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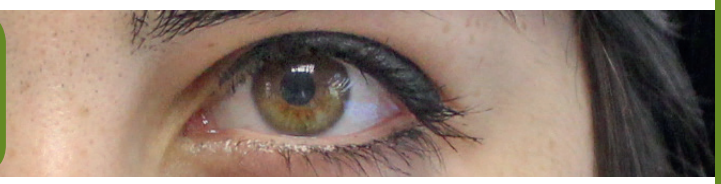


China Moves towards Environmental Taxation to Combat Pollution
中国将用环保税对抗污染

For many years, the most serious environmental challenges facing China are its severe air, water and soil pollution. Besides coal-fired power plants, agriculture and the transport sector, heavily polluting industrial enterprises are mainly responsible for China's pollution crisis. Appropriate regulatory framework conditions need to be put in place in order to upgrade the environment and to support the industry transition to more efficient production methods and environmentally compliant technologies.

In an effort to further curb industrial emissions, a draft on China's first Environmental Tax Law has been submitted at the end of August to the National People's Congress, the country's top legislative body. After years of deliberation, the highly anticipated law proposes levies on pollutants in air, water, as well as solid waste and noise.

The draft targets companies that directly discharge pollutants in key industries such as power, metal, cement, coal and mining, chemical engineering and pharmaceutical, as well as textiles. Meanwhile, the agricultural sector, except for large-scale animal husbandry, as well as mobile pollution producers such as motor vehicles, ships and aircrafts are exempt from the new tax. Treatment plants for urban sewage and household waste will also be excluded, if their discharge of waste does not exceed national standards.

The draft law sets rates for a specified quantity of air and water pollutants as well as a range of five to 1,000 CNY (0.67-134 EUR) for each tonne of various types of solid waste. For example, companies will be charged 1.2 CNY (0.16 EUR) for 0.95 kilogram of sulfur dioxide emissions and 1.4 CNY (0.19 EUR) for discharging 100 grams of petroleum into the water. Regarding noise pollution, rates between 350 CNY (47 EUR) to 11,200 CNY (1,500 EUR) per month are suggested on a range of industrial noises, depending on the decibel level. Carbon dioxide emissions have not been included in the levying list, since they are already covered by China's carbon market that will be launched on a national scale in 2017.

多年以来，中国面临的最严峻的环境挑战就是严重的大气、水和土壤污染。除了燃煤发电、农业和运输业之外，重污染工业应对中国的污染危机负主要责任。需要实施适当的监管框架条件，使环境变得更好，支持产业升级，向更高效的生产方式和符合环保标准的技术过渡。

为了进一步减少工业排放，中国第一部环境保护税法草案已在8月底的中国最高立法机构人民代表大会上提交。经过几年的商议，这一备受关注的法律提出对大气污染、水污染、固体废弃物和噪音征税。

该草案直指重点行业的污染排放大户：电力、金属、水泥、煤矿、化工、制药和纺织业。同时，对农业部门除了规模化养殖外，以及对机动车、船舶和航空器等流动污染源排放的应税污染物免税。对依法设立的城镇污水集中处理、生活垃圾集中处理场所向环境达标排放的应税污染物和纳税人符合国家或地方标准综合利用的固体废弃物免税。

The draft law proposes levies on pollutants in air, water, as well as solid waste and noise
环保法草案提出对大气污染、水污染、固体废弃物和噪音征税
Source / 图片来源: palmtrends.com

草案以现行排污费收费标准作为环境保护税的税额下限，规定：大气污染物税额为1.2元（0.16欧元）每污染当量，即排放0.95公斤二氧化硫；水污染物税额为1.4元（0.19欧元）每污染当量，即排放100克石油；固体废物按不同种类，税额为每吨5元——1000元（0.67——134欧元），工业噪声按分贝数，税额为每月350元——11200元（47——1500欧元）。二氧化

Enterprises that successfully decrease their pollutant emissions will be receiving tax benefits. For instance companies that manage to reduce air and water emissions to half of the national or regional standard may only pay half the taxes. In consideration of local economic conditions and pollution levels, provincial governments on the other hand may also be allowed to increase rates appropriately.

Already back in 1979, China set up a fee system for pollutant discharge that would be replaced by the new framework of environmental taxes. The standard environmental tax rates of the newly proposed law are the same or higher than the current pollutant discharge fees. During the existing system, China collected 17.3 billion CNY (2.3 billion EUR) in fees for pollutant discharge in 2015 from 280,000 companies and between the years 2003 and 2015 more than 211 billion CNY (28.1 billion EUR).

However, the current system where local environmental watchdogs are tasked with charging enterprises for pollution is widely regarded as ineffective, as it features loopholes related to implementation and administration. Under the existing system, pollution fees remain uncollected on a wide scale by local authorities in order to help the local economy to grow. Under the new tax system, however, national entities are supposed to maintain more control through a centralized approach for enforcement and implementation.

Besides restructuring the current enforcement of fines for pollution and incentivizing compliance, the newly proposed tax is designed to change the behavior and operation of businesses and will encourage investment in technological upgrades and cleaner solutions.

During recent years, China has already issued several new or updated laws and standards aimed at making industrial enterprises more accountable for their pollution, such as the comprehensively revised version of the Environmental Protection Law that entered into force in January 2015.

The draft on the Environmental Tax Law has been released for public consultation in June 2015 after a proposal was first submitted to the State Council in 2013 in a joint effort by the Ministry of Finance, the State Administration of Taxation and the Ministry of Environmental Protection. If the reviews following the first reading at the end of August go well, the draft could potentially become a law already by the end of this year.

碳排放量没有被列入征收名单，因为它已经包括在中国将在2017年启动的全国碳排放交易里了。

成功减少污染物排放的企业将得到税收优惠。例如将大气污染和水污染降低至国家或地方标准的一半的企业，可以只支付一半的税款。同时兼顾各地经济条件和污染水平，省政府可以适当上浮税率水平。

早在1979年，中国设立了排污费制度，这将被新的环保税所取代。新提出的环保法里的标准环保税率与目前实行的排污费相同或更高。根据现有的制度，中国在2015年向28万家公司收取了共计173亿元人民币（23亿欧元）的排污费，从2003年至2015年共收取超过2110亿元（281亿欧元）排污费。

然而，现有的地方环保监管机构负责向企业征收排污费的制度被广泛认为效果不佳，因为它在执行和管理方面有漏洞。在现行制度下，当地政府为了促进经济发展，很大程度上没有收取排污费。按照新税法制度，中央将有更强有力的控制，通过集中管理保证执行实施。

