到漢能大學自動推送的新員工自主學習課程；同時各單位可根據自身情況自主開發錄製課程，課程在經審核通過後將進入學習知識庫。漢能大學電子化學習平台是企業調整業務發展期間線下培訓的有利補充工具，為滿足不同層級、不同業務、不同需要的員工培訓提供了有效的學習平台。

5.3.3 Occupational Health and Safety

We strictly abide by the laws and regulations relevant to occupational health and safety of the employees such as the Labor Law and the Fire Law, and try our best to safeguard the health and safety of our production and R&D employees at work sites by formulating the Safety Protection Code, equipping our plant sites with perfect firefighting devices, and requiring all the employees at work sites must adhere to strict safety rules, wear safety helmets and noise-proof earplugs. Meanwhile, the Company pays close much attention to potential health threats upon employees by providing annual physical examinations, medical insurance and other related guarantees for all of its employees to make them most productive. In addition, the Company installed air purifiers in offices, purchased ergonomically correct tables and chairs, and special foot stools for fetching high-standing objects, and held a variety of physical activities regularly to help keep its employees physically and psychologically fit.

5.3.3 職業健康與安全

我們嚴格遵守《勞動法》、《消防法》等有關保護員工職業健康與安全的法律法規，竭力保障員工在工作場所的健康安全，為保障生產及研發人員安全，制定了安全防護守則，為廠區配備了完善的消防裝置，並規定員工進入廠區必須執行嚴格的安全規定，並佩戴安全帽及防噪耳機。同時，公司也十分關注員工可能出現的潛在健康威脅，公司為全體員工提供年度健康體檢、醫療保險等相關保障，消除員工的後顧之憂。此外，公司還在辦公場所配備空氣淨化機，為員工購買了符合人體工程學的桌椅以及取用高層物品的專用腳踏取貨梯凳，並定期舉辦各類體育活動以此幫助員工保持身體及心理健康。



5.4 Creating a Family Atmosphere

The Company has created a family atmosphere through its abundant activities, and our sincere care for our employees. We strive to make every employee feel loved and supported from the Company both on and off work, so that each and every employee would have a sense of belonging to the Company and would be able to sail in the same boat with the Company and create a shared future.

We also care for every employees personal difficulties encountered during their work or within their daily lives. These problems would be listed as an issues that the Company must address and improve, so that the Company could create a working environment in good faith that satisfies its employees.

5.4 營造家園氛圍

公司以豐富的員工活動，對員工的真誠關懷建立起如家園般和諧的氛圍，讓每一位員工在工作以及業餘時間都能感受到公司對他們的愛與支援，也讓員工建立起對公司的歸屬感，與公司同舟共濟，共創未來。

我們用心關愛每一位員工，瞭解他們在工作生活中遇到的困難和需求，並將其視為公司亟待改進、解決的情況之一，以真誠和善意塑造讓員工滿意的工作環境。

Case: Organizing a Crowd Funding Initiative to Raise Money for an Employee in Need

案例：組織眾籌活動為困難員工募集資金

In December 2016, the Guangzhou Company of the Hanergy Thin Film Power launched a crowd funding initiative to raise money for a colleague whose daughter had suffered from congenital biliary atresia and needed liver transplant. This initiative raised a total of RMB 185,000 Yuan from 4,042 people including colleagues and friends from Wechat. This sum of money helped the colleague cover the operation cost of his daughter.

2016年12月，漢能薄膜發電廣州公司發起眾籌，為廣州某同事患先天性膽道閉鎖的女兒募集資金進行肝移植手術。通過公司同事自發捐款以及微信宣傳，共獲得了4042人的幫助，籌集了18.5萬元善款，順利幫助孩子完成手術。

The company consistently organizes and encourages employees to participate in various activities in order to improve employees' motivation and team work. In response to the needs of its employees, the Company regularly organizes physical activities and patriotic education activities to balance their lives and work, while experiencing the Company's corporate culture.