除了对现有的收取排污费的规章制度的调整，激励合规行为，新的税法草案意图改变企业的行为和经营方式，同时鼓励他们投资升级清洁能源技术和方案。

The newly proposed tax will encourage investment in technological upgrades and cleaner solutions
新的税法草案鼓励企业投资升级清洁能源技术和方案
Source / 图片来源: gov.cn

近些年来，中国已颁布了一系列新的或修改的法律法规，旨在使工业企业对他们造成的污染承担更多的责任，例如2015年1月生效的全面修订的新环境保护法。

在财政部、国家税务总局和环境保护部的共同努力下，环保税法于2013年首次向国务院递交提案，并已于2015年6月就该法草案公开征求公众意见。如果审阅之后的反响好的话，该草案最快可能会在今年底通过审议成为正式的法律。

Building

Sustainability Finds its Way into Chinese Football

A contribution by Kristin Brosch, HPP Hentrich-Petschnigg & Partner

中国足球的可持续发展道路

来自HPP Hentrich-Petschnigg & Partner的Kristin Brosch的客邀文章

Sustainability and environmental protection are gaining significance around the globe. As the world's largest energy consumer, China must significantly reduce its CO_2 emissions over the next decades in order to achieve its self-defined climate targets. The Chinese Government is therefore promoting efficient and sustainable construction — and receiving support from pioneers such as the Federal Republic of Germany and its solution-providing companies. As an innovative example, a football academy has been developed in a German Chinese low-energy cooperation project in the Qingdao Ecopark.

The German-Chinese Ecopark in the city of Qingdao, located on the east coast of the province of Shangdong represents a pilot project for sustainable cooperation between Germany and China. The park promotes industrial restructuring, carbon consumption reduction and environmental protection. Located near Jiaozhou Bay, it is the city's economic and technical development zone. In order to contribute to the park's sustainable goals, a football academy designed by HPP Architects according to German standards has been built on the site.

German Soccer on Asian Grass

Build a sustainable sports ground according to international standards: This task was accomplished in Qingdao.

A visionary energy concept was developed as the most important measure in terms of building sustainability. A fundamental component of the project is the use of geothermal energy. Geothermal probes deliver the energy required for heating and cooling of the building using a heat pump.

Energy is also sourced actively by means of a photovoltaic system on the roof. These measures alone do not guarantee low energy consumption, however, only by implementing a holistic and coordinated approach was it possible to achieve an energy-efficient building.

可持续发展和环境保护在全球范围内越来越重要。作为世界上最大的能源消费国，中国必须在之后的几十年里大幅降低二氧化碳排放，以达成自我设定的气候目标。因此中国政府大力推进能效和可持续性建设，并接受来自诸如联邦德国及他的解决方案提供商这样的先驱的支持。作为一个创新的例子，中德节能合作项目在青岛生态园开发了一所足球基地。

青岛中德生态园位于山东省的东海岸，是代表中德两国之间可持续性合作的一个试点项目。该园区促进产业结构调整，降低碳消耗，保护环境。它位于胶州湾附近，是该市经济技术开发区。为了促进园区的可持续发展目标，HPP建筑师事务所按照德国标准在当地设计建造了一所足球基地。

A German football academy has been built on the grounds of the German-Chinese Ecopark in Qingdao according to the plans of German architects
按照德国建筑师的计划在青岛中德生态园建成了一所德国足球学校
Source / 图片来源: HPP International Shanghai

亚洲绿茵场上的德国足球

按照国际标准建造一个可持续性的体育场：这项任务是在青岛完成的。

作为实现建筑可持续性最重要的措施，设计者开发了一个目光长远的能源方案。该项目的一个基本组成部分是使用地热能。地热钻井为建筑通过热泵取暖和制冷提供了所需能量。

通过屋顶光伏系统也能积极地获取能源。单凭这些措施不能保证低能耗，然而只有通过实施一个全面协调的方法才可能实现节能建筑。

Heat loss, for example, is avoided through the use of highly effective insulation of the building envelope. In addition, natural ventilation via the windows contributes to a healthy interior climate. The perforated metal façade optimises the degree of sunlight penetration.

The green roof absorbs rainwater and delays drainage of unused water. After minimal treatment, the rainwater can be used for instance for toilet flushing or lawn irrigation. Organic raw materials were used both internally and externally. Through the application of local materials, long transport routes were obviated, which in turn reduced carbon dioxide emissions. In addition, emphasis was also placed on the use of recyclable building materials.

Design following the German model

“The round thing has to go into the square thing” - this famous football quote was used as the basis for the architectural design of the new football academy. The project consists of three different-sized playing fields, a physiotherapy centre, and additional service areas.

The highlight of the complex is the façade of the building, also with regard to energy efficiency: High-quality double glazing provides effective insulation, and maps to the outside, what is happening on the inside. The CNC die-cut metal curtain wall also resembles a veil, the effectiveness of which is maximised according to the respective direction.

“The heat entering the building is controlled by the perforated sheet metal. The opening portion of the façade with sun-shading and the transparency that is maximized from the user perspective are balanced according to the points of the compass”, explains Jens Kump, Project Partner at HPP International Architektur Consult Shanghai. According to the architect, “the east and west façades are exposed to more impact from the low sun, so there are fewer perforations here in order to control the irradiation and block penetration. The metal shading of the north façade is purely decorative and serves to complete the picture”.

The model for the design of the football academy was - in the sense of the corporate architecture of the German Football Association (DFB) - the German Football Museum in Dortmund, which was also planned and realised by Düsseldorf architects HPP. Completed in 2015, the firm won the Europe-wide competition for the museum project back in 2011.

The new football academy stands as a pioneering example for the mutual dialogue between China and Germany and promotes exchange between the players.

例如通过使用高效能保温隔热围护结构来避免热损失。此外通过窗户的自然通风有助于一个健康的室内环境。穿孔金属幕墙可以优化透光度。

屋顶绿化吸收雨水，延缓余水的排放。经过最少的处理后，雨水可以用于例如厕所冲洗或草坪灌溉。在内部和外部使用了有机原材料。通过使用本地材料来避免长途运输，从而减少二氧化碳的排放。此外，使用可循环利用的建筑材料也是一个重点。

The aim of the project was to establish a sustainable venue according to international standards
该项目的目的是按照国际标准建造一个可持续性的场地
Source / 图片来源: HPP International Shanghai

遵循德国模式的设计

“圆的要进入方的” ——这句著名的足球箴言被用来作为新的足球基地的建筑设计基础。该项目由三个不同大小的运动场、一个物理治疗中心和一个额外的服务区组成。

综合体的亮点是建筑的外立面，也考虑到了节能能效：高质量的双层玻璃提供了有效的隔热，并把里面的景象映射到外面。数控切割金属幕墙像一层面纱，它能根据不同的方向达到效果最大化。