組織員工活動是公司提高員工積極性，增強團隊協作的重要方式之一。我們也響應員工需求，定期組織員工體育活動以及愛國主義教育活動，讓員工更好地平衡工作與生活，同時也讓員工親身感受公司文化。

The Company also organizes featured holiday activities during holidays. In December 2016, the Company held a Christmas celebration activity, in which representatives from various business units were invited. More than 100 colleagues participated in the activity and were impressed by its rich and colorful forms and contents like indoor tea parties, interactive games, exchanging festival presents, and outdoor tug-of-war competitions. This activity has won high praises from both leaders and employees.

公司還在各節假日組織特色節日活動。2016年12月，公司組織開展了聖誕節活動，各事業部也分別派代表參加。本次聖誕節活動以室內茶話會、互動遊戲、互贈節日祝福、室外拔河比賽等豐富多彩的形式和內容吸引了百餘人前來參加，並獲得了領導和員工的一致好評。

Meanwhile, the business units of the Company has held some activities adaptive to their own characteristics. Take the Flexible Consumer Application Business Unit as an example, in 2016, the unit held two team-building activities: one was a "10 Kilometers' Walk" in the Xiangshui Lake with 25 people participated. Every member had deep inspiration and reflection through team coordination manifested in the "sandstorm picnic" ultimate challenge and "expansion games". The other was a brisk walking activity held in the Olympic Park in May. In this activity, the veteran employees led the new employees to do the brisk walking, so that the new employees could integrate into the team and increase their identity recognition speedily.

與此同時，下屬事業部也自發開展了一些各具特色，適應自身特點的活動。以柔性民用事業部為例，2016年共組織了兩次團建活動：其中4月組織的響水湖「徒步10公里」活動吸引了25人參加，通過「風沙野炊」的極限挑戰、「拓展遊戲」的協作配合，每位員工都從中受到了啟發和思考；而5月份在奧體公園舉行的健步走活動則由老員工帶領新員工共同進行，讓新員工得以融入集體，迅速增強身份認同感。

Cultural Activities and Sports Organized by the Group's Trade Union

由集團工會組織的各項文體活動：



In 2016, the Company's HQ took a lead to hold six brisk walking activities with a total of 480 employees participated.
2016年度，公司總部由工會牽頭舉行了6次健步走活動，共計有480名員工參與。



In 2016, the Company leased six activity fields separately for basketball, football, badminton, tennis, swimming and billiards for its employees. Around 5,000 people participated in these activities annually.
2016年公司為員工租賃了籃球、足球、羽毛球、網球、游泳、桌球6個活動場地，全年場地活動人員達5000人次。



In August 2016, the Company successfully held the 2016 "Hanergy Cup" Badminton Competition with a total of 60 persons participated.
2016年8月份，公司成功舉辦2016年度「漢能杯」羽毛球比賽，共有60人參加。



6 PV Poverty Alleviation: Our Path to Public Welfare

As a responsible enterprise, we put social responsibility in the important position of enterprise development from beginning to end. We actively respond to "PV poverty alleviation" policy scheme led and implemented by two ministries and commissions of National Energy Administration and Poverty Alleviation of the State Council, implement national poverty alleviation and development policies, study PV policies, make regional poverty alleviation strategies and explore sustainable PV poverty alleviation road with Hanergy Thin Film Power characteristics.

Poverty alleviation is to improve people's livelihood. Poor family income can increase through electricity generation of Solar. PV power generation requires only a one-time investment, but it can benefit them for successive 25 years, which fundamentally ended their long-term poverty. PV poverty alleviation is mainly targeted to rural areas and most users are ordinary residents whose knowledge of electricity only comes from simple explanation of installation personnel, and as result, subsequent operation of power station for poverty alleviation may have certain risks. In order to assure poor families' long-term and stable income, we not only strengthen its installation design based on roof conditions in different areas and quality supervision and management as well, but also enhance education of electrical safety and inspection of power station

Since China issued policies of PV poverty alleviation in 2014, we have taken agriculture projects, building distributed power station, poverty alleviation for a whole village and so on as our major measures against poverty. Working with many local agencies, we have established an overall and multilevel "thin film power generation + PV poverty alleviation" model to generate economies of scale. By the end of 2016, we had almost 30 county-level PV poverty alleviation projects in 12 provinces of the whole country, involved in rooftop systems, village-level power station, agricultural greenhouse and etc.. We have contracted 130 PV poverty alleviation projects and installed capacity has exceeded 300 MV. It is estimated that around 100 thousand poor families with registered files can annually increase an income of RMB 3000 Yuan on average.

6 光伏扶貧：我們的公益之道

作為負責任的企業，我們始終將社會責任放在企業發展的重要地位。我們積極回應國家能源局和國務院扶貧辦兩部委牽頭實施「光伏扶貧」政策方案，貫徹落實國家扶貧開發方針，研究光伏政策，制定區域扶貧策略，探索有漢能薄膜發電特色的、可持續的光伏扶貧之路。

扶貧改善民生。光伏扶貧的目的是用光伏發電收益，為貧困戶創收，一次性投資，連續25年收益，從根本上扭轉貧困戶年年貧、月月窮的現狀。考慮到光伏扶貧的市場主要在農村，且大部分光伏發電報裝客戶都是普通居民，對電氣專業知識的瞭解僅停留在安裝人員的簡單解釋層面，可能在扶貧電站的後續運行存在一定風險。我們不僅根據各個地方的屋頂狀況，加強安裝設計、技術和品質監督管理；還對貧困戶進行安全用電宣傳，對電站進行安全檢查，以保證貧困戶安全地獲得長期穩定的收益。

自2014年國家出台光伏扶貧政策以來，我們以農業扶貧、分散式電站扶貧、整村扶貧等為主要扶貧方式，與多地攜手，建立起多層面、立體化的「薄膜發電+光伏扶貧」合作模式，形成規模效應。截至2016年末，我們在全國12個省份有著近30個市縣級的光伏扶貧項目，這些項目涉及戶用屋頂、村級電站、農業大棚等。我們簽約光伏扶貧項目130個，裝機容量超過300MV，預計每年可幫助近10萬建檔立卡貧困戶平均增收人民幣3000元。

Case: Hanergy Thin Film Power Supports Jiayuguan's "Four-in-One" Mode to Make Poverty Alleviation More Sustainable

案例：漢能薄膜發電助力嘉峪關光伏扶貧「四位一體」模式讓扶貧更持久

The situation of rural poverty in Jiayuguan is very special: most of rural people do not have labor capacity. And therefore, they may be supported by industrial development projects. Annual sunshine duration in Jiayuguan city lasts more than 3000 hours, which is superior natural condition to develop PV industry and promote PV poverty alleviation. PV power generation, as an important branch of industrial poverty alleviation, can greatly enhance poor families' function in "self-production of blood" in Jiayuguan.

For peasants who have made living by farming for years, they usually take a wait-and-see attitude to unknown PV poverty alleviation projects. The 'Four-in-One' poverty alleviation mode with 'zero investment but continuous return' can play a guiding and exemplary role in relatively short time.

Hanergy Thin Film Power as one link of "Four-in-One" gives low-income families 10% discount of total investment in installing PV power generation system to help them realize long-term benefits based on its safe use.

"The key of poverty alleviation is to increase peasants' income sustainably and stably." Calculated by the annual average, daily average power generation of low-income families that install 3 kW distributed rooftop PV is about 11.6 kWhs and annual power generation is about 4264 kWhs. It is estimated that revenue of 3411 Yuan can be brought to each household in the grid purchase price of 0.8 Yuan/kWh for PV poverty alleviation projects in Jiayuguan.