“进入建筑的热量由穿孔金属板控制。外立面有遮阳和透光部分，可以从用户的角度，按照不同方向，达到最大化的平衡。” HPP国际建筑咨询上海公司的项目合伙人Jens Kump解释道。这位建筑师说，“东西立面受到较多斜阳的照射，因此这里穿孔较少，为了控制阳光照射、阻挡直透。北立面的金属遮阳是纯粹的装饰，为了完整美观。”

足球基地的设计灵感参照了由HPP杜塞尔多夫设计的多特蒙德德国足球博物馆，以此体现德国足协（DFB）的建筑个性。HPP事务所于2011年赢得欧洲范围内的设计竞赛，获得该项目，并于2015年建造完成。

新的足球基地为中德两国间的相互对话树立了一个开创性的榜样，并促进了运动员之间的交流。

Energy

Putting a Price on Carbon

A contribution by Ingo Ramming, Commerzbank

碳定价

来自德国商业银行Ingo Ramming的客邀文章

China launched seven pilot carbon trading schemes during 2013/14 and is working on the establishment of a National Emissions Trading System ("Chinese ETS"). The Chinese ETS will begin during 2017 and analysts expect that the scheme will cover 10,000 companies with 3 to 4 bio. tonnes of CO_2. Ingo Ramming reviews the current development in the global carbon markets, the Chinese ETS and sets out what is important for companies to achieve operational compliance as well as minimise the cost of compliance.

With the start of the new millennium, carbon markets and emissions trading was the new buzz phrase which excited not only the financial community but also politicians, environmentalists and NGOs. The start of the EU Emissions Trading System (EU ETS) as well as the entering into force of the Kyoto Protocol in 2005 created a surprising feel good atmosphere and the impression that this was about more than just trading. Perhaps more importantly, carbon pricing became a reality and moved from environmental circles into boardrooms. The UN's Clean Development Mechanism (CDM) created not only a global carbon market but as well a catalyst for sustainable development that raised billions of dollars for low carbon investments in developing countries.

It was pre-financial crisis, with a strong belief in markets, deregulation and globalisation, it was a different time - the global economy was flourishing. It was largely inspired by the challenges of transforming our energy system and preventing global warming.

However, once the economic crisis hit and the 2009 UN climate talks in Copenhagen resulted in a minimum consensus, it became increasingly difficult for policy-makers to balance often mutually conflicting goals or, as political scientist Roger Pielke Jr's phrases it in his 'iron law': "When policies focused on economic growth confront policies focused on emissions reductions, it is economic growth that will win out every time."

中国在2013到14年期间在七个省市启动了碳交易试点，并正在努力建立全国碳交易体系（"中国ETS"）。中国碳交易体系将在2017年启动，分析者期望该体系能够覆盖10000家公司的30到40亿吨二氧化碳排放。笔者回顾目前全球碳市场的发展，中国碳交易体系和对公司实现经营合规性以及减少合规成本的重要性。

随着新千年的开始，碳市场和碳排放交易成为了新的时髦短语，使得金融界、政界、环保人员和非政府组织都为之振奋。欧盟碳排放交易体系（EU ETS）的开启，以及2005年京都议定书生效都创造了一个让人惊喜的良好氛围和印象，觉得这不仅仅是交易。也许更重要的是，碳定价成为了现实，并从环境圈走向了国际政治经济舞台。联合国的清洁发展机制（CDM）不仅创建了一个国际碳市场，而且还作为可持续发展的催化剂，为发展中国家的低碳投资筹集了数十亿美元。

当时是金融危机前，人们信任市场、放松管制和全球化，那是一个不同的时代 — 全球经济蓬勃发展。它在很大程度上 是由能源体系转变和防止全球变暖的挑战所带来的。

Historical Development of Certified Emission Reductions (CER, spot)
核证减排量的历史发展
Source / 图片来源: Commerzbank Corporates & Markets, Bloomberg

然而，一旦经济危机遇上了2009年联合国哥本哈根气候大会，得出了最低限度的共识，对于决策者来说就变得越来越难平衡往往是互相冲突的目标，或者说像政治学家Roger Pielke Jr在他的"铁律"中所说：

This is best illustrated by the development of the price Certified Emission Reductions (CERs) generated under the CDM. CERs fell from a high of more than € 20 per tonne of CO_2e to a couple of cents on the back of a increasing supply and very limited demand, once installations in the EU ETS had used up their offset limits.

Since then a lot has changed, the Paris Agreement was adopted on the 12th December 2015 and the recent ratification of both China and the United States of America creates a big boost to efforts to bring the UN accord into force. Now, 26 states have ratified accounting in total for 39.06% of the total global greenhouse gas emissions. The Paris Agreement will enter into force once at least 55 Parties accounting in total for at least 55 percent of the total global greenhouse gas emissions have ratified. Assuming a ratification by the EU, Canada and Japan would mean 57 countries with approx. 57% of global emissions and with that the entering into force of the Paris Agreement.

Furthermore, emissions' trading has moved from UN circles and international discussions into national policies. According to a World Bank study, "about 40 national jurisdictions and over 20 cities, states, and regions, including seven out of the world's ten largest economies, are putting a price on carbon. These jurisdictions are responsible for almost a quarter of global GHG emissions". These include among others the EU ETS, the Regional Greenhouse Gas Initiative (RGGI), the New Zealand Emissions Trading Scheme, the Korea Emissions Trading Scheme, California and Québec.

China will launch a national carbon market in 2017, building on ten years of emissions trading experience, initially through the Clean Development Mechanism (CDM) and more recently through its seven pilot carbon markets established during 2013 and 2014. The national Chinese ETS will cover 10,000 companies with 3 to 4 bio. tonnes of CO_2. It will have significant implications for carbon markets and trading. A successful Chinese ETS will be a catalyst for international markets and a global carbon price.

For companies in China, the establishment of a national ETS provides new obligations and challenges. Companies need to monitor and verify their CO_2-emissions. Once verified, they need to surrender allowances in line with the actual emissions in a respective compliance year.