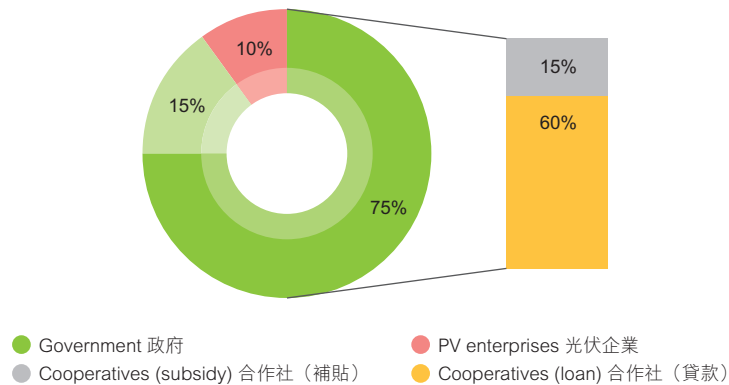
嘉峪關農村貧困人口情況特殊，大部分都沒有勞動能力，對他們的幫扶只能依靠產業扶貧。嘉峪關市年日照時間達3000小時以上，發展光伏產業、推進光伏扶貧具有優越的自然條件。光伏扶貧作為產業扶貧的一個重要分支，是增強嘉峪關貧困戶自我「造血」功能的重要形式。

農民多少年來都以種地為生，對於所不瞭解的光伏扶貧項目通常會持觀望態度。「零投入持續回報」的「四位一體」的扶貧模式，可在相對短的時間內起到示範引領作用。漢能薄膜發電作為「四位一體」其中一環，給以貧困戶安裝光伏發電系統總投資10%的優惠，保障貧困戶在使用安全的基礎上實現長期獲益。

「扶貧的關鍵應是持續、穩定地增加農民收入。」按全年平均值進行測算，安裝3千瓦屋頂分散式光伏的貧困戶每天可平均發電大約11.6千瓦時，年發電4264千瓦時左右。以目前嘉峪關市光伏扶貧項目上網電價每千瓦時0.8元計算，預計每年可以給每戶帶來3411元的收益。



“Four-in-One” poverty alleviation mode of Jiayuguan city
嘉峪關市“四位一體”的扶貧模式



Explanation of “Four in One” poverty alleviation mode:

- Government: Poverty Alleviation Office of Jiayuguan City uses financial special funds of poverty alleviation to subsidize 15% total investment for each low-income family;
- PV enterprises: PV equipment enterprises give 10% discount to low-income families;
- Cooperatives (subsidy): Cooperatives put into 15% subsidy for each household;
- Cooperatives (loan): Cooperatives play leading roles in giving small loan of poverty alleviation to poor household in need.

「四位一體」的扶貧模式解釋：

- 政府：嘉峪關市扶貧辦使用財政專項扶貧資金，為每個貧困戶投入總投資額 15% 的補貼；
- 光伏企業：光伏設備企業給與貧困戶 10% 的優惠；
- 合作社（補貼）：合作社為每戶投入 15% 補貼；
- 合作社（貸款）：合作社為需要貸款的貧困戶牽頭辦理小額扶貧貸款

Case: PV Greenhouse for Red Dates Installed in Yonghe
Unveiling a New Model of PV Application
案例：紅棗光伏大棚亮相永和 開啟光伏應用新模式

Planting red dates is the local traditional industry in Yonghe county, a national-level poor county, in Shanxi province. The county has innovated its poverty alleviation mechanism to respond the national strategy of targeted poverty alleviation since 2015. In order to solve the problem of red dates cracking, the local government worked with Hanergy Thin Film Power and implemented a PV greenhouse pilot project based on the local conditions

Different from regular solar PV power generation, this project integrates thin-film solar power generation and red date planting into building a "PV greenhouse". This is the first poverty alleviation project that integrates PV industry with agriculture in China since PV poverty alleviation policies were issued.