In case companies have a surplus of allowances, i.e. the actual emissions are below the (free) allocation,

"当政策制定陷入关注经济增长还是关注节能减排的两难时,每一次都会是经济增长胜出。"

清洁发展机制下产生的核证减排量价格走势最好地说明了这一点。一旦欧盟碳排放交易体系用完了它的碳抵消限额,核证减排量供给增多而需求十分有限,价格便从每吨二氧化碳当量超过20欧元的高位跌落到几分欧元。

自那以后发生了很多变化,2015年12月12日通过了巴黎协议,最近中美两国批准了巴黎协议,这产生了强大的推动力使得联合国协议生效。现在26个国家已经批准了巴黎协议,累加排放量占到全球温室气体排放总量的39.06%。当批准巴黎协议的缔约国数量达到55个,且其累加排放量达到全球总排放量55%时,该协议即正式生效。假如欧盟、加拿大和日本也批准的话,那就有占总排放量的57%的57个国家了,这样协议就可以生效。

此外,碳排放交易也从联合国范围的国际讨论延伸到了各个国家政策。根据一份世界银行的研究,"约40个国家和20多个地区,包括世界前十大经济体中的七个,正在为碳定价。这些区域的温室气体排放量占了全球近四分之一。"这些政策包括欧盟碳交易体系,区域温室气体倡议(RGGI),新西兰碳排放交易计划,韩国碳排放交易方案,加利福尼亚和魁北克。

The establishment of the Chinese ETS will generate momentum for global carbon markets and creates compliance obligations for Chinese companies
中国碳排放交易体系的建立将会对全球碳市场产生动力,中国企业有义务遵守规定

中国将在2017年启动全国碳市场,这建立在十年的碳排放交易经验之上,最初是通过清洁发展机制(CDM),近期是通过2013至14年建立的七个碳市场交易试点。中国国家碳排放交易体系将会覆盖10000家公司的30到40亿吨二氧化碳排放。这将会显著地影响碳市场交易。一个成功的中国碳排放交易体系会成为国际市场和世界碳价的催化剂。

they need to decide if they want to sell the surplus or keep the allowances for compliance in the future or to sell at a later stage.

If a company faces a compliance deficit, i.e. verified emissions are above the (free) allocation, it needs to cover this shortfall and purchase allowances in the market. More strategically, it is about "make or buy". Is it possible to reduce CO_2-emissions, what is the cost of an abatement, is it cheaper to invest in low carbon technologies than to purchase allowances?

Typically such an analysis does not only include carbon costs but as well benefits from energy savings and (resource) efficiency, which benefits the overall productivity and profitability of an organisation. Recent research by the Carbon Disclosure Project (CDP) found that "industry leadership on climate engagement is linked to higher performance on three financial metrics that reflect on overall corporate quality: return on equity, cash flow stability, and dividend growth".

Companies need to decide which entity (location), department and persons are responsible for:

- the monitoring and external verification of annual emissions volumes, internal and external submission of the data, the regular update of emission forecast
- the submission of verified emissions data to the regulator and allowances/offsets
- the external carbon trading (in line with the trading policy, trading and counterparty limits) timing of the trades, execution, confirmation and settlement of trades
- the reconciliation of allowances and offset credits against registry accounts

These decisions are key and should be agreed formally in a carbon strategy, approved in line with a company's procedures.

Equally important are decisions on external carbon trading and the carbon risk strategy. It should follow a systematic approach and it is important to note that trading is not a goal in itself but a mean to achieve a specified target.

The first step of implementing a successful carbon risk management strategy involves identifying the risks. These then need to be quantified and prioritised: How

对中国的公司来说，建立全国碳排放交易体系提供了新的义务和挑战。公司需要监控测量他们的二氧化碳排放。核查之后他们需要在每一个合规年使得配额和实际排放保持一致。

如果公司有多余的配额，就是说实际排放低于（免费的）额度，他们就要决定是否愿意出售余额，还是为了符合未来的配额保留现有余额，或是在以后的阶段出售。

如果公司面临配额不足，就是说核实的排放量高于（免费的）额度，他就需要在市场上购买配额来弥补不足。概括地说，这是关于"制造或购买"。是否能够减少二氧化碳排放，减排成本是多少，投资低碳技术是否比购买配额更便宜？

通常情况下，这样的分析不止包括碳成本，也包括节能带来的利益和资源能效，它对于一个组织整体的生产力和盈利能力有好处。碳信息披露项目（CDP）最近的一项研究表明"气候承诺的行业领导与三个反映公司总体质量的财务指标正相关：净资产收益率、现金流稳定，股息增长"。

An efficient carbon risk management strategy helps to achieve operational compliance, minimise costs and maximise opportunities
一个有效的碳风险管理策略有助于实现业务合规性，降低成本，最大限度地提高机会

公司需要决定哪些实体（位置）、部门和人员对以下要素负责：

- 年排放量的监测和外部核查，内部和外部提交的数据，定期更新的排放量预测
- 向监管机构提交核证的排放数据以及配额和碳抵消
- 外部碳交易（符合交易政策、交易和对手限制）的交易时机、执行、确认和结算
- 协调配额和对注册账户的碳抵消信用

这些决策很关键，应该在碳策略中正式同意，并按照公司程序批准。

big are they in absolute terms, and how pivotal are they in terms of the success of individual deals or the entire company?

Many companies already actively manage their interest rate, foreign exchange and commodity risks. The tools available for carbon are the same. Therefore, it often makes sense to align the carbon strategy with the general risk management of a company.

China's National ETS will begin in 2017 and companies will be obliged to comply with the rules. A proactive approach is required to manage the carbon related risks and reduce the cost of compliance. Experience from other markets shows that new markets provide as well opportunities as companies over the world have to accept the fact that a "carbon-restrained future" is likely.

Views expressed in this article are those of the author and do not necessarily reflect the opinion of Commerzbank or IETA.

同样重要的是外部碳交易和碳风险策略的决定。它应该遵循一个系统的方法，重要的是要注意，交易本身不是目标，而是达到特定目标的方法。

实施成功的碳风险管理策略的第一步包括认清风险。这就需要量化及确定优先级：风险在绝对条件下有多大，以及它们对个别交易和公司整体的成功来说有多关键？

许多公司已经在积极管理他们的利率、外汇和商品风险。可用于碳市场的工具是相同的。因此，将碳策略和公司的总体风险管理结合到一起往往是有意义的。

中国的全国碳交易体系将在2017年启动，公司有义务遵守规则。需要有一个积极主动的方法管理碳相关的风险并降低合规成本。从其他市场的经验表明，新市场提供了机会，所有的公司必须要接受这样一个事实："碳排放管控的未来"是可能的。

本文仅为作者观点，并不代表商业银行或IETA的意见。

Good to know / 信息提示

Chinese Certified Emission Reductions (CCERs) from Sino-German GHG emission reduction projects are now available for compliance in selected Chinese emissions trading pilots and the upcoming national carbon market in China. Developed by UPM Umwelt-Projekt-Management GmbH and its Chinese partner Chengdu Oasis in cooperation with the Sichuan Rural Energy Office, two CCER Sichuan Rural Household Biogas Projects (SC01 & SC02) were registered under China's CCER scheme earlier this year. This month, they received their first carbon credit issuance with approximately 104,000 CCERs in total. These CCER carbon offsets can be used by any entity with compliance obligations in the emissions trading pilots of Beijing, Shanghai and Tianjin, in China's new nationwide carbon market to be launched in 2017, as well as by any voluntary carbon offsetters globally.