Apart from power generation by PV on the top of greenhouse of red dates, forestry economy can be implemented in the greenhouse with vegetable planting and poultry and livestock breeding, which improve multiple cropping index, change planting pattern and finally promote overall upgrade of the industry. At the same time, the PV poverty alleviation mode can provide peasants with tourism resource with high quality, for instance, ecological picking, agritainment and other tourism projects which create added-value from the PV facilities.

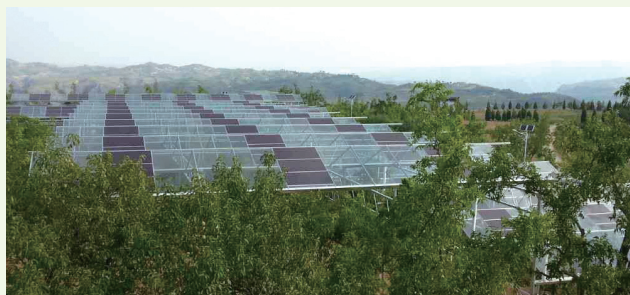
The project of PV greenhouse for red date injects new vitality and energy into poverty alleviation development. It is estimated that annual power generation will be 62811 kWh and create income more than RMB 60,000 Yuan.

在國家級貧困縣山西省永和縣，種植紅棗是當地的傳統產業。2015年起，當地創新扶貧機制，實施精準扶貧戰略。為解決紅棗裂果問題，當地因地制宜，利用漢能薄膜發電推出的光伏大棚這一農業設施，強力實施紅棗光伏大棚試點項目。

與常見的太陽能光伏發電不同，此項目把漢能的薄膜太陽能發電和紅棗種植融為一體，形成「光伏大棚」。這是國家光伏扶貧政策出台以來，全國首家將光伏與農業相結合的扶貧項目。

紅棗光伏大棚除利用頂部發電外，棚下可開展林下經濟，提高復種指數，改變種植模式，如蔬菜種植；也可進行家禽家畜養殖等，全面推進產業升級。同時，這一光伏扶貧模式還能促成優質的旅遊資源，可開展生態採摘、農家樂等旅遊項目，提高設施的附加收入。

紅棗光伏大棚的出現，為扶貧開發注入了新的活力和動力。項目建成後，預計年發電量為62811度，實現效益人民幣6萬餘元。



The first "PV greenhouse" that integrates PV poverty alleviation with red date planting in China
全國第一個將光伏扶貧與紅棗種植融為一體的「光伏大棚」



Case: PV poverty alleviation escorted by insurance: Hanergy Thin Film Power piloted a new poverty alleviation model of “PV + insurance”

案例：保險護航光伏扶貧，漢能薄膜發電試點「光伏+保險」扶貧新模式

Hunan Branch of Hanergy Thin Film Power and Hunan Branch of China Life Property & Casualty Insurance Company reached a cooperation agreement in September 2016. Both parties piloted the poverty alleviation model of “PV + insurance” in Longhui County to minimize the risks and guarantee sustainability of PV poverty alleviation project.

Implementing PV poverty alleviation relying on sunshine resource in poor areas has been an important part of industrial poverty alleviation in Hunan province.

However, construction sites of PV poverty alleviation projects are mostly in farmland, on hillside, and on the roof of peasants, the projects suffer from risks of property and casualty due to natural disasters and sudden accidents.

Hanergy Thin Film Power cooperated with China Life Property & Casualty Insurance to prevent and control risk. China Life Property & Casualty Insurance provided a special insurance service for PV equipment (such as household-type solar power generation equipment, village-level PV power station and so on) sold by Hanergy Thin Film Power in Longhui county.

As for financial loss caused by natural disasters and sudden accidents during PV equipment operations, the insurance company is responsible for funding and reconstruction to minimize risks in PV equipment operations, which removed fears and worries of those low-income families and villages in implementing PV poverty alleviation projects and therefore increased stable income for them.