The two projects support approximately a total of 27,600 households by installing efficient biogas digesters and biogas cook stoves on their premises. These proven and reliable systems reduce methane emissions originating from the widely used pits to store animal manure and provide the households with clean biogas for cooking, thus also replacing coal as fuel and saving carbon dioxide.

由德国UPM环境项目管理有限公司及其中国合作伙伴-成都智联绿洲科技有限公司以及四川省农村能源办公室联合开发的两个中国自愿减排（CCER）项目，即四川省农村户用沼气项目（SC01）以及四川省农村户用沼气项目（SC02），于本月获得了首批约104,000单位的CCER碳信用。这两个中德温室气体减排项目已于今年早些时候，获得了CCER项目备案批准函。此次获签的碳信用，可用于碳试点以及将要启动的全国碳交易市场进行履约交易。
北京、上海、天津三地碳交易市场以及将于2017年启动的全国碳市场中有履约义务的单位和国际自愿碳市场的任何有碳抵消需求的参与者都可对这批碳信用其进行购买。

这两个项目总共支持了约27,600个农户家庭，在他们的住所旁修建了高效沼气池，并为其配备了沼气炉。这些成熟可靠的沼气回收利用系统，　避免了因广泛使用露天动物粪坑而产生的甲烷气体排放，同时，给参与项目的农户提供了清洁沼气作为新燃料，取代燃煤用于炊事活动，减少了二氧化碳的排放。

Environment

Renewable Resources for Process Engineering – A New Solution for China's Environmental Challenges?

A contribution by Hanspeter Trost, Babindili Anlagentechnik

过程技术中的原材料再生 — 解决中国环境问题的新方法?

来自Babindili Anlagentechnik的Hanspeter Trost的客邀文章

The People's Republic of China still suffers from major environmental problems such as air pollution as well as contaminated soils and water supplies. The cause for the serious fine dust air pollution, which is especially severe during winter, are emissions from power and heating plants, motor vehicles, furnaces, as well as metal and steel production.

Another part of the anthropogenic dust pollution, which has been barely taken notice of until now, originates from emissions of a variety of companies, for instance in the industrial, construction, agricultural and food sectors, especially when it comes to bulk handling. However, in those sectors the emerging dusts with particle sizes between 2.5 to 100 micrometers for industrial, carbon and cement dusts, as well as 0.1 to 10 micrometers for metallurgical dusts and paint mist are to be classified as unhealthy fine dust as well.

The sources for fine dust can be quickly identified, because a large part of small and medium sized companies' production processes use powdery materials. These materials are transported, stored, grinded, weighed, mixed, and packed. Within each of these steps, dust and fine dust is generated. In addition to construction materials such as sand, gravel and cement, bulk materials also involve raw materials like ores, coal or salt. Furthermore, aliments such as cereals, sugar, coffee, and flour as well as bulking agents, granules and pellets fall into the group of bulking materials. Consequently, fine dust pollution has to be taken into consideration in each process engineering plant. This concerns almost all industrial sectors, e.g. building material plants, chemical and plastics processing industries, paint, rubber and food production, pharmaceutical manufacturing as well as wood processing.

The Chinese Government's Will to Reform

With regard to the predominant environmental pollution, the Chinese Central Government realized the

中国一直面临着严重环境问题的威胁，如空气污染，土壤和水资源也受到严重的损害。冬季空气中的颗粒物造成的污染会大幅加重，众所周知造成这一现象的元凶是来自于发电厂、供热厂、机动车、锅炉和钢铁生产的排放。

还有一个迄今为止并没有引起足够注意的造成污染的人为因素，有很大一部分排放来自于生产过程中，如加工业、建筑业、农业和食品业等，尤其是随之而来的散装物料包装。工业粉尘和煤炭水泥粉尘的直径为2.5-100微米，冶金粉尘和颜料喷涂粉尘的直径为0.1-10微米，在这些领域产生的微尘根据其大小可以归为对人体有害的颗粒物。

Bulk materials for instance for construction generate fine dust while being stored and utilized
散装物料如建筑材料通过其存储和使用产生颗粒物
图片来源：H. D. Volz / pixelio.de

加工过程中产生颗粒物的来源很快就能找到，因为生产过程中很大一部分是在中小企业里使用了粉状原料。这些粉状物被运输、存储、磨碎、摇晃、混合和打包。这其中每一步都会产生粉尘和颗粒物。属于这些散装物料的有建筑材料如沙子、砾石和水泥，以及

scope of the issue and shows its will to reform through political support. For instance, at the beginning of the year 2015 a new Environmental Protection Law entered into force, representing a revision of the previous law of 1989. Besides regulatory measures, the law also contains regulations regarding promotion and support of environmental technologies, as well as fundamental changes for increased punishment of intransigent polluters. An interesting addition is the improved involvement of the general public.

The Environmental Protection Law is complemented through the 13th Five-Year-Plan (2016-2020) which defines increased efforts regarding environmental protection and improvements of air quality. Thus, increasing the share of renewable energy and a more efficient use of resources is to be promoted in the coming years in order to achieve a development without fossil fuels towards less energy-intensive sectors, while at the same time combating air pollution.

The debate about fine dust also has an immense impact on the construction sector, which now needs to meet stricter requirements in terms of dust free construction sites, logistics and prefabricated construction. At the beginning of January 2015, for instance, the "Green Building Evaluation Standard" had been revised. For the first time, this standard puts now its focus also on construction management as a key factor for evaluating green building. Thus, the combat against fine dust emissions takes place at a large number of construction sites, which are significant polluters in cities such as Beijing and Shanghai.

National Ambient Air Quality Standard

Since the beginning of the 1980s, the air quality in China is being regulated with the establishment of fine dust threshold. At the beginning of January 2016, the Ambient Air Quality Standard (GB 3095-2012) developed by the Ministry of Environmental Protection (MEP) entered into force nationwide. The standard determines the particulate matter threshold, divided into two categories: one covering nature protection zones (including landscapes, landmarks as well as other special protection areas) and another category for urban and other areas.

Environmental Protection Needs Consideration from the Beginning

In spite of previous efforts, China faces enormous challenges as its economy needs to be constantly revived in order to stay competitive. Usually, this means that outdated technologies have to be modernized or

原材料如矿石、煤炭或融雪盐。此外还有食品类如谷物、糖、盐、咖啡、面粉以及填充剂、颗粒材料等也是散装物料。在所有处理这些散装物料的设备中都要相应地注意颗粒物危害问题。几乎所有的工业领域都面临这一问题，例如建筑材料生产、化工材料加工、喷涂上色、橡胶生产、食品生产、药品生产和木料加工等。

中国政府的改革意愿

鉴于严重的环境负担，中国政府意识到了问题的严重性，并通过政策支持展现了他们改革的决心。例如2015年初施行的新环境保护法在原有的1989年实施的环保法基础上做了修改。新法不仅包括规章制度性的条文，还包括促进和支持环保技术的规定，以及对不作为和危害环境的犯罪行为严加惩治的根本性改变。其中有一个很有意义的更新：加强民众对抗环境问题的参与性。

今年三月公布的十三五计划（2016-2020）是对环保法的一个很好的补充，其中明确规定了要加强环保方面的努力，改善空气质量。未来将促进提高可再生能源的比重，提高资源利用效率，降低未来发展对化石能源的依赖性，转向能源强度更低的领域，从而进一步遏制空气污染。

关于污染颗粒物的讨论也强烈地影响了建筑业，现在要遵守严格的无尘施工工地、施工物流和预制构件施工条款。例如中国在2015年1月初更新了《绿色建筑评价标准》。其中首次重点关注了建筑管理方面并将它作为评价绿色建筑的关键指标。大量的施工工地被认为是北京上海这样的城市里的主要粉尘来源，现在它们也需要全力以赴对抗颗粒物排放。

国家环境空气质量标准

中国的空气质量在八十年代初就有规定，首次提出了颗粒物的限值。2016年1月初环境保护部发布实施了环境空气质量标准（GB3095-2012）。它确定了空气中颗粒物的限值，并分为一类区和二类区：一类区为自然保护区、风景名胜区和其他需要特殊保护的区域；二类区为居住区、商业交通居民混合区、文化区、工业区和农村地区。

环境保护必须从一开始就引起重视

经过一系列的努力，中国仍然面对繁重的任务，为了保持竞争力，必须保持经济增长。通常这意味着改进

new ones need to be developed. Upgrading as well as the new planning and development of industrial plants should take into account environmental protection and the conservation of resources in a more consistent manner.

Plant components used in process engineering are expected to be as easily as possible installed in various plants while they should also interact reliably with the components that are already in place. Furthermore, components should be suitable for almost every production process and work properly with every type of product, regardless of its composition. Until now, when it comes to process engineering only a component is added in many cases, e.g. filters for dust collection. However, especially regarding the topic of fine dust, altered process engineering concepts and operating modes are required when using conventional collectors.

The application of renewable resources for the construction of plant components represents an innovative and more sustainable approach. Its advantages are for example a more affordable production, the possible application in new plants and ones that have to be upgraded, and especially the support of economically underdeveloped regions. In those particular regions, natural resources such as wood and straw are abundant. These materials should be used and processed further into industrial products.

The introduction of new technologies in economically underdeveloped regions additionally creates synergetic effects. It is not only about building production plants to manufacture new products. The usage of plant components from renewable resources is also a still unconventional technology which is currently not widely spread. Thus, locational advantages can lead to a model region which is able to serve a large number of production sectors and industries with components for process engineering.

In conclusion, China's significantly intensified emissions reduction regulations open up promising market opportunities for proactive solution providers. Companies in the field of environmental technologies that offer innovative solutions or support the reconstruction of Chinese industrial plants are thus put in the spotlight. The required economic transformation for more growth through innovation and technological progress which is supported by the 13th Five-Year-Plan emphasizes the interest of Chinese companies and investors in this context.

旧技术或发展新技术。无论是技术的更新换代还是重新规划开发，未来都要持续重视环境保护和资源保护。

	Category 1		Category 2	
	PM10	PM2.5	PM10	PM2.5
Annual average	40 µg/m³	15 µg/m³	70µg/m³	35µg/m³
Daily average (24 hours)	50µg/m³	35µg/m³	150µg/m³	75µg/m³
Allowed number of exceedance	none	none	none	none

Ambient Air Quality Standard: threshold defined for nature protection zones (category 1) as well as urban and other areas (category 2)
环境空气质量标准为自然保护区和其他地区设定了限值

过程技术中的设备零件需要尽可能无障碍地装配大量不同的设备，同时和已有的零件结合在一起顺利运行。此外它们还要适应每项生产过程，在各种生产方式下无障碍运行，不管是粉状材料，粘结的，还是纤维状的。迄今为止在过程技术中大多数情况只是添加了新的零件，如除尘过滤器。正是在颗粒物处理方面，使用和传统分离器不一样的过程技术方案和企业行为是必不可少的。

在建筑设备零件中使用可再生的原材料是一个有创新性和可持续的方案。优点有节约生产成本，包括设备的更新换代，重新开发，特别是加强经济不发达地区。因为在这些地区通常会产出原材料如木材和秸秆。这些材料须善加利用，在工业生产中进一步加工。

在经济不发达地区实现新技术还会产生协同效应。这不仅能够完善生产设备，制造新的产品，还能使原材料物尽其用，同时创造工作岗位刺激经济增长。使用可再生原材料制作的设备零件还有一项好处，它可以不受已经广泛应用的传统技术的限制。因此可以在本地优势的基础上发展出一个示范区，可以利用过程技术设备零件广泛地服务于各个生产领域和部门。

总的来说可以确定的是，中国明显加强的排放管理规定为解决方案提供者们打开了很多新的市场机会。这里重点需要关注的就是那些从事环境技术并能为中国工业设备提供创新性技术和装备的企业。同时在十三五计划中推动的经济转型，即通过创新和技术进步实现经济增长，也凸显了中国企业和投资者在这方面的浓厚兴趣。

Politics

The Voluntary Carbon Market after the Paris Agreement – Boom or Bust?

A contribution by Dr. Ralph Westermann, UPM Umwelt-Projekt-Management

巴黎协议之后的自愿碳市场 — 繁荣还是萧条?

来自UPM-环境项目管理有限公司的Ralph Westermann博士的客邀文章

2015 witnessed an historic global step forward in taking action on climate change. World leaders reached an agreement on December 12, 2015 at the 21st Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris to keep the global average temperature increase well below 2°C and pursue efforts to hold the increase to 1.5°C.

As of May 1, 2016, 162 intended nationally determined contributions (INDCs), representing 190 Parties, had been submitted to the UNFCCC and will automatically become NDCs after ratification. These INDCs outline the intended national efforts towards reducing greenhouse gas (GHG) emissions and climate resilient development under the Paris Agreement. More than 90 of the submitted INDCs include proposals for emission trading systems (ETSs), carbon taxes and other carbon pricing initiatives.

A major step forward for global carbon pricing took place in 2015 with China rolling out its plans for a national ETS. On September 25, 2015, the Chinese President Xi Jinping announced that the Chinese national ETS will commence in 2017 including the sectors: power, steel, non-ferrous metals, building materials, chemical, paper, aviation and transportation. The seven operating pilot ETSs in the provinces of Beijing, Chongqing, Guangdong, Hubei, Shanghai, Shenzhen and Tianjin are to be merged into the national ETS under unified rules and a detailed transition plan is currently being developed under leadership of China's National Development and Reform Commission (NDRC). Early unofficial estimates show that following the launch of China's new nationwide mandatory carbon market, about half of global GHG emissions will be generated by jurisdictions that are putting a price on carbon.