2016年9月，漢能薄膜發電湖南分公司和中國人壽財險湖南分公司達成合作協定，雙方在隆回縣率先試點「光伏+保險」扶貧新模式，以降低光伏扶貧項目風險，保障光伏扶貧的可持續性。

依託貧困地區的日照資源，開展光伏扶貧，已成為湖南省產業扶貧的一項重點內容。

然而，由於光伏扶貧項目的建設選址多為田地、山坡和農戶屋頂等處，因自然災害和突發事故遭受財產損失的風險較大。

漢能薄膜發電與中國人壽財險合作防控風險，由中國人壽財險為漢能薄膜發電在隆回縣銷售的光伏設備(戶用型太陽能發電設備、村級光伏電站等)提供專業化的保險服務。

對於光伏設備在運行過程中遭遇自然災害或突發事故造成的財產損失，由保險公司負責出資重建，以最大限度降低光伏設備運行中的風險，解決貧困戶和貧困村實施光伏扶貧項目的後顧之憂，幫助貧困戶和貧困村穩定增收。

Case: Hanergy Thin Film Power engaged into Guangdong PV poverty alleviation**案例：漢能薄膜發電助力廣東省光伏扶貧項目**

Hanergy Thin Film Power engaged in Guangdong targeted poverty alleviation to lift peasants out of poverty sustainably by distribution of PV poverty alleviation projects in Heyuan, Yunfu, Luoding and other areas in Guangdong province.

The first 12 sets of thin-film power generation systems of Hanergy, the pilot batch for Yunfu Hanergy PV poverty alleviation demonstration project, were installed and grid-connected in Luoding, Yunfu City, Guangdong Province in a sunny day of 2015. With 12 two-way electricity meters' moving, the villagers' dream out of poverty came true. In order to completely end poverty of the entire village, Jiapai Village in Tuo Cheng Town, Longchuan County, Heyuan City, Guangdong Province in 2016 planned to adopt thin-film solar modules of Hanergy Thin Film Power to establish a centralized and contiguous PV power station with the covering area of 20 Mu and total installed capacity of 1000 kw. According to preliminary design, income from the PV power station with total installed capacity of 1000 kW would be split into 3 portions: approximate RMB 100,000 Yuan revenue from the first 100 kilowatts will go to collective account of the village; RMB 450,000 Yuan from the second 450 kilowatts will be given to 150 poor villagers from 41 families; and the left RMB 450,000 Yuan from the third 450 kilowatts will cover the cost of the village's public welfare and construction as well as management and maintenance of the power station.

漢能薄膜發電在廣東省河源市、雲浮羅定等區域，佈局光伏扶貧項目，助力廣東省精準扶貧工作，幫助農戶可持續性脫貧發展。

2015年，在廣東省雲浮羅定市璀璨的陽光下，雲浮·漢能光伏扶貧示範項目首批試點的12套漢能薄膜發電系統全部安裝並網，12個走動的雙向電錶將村民脫貧致富的夢想變為現實。2016年，廣東省河源市龍川縣佗城鎮佳派村採用漢能薄膜發電的薄膜太陽能原件，擬建設一個佔地20畝、總裝機容量達1000千瓦的集中連片式光伏發電站，促進該村實現脫貧。根據初步設計，擬建設的光伏發電站總裝機1000千瓦發電收益分成3份：第一份100千瓦發電收益屬村集體經濟收入，年收益約為人民幣10萬元；第二份450千瓦發電收益預留給41戶、150人貧困戶，年收益約為人民幣45萬元；第三份450千瓦發電收益用於每年支付村公益事業建設投入資金和電站管理維護綜合費用，年收益約為人民幣45萬元。



Case: Supporting nursing home by PV poverty alleviation of Hanergy Thin Film Power

案例：漢能薄膜發電助力敬老院光伏扶貧

June 26, 2016 was a sunny day in Si County, Anhui Province. Lines of thin-film solar panels from Hanergy Thin Film Power were in the yard of Dazhuang Town Nursing Home in Si County. In front of battery panels, Xu Shugang, the chief of the nursing home was describing the future plan of the nursing home. "The floor must be changed into slip-resistant panels and the bed must be changed into the one with guardrails." He said, "It is best to install air conditioners, and meal standard need to be improved." Xu Shugang's expectations were counted on a sum of money not received yet.

Dazhuang Town Nursing Home is located in Si County, a national-level poor county. Because the funds only from financial appropriation are extremely limited, all conditions of the nursing home are hard to win people's satisfaction. Thin-film solar power of Hanergy could bring the nursing home more possibilities. A PV poverty alleviation project for the nursing home by Hanergy Thin Film Power was launched in November 2015, and was mainly completed and transferred at the end of March 2016. After grid connection, annual power generation by thin-film power station installed on the rooftop and ground of Dazhuang Town Nursing Home is estimated to 85,000 kwhs, and will increase around RMB 85,000 Yuan revenue according to the local subsidiary policy of PV poverty alleviation.

2016年6月26日，安徽泗縣太陽高照。泗縣大莊鎮敬老院院子裡，來自漢能薄膜發電的薄膜太陽能電池板站成一排排吸收光照。敬老院院長許述剛站在電池板前，描繪起關於敬老院的未來規劃。「地板要換成防滑的，床要換成帶護欄的。」他說：「最好再安上空調，伙食標準還能改善一下。」許述剛將這一切預期的實現寄託在一筆尚未到手的錢上。

大莊鎮敬老院所在的泗縣是一個國家級貧困縣。由於資金主要來源財政撥款極為有限，院內各方面條件仍難以盡如人意。漢能薄膜發電的薄膜太陽能給這家敬老院帶來了更多可能性。2015年11月，漢能薄膜發電敬老院光伏扶貧工程開工，2016年3月底基本完工並移交。併網後，安裝在大莊鎮敬老院屋頂和地面的薄膜电站預計年發電量為8.5萬度。依照泗縣當地的光伏扶貧補貼政策計算，將產生人民幣8.5萬元左右的發電年收入。

DISCLOSURES AND KPIS OF HKEX ESG REPORTING GUIDE

香港聯交所《環境、社會及管治報告指引》內容索引

Disclosures and KPis of HKEX ESG Reporting Guide 香港聯交所《環境、社會及管治報告指引》內容索引

Environmental, Social and Governance Reporting KPis 環境、社會及管治指標		Page 頁
A1: Emissions A1：排放物	General disclosure: information on: (a) the policies; and (b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to air and greenhouse gas emissions, discharges into water and land, and generation of hazardous and non-hazardous waste. 一般披露：有關廢氣及溫室氣體排放，向水及土地的排汙、有害及無害廢棄物的產生等的： (a)政策；及 (b)遵守發行人有重大影響的相關法律及規例的資料。	29
	A1.1 The types of emissions and respective emissions data. A1.1 排放物種類及相關排放資料。	29
	A1.5 Description of measures to mitigate emissions and results achieved. A1.5 描述減低排放量的措施及所得成果。	29
	A1.6 Description of how hazardous and non-hazardous wastes are handled, reduction initiatives and results achieved. A1.6 描述處理有害及無害廢棄物的方法、減低產生量的措施及所得成果。	29
A2: Use of Resources A2：資源使用	General disclosure: policies on the efficient use of resources, including energy, water and other raw materials. 一般披露：有效使用資源(包括能源、水及其他原材料)的政策。	28
A3: The Environment and Natural Resources A3：環境及天然資源	General disclosure: policies on minimising the issuer's significant impact on the environment and natural resources. 一般披露：減低發行人對環境及天然資源造成重大影響的政策。	12
	A3.1 Description of the significant impacts of activities on the environment and natural resources and the actions taken to manage them. A3.1 描述商務活動對環境及天然資源的重大影響及已採取管理有關影響的行動。	12-28