With all these crucial developments in international climate policy, it is the key question for the voluntary carbon markets, what role voluntary carbon offset-

2015年,全世界见证了对气候变化采取行动的历史性的一步。世界各国领导人在2015年12月12日巴黎的《联合国气候变化框架公约》(UNFCCC)第21届缔约方会议(COP 21)上达成了协议,将全球平均气温上升控制在2摄氏度以内,努力使气温上升不超过1.5摄氏度。

截至2016年5月1日,已有代表190个缔约方的162份国家自主贡献预案文件(INDC)被提交到联合国气候变化框架公约,批准之后就会自动确定为国家自主贡献文件。这些国家自主贡献预案文件显示了巴黎协议下各个国家降低温室气体(GHG)排放和气候顺应发展所要进行的努力。这些已提交的国家自主贡献预案文件中有超过90份包含了关于碳排放交易体系(ETS)、碳税和其他碳定价措施的提议。

2015年中国提出了将启动全国碳排放权交易市场的计划,这标志着迈向全球碳定价的重要一步。2015年9月25日,习近平主席宣布中国计划于2017年启动全国碳排放权交易市场,第一阶段将涵盖石化、化工、建材、钢铁、有色、造纸、电力、航空和运输等重点排放行业。之前碳排放交易的七个试点北京、重庆、广东、湖北、上海、深圳和天津将依据发改委(NDRC)制定的统一规则和具体过渡方案,并入国家的碳排放交易体系中。早期的非官方预测显示,在中国推出新的全国范围强制性碳市场后,大约一半的全球温室气体排放将会在对碳排放进行司法定价的区域产生。

在国际气候政策这些关键的发展中,自愿碳市场的主要问题是,自愿碳抵消会在这个几乎每个国家都积极有效遵守节能减排承诺的世界,对气候保护扮演怎样的角色。

关于国际市场自愿碳抵消的一些事实和数据

"自愿碳市场" 是指不受现有强制碳减排规定的约束而自愿购买碳减排量,用以抵消碳排放的市场。

ting will play for climate protection in a world in which nearly every country is effectively under a compliance agreement to reduce GHG emissions.

Selected Facts and Figures about the International Market for Voluntary Carbon Offsetting

The term "voluntary carbon markets" refers to all purchases of carbon offsets not driven by an existing regulatory compliance obligation.

According to this year's „State of the Voluntary Carbon Markets Report", published by Forest Trends' Ecosystem Marketplace in May 2016, the volume of voluntary offset transactions increased by 10% in 2015 as buyers around the world contracted 84.1m tCO_2e. The aggregated transaction volume has now nearly reached 1bn tCO_2e. On the other hand, total market value fell by 7% to $278m, a result of the global volume-weighted average price dropping by 14% to $3.3/tonne – a new low.

Another study by the same information provider, released just a few weeks ago, takes stock of the role of carbon offsets in corporate carbon strategies.

Among a group of 1,896 companies that publicly disclosed data to CDP (formerly Carbon Disclosure Project) in 2015, 322 firms (17%) use offsetting as part of a carbon reduction strategy. Thereof, 248 businesses invested in projects to reduce GHG emissions outside of their immediate operations, purchasing the equivalent of 39.8m tCO_2e in 2014.

The single sector with the most voluntary offset buyers was finance, where one in five firms voluntarily purchased offsets; top buyers in this category included Deutsche Bank, Credit Suisse, and JPMorgan Chase & Co. Another significant portion of buyers came from sectors where reputation – keeping in good standing with consumers, shareholders, and employees – is an important factor for success, such as consumer goods & retail, and technology. Delta Air Lines (No. 3 among voluntary buyers, by volume) and

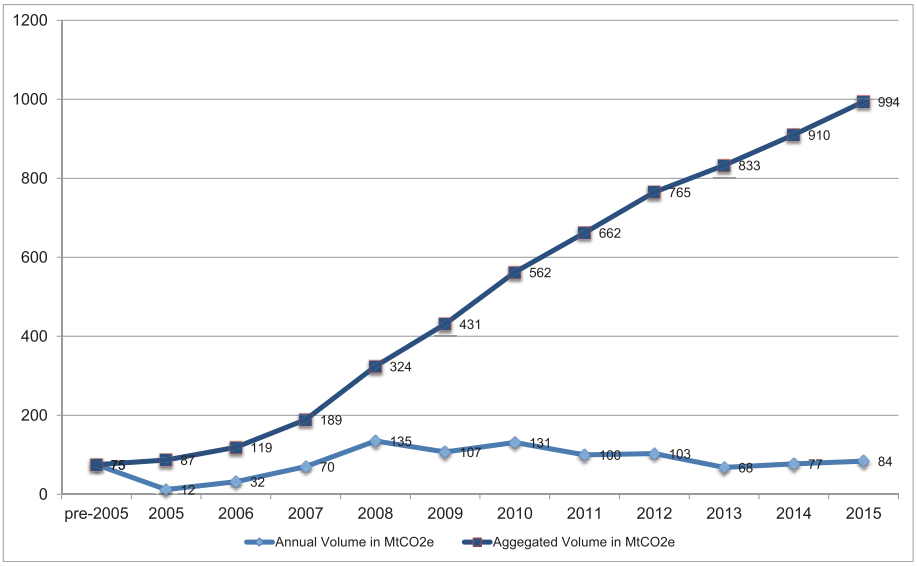
根据Forest Trends生态市场组织于2016年5月发布的今年的《自愿碳市场报告》，2015年自愿碳抵消交易量上升了10%，全世界的购买者签约认购了8410万吨二氧化碳当量排放。累计交易量现在已达到近10亿吨二氧化碳当量排放。另一方面，总市值下降了7%至2.78亿美元，这是由于全球交易量加权平均价格下降了14%达到3.3美元每吨，创造了新低。

同一作者几周前刚发布的另一个研究，考察了碳抵消在企业碳策略中的作用。

一组2015年1896家公司公开披露的数据（原碳信息披露项目）显示，322家公司（17%）使用碳抵消作为碳减排策略的一部分。其中，有248家企业除了直接操作之外还投资减少温室气体排放的项目，他们在2014年购买了3980万吨二氧化碳当量。

产生了最多自愿碳抵消购买者的是金融领域，其中五分之一的公司都自愿购买了碳抵消；这一类中的顶级购买者包括德意志银行，瑞士信贷和摩根大通。购买者的另一重要来源是那些特别需要重视良好声誉，对消费者、股东和员工保持良好形象地位的行业如消费品和零售及技术。达美航空（自愿购买者中购买量排第三）和澳航（排第十三）以及其他十一家航空公司已经购买了自愿碳抵消以解决他们一些不可避免的碳排放，也为航空领域未来预期的调控做准备。

除了碳抵消，435家公司确定了一个公司内部碳价，是2014年有碳价的公司数的三倍，还有538家公司在未来几年计划这么做。这表明，企业开始量化气候风险，并将其纳入到他们的业务预算。典型的例子如巴克



Transaction Volumes in the Voluntary Carbon Market over Time
自愿碳市场上的交易量随时间变化
Source / 图片来源: Forest Trends' Ecosystem Marketplace

Qantas (No. 13) plus eleven other airlines have been buying voluntary carbon offsets to address some of their unavoidable emissions – and also to prepare for expected regulation of the aviation sector.