Environmental, Social and Governance Reporting KPIs 環境、社會及管治指標		Page 頁
B1: Employment B1：僱傭	General disclosure: information on a) the policies; and b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to compensation and dismissal, recruitment and promotion, working hours, rest periods, equal opportunity, diversity, anti-discrimination, and other benefits and welfare. 一般披露：有關薪酬及解僱、招聘及晉升、工作時數、假期、平等機會、多元化、反歧視以及其他待遇及福利的： (a) 政策；及 (b) 遵守對發行人有重大影響的相關法律及規例的資料。	38, 42
	B1.1 Total workforce by gender, employment type, age group and geographical region. B1.1 按性別、僱傭類型、年齡組別及地區劃分的僱員總數。	39
B2: Health and Safety B2：健康與安全	General Disclosure: information on a) the policies; and b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to providing a safe working environment and protecting employees from occupational hazards. 一般披露：有關提供安全工作環境及保障僱員避免職業性危害的： (a) 政策；及 (b) 遵守對發行人有重大影響的相關法律及規例的資料。	47
	B2.3 Description of occupational health and safety measures adopted, how they are implemented and monitored. B2.3 描述所採納的職業健康與安全措施，以及相關執行及監察方法。	47
B3: Development and Training B3：發展與培訓	General disclosure: policies on improving employees' knowledge and skills for discharging duties at work. Description of training activities. 一般披露：有關提升僱員履行工作職責的知識及技能的政策。描述培訓活動。	43-47
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	B3.2 The average training hours completed per employee by gender and employee category. B3.2 按性別及僱員類別劃分，每名僱員完成受訓的平均時數。	45

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	B4.1 Description of measures to review employment practices to avoid child and forced labor. B4.1 描述檢討招聘慣例的措施以避免童工及強制勞工。	42
	B4.2 Description of steps taken to eliminate such practices when discovered. B4.2 描述在發現違規情況時消除有關情況所採取的步驟。	42
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	B5.2 Description of practices relating to engaging suppliers, number of suppliers where the practices are being implemented, how they are implemented and monitored. B5.2 描述有關聘用供應商的慣例，向其執行有關慣例的供應商數目、以及有關慣例的執行及監察方法。	37
B6: Product Responsibility B6：產品責任	General disclosure: information on a) the policies; and b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to health and safety, advertising, labeling and privacy matters relating to products and services provided and methods of redress. 一般披露：有關所提供產品和服務的健康與安全、廣告、標籤及私隱事宜以及補救方法的： (a) 政策；及 (b) 遵守對發行人有重大影響的相關法律及規例的資料。	35
	B6.2 Number of products and service related complaints received and how they are dealt with. B6.2 接獲關於產品及服務的投訴數目以及應對方法。	35
	B6.3 Description of practices relating to observing and protecting intellectual property rights. B6.3 描述與維護及保障智慧財產權有關的慣例。	30-32



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B7: Anticorruption B7：反貪污	General disclosure: information on a) the policies; and b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to bribery, extortion, fraud and money laundering. 一般披露：有關防止賄賂、勒索、欺詐及洗黑錢的： (a) 政策；及 (b) 遵守對發行人有重大影響的相關法律及規例的資料。	7
	B7.1 Number of concluded legal cases regarding corrupt practices brought against the issuer or its employees during the reporting period and the outcomes of the cases. B7.1 於匯報期內對發行人或其僱員提出並已審結的貪污訴訟案件的數目及訴訟結果。	7
	B7.2 Description of preventive measures and whistle-blowing procedures, how they are implemented and monitored. B7.2 描述防範措施及舉報程序，以及相關執行及監察方法。	7
B8: Community Investment B8：社區投資	General disclosure: policies on community engagement to understand the needs of the communities where the issuer operates and to ensure its activities take into consideration the communities' interests. 一般披露：有關以社區參與來瞭解營運所在社區需要和確保其商務活動會考慮社區利益的政策。	50
	B8.1 Focus areas of contribution (e.g. education, environmental concerns, labor needs, health, culture, sport). B8.1 專注貢獻範疇(如教育、環境事宜、勞工需求、健康、文化、體育)。	50-56

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