Aside from offsetting, 435 companies now assign an internal carbon price – triple the number of companies that had a price in 2014 – and another 538 have plans to do so in the next couple of years. This indicates that businesses are starting to quantify climate risk and factor it into their operational budgets. Some – Barclays, Disney, Microsoft, and Swiss Re are prominent examples – go so far as to charge their business divisions a fee based on their emissions, incentivizing them to reduce their carbon footprint while also raising money that can then be reinvested in energy efficiency or used to purchase offsets. The price companies assigned ranged widely, but the median value of $18 per tCO_2e makes the average price for offsets on the voluntary market ($3.3 per tCO_2e) a good deal for many companies looking to reduce their carbon risk.

In contrast to the mature economies of western industrialized countries, China's voluntary carbon market is still in its infancy and reliable quantitative data on domestic voluntary carbon offset transactions are hard to obtain. There is also no significant increase in pre-compliance offset transactions in China, where many to-be-regulated entities are still waiting for clear guidance from the national government about the eligibility of offsets for compliance. Instead, as the country with the world's most Clean Development Mechanism (CDM) projects, China has traditionally been acting as an exporter of large quantities of CDM Certified Emissions Reductions (CERs) into foreign mandatory or voluntary carbon markets. However, in recent years and mainly because the EU ETS does not work as the main target market anymore, CERs orginating from China are increasingly hard to sell.

Against these ambivalent market data and trends, it needs to be discussed whether the Paris Agreement could be the decisive game-changer for voluntary carbon offsetting or not.

莱银行、迪士尼、微软和瑞士再保险，甚至于会根据碳排放给他们的业务部门收取费用，以鼓励他们减少碳足迹，同时也筹集资金，用来再投入到提高能效或购买碳抵消。公司确定的碳价范围很大，中值是18美元每吨二氧化碳当量，这使得自愿市场上的碳抵消平均价格（3.3美元每吨二氧化碳当量）对很多想要降低他们的碳风险的公司成为一个很好的交易。

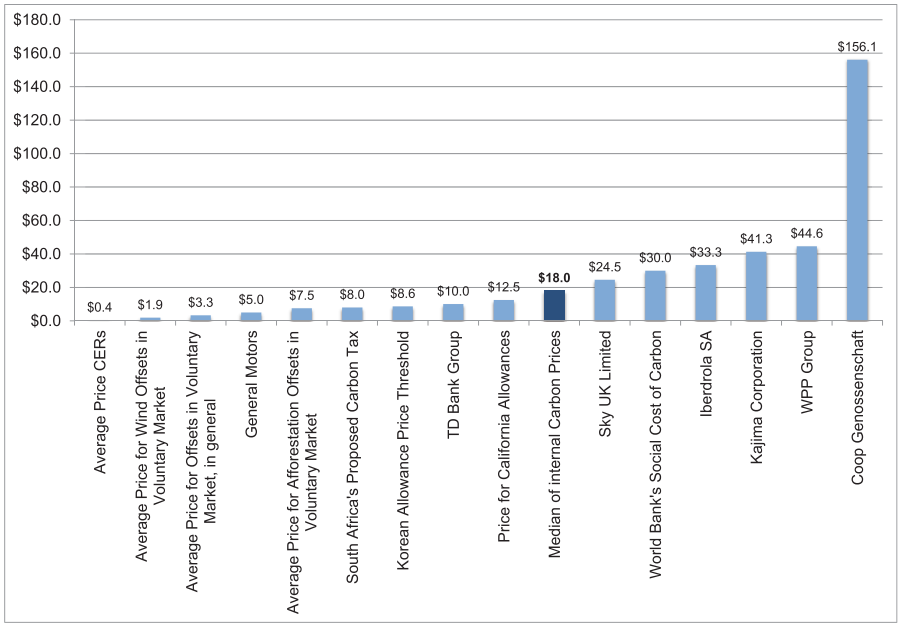
与西方工业国家成熟经济相比，中国的自愿碳市场仍处于起步阶段，很难取得国内自愿碳抵消交易的可靠量化数据。中国的碳抵消交易预先规范也没有明显的增加。许多将要被监管的公司仍在等待国家政府对于碳抵消资质的明确规定。而作为拥有世界上最多的清洁发展机制（CDM）项目的国家，中国一直向外国受托方或自愿碳市场大量出口清洁发展机制的核证减排量（CERs）。然而近年来主要是由于欧盟碳交易体系不再作为主要目标市场，来自中国的核证减排量越来越难卖出去。

对这些矛盾的市场数据和趋势，需要讨论的是巴黎协议是否会是自愿碳抵消的决定性因素。

巴黎协议之后新的关于自愿碳抵消的气候政策框架

评估巴黎协议对世界自愿碳市场可能造成的影响时应考虑到它的成绩和不足两个方面。

正面来说，巴黎协议对气候变化确实是一个历史性的转折点，它将定义二十一世纪的全球经济。196个国



Internal Carbon Prices and Carbon Offset Market Prices in Comparison
内部碳价和碳抵消市场价格比较
Source / 图片来源: Forest Trends' Ecosystem Marketplace

A New Climate Policy Framework for the Voluntary Carbon Offset Market after Paris

To assess the likely impact of the Paris Agreement on the world's voluntary carbon maket both its achievements and deficiencies need to be considered.

On the upside, the Paris Agreement on climate change is indeed a historic turning point and it will define the global economy of the 21st century. 196 countries have agreed to peak and then rapidly reduce GHG emissions with the goal of achieving net zero global emissions in the second half of this century. They are further agreeing to build this emissions trajectory through national climate plans which are improved every five years. They are demonstrating the collective intent to end the era of fossil fuel driven development by comprehensive decarbonization of all sectors of the economy and are sending a clear and unequivocal political signal to the market that the transition to a thriving clean economy is now inevitable, irreversible and irresistible.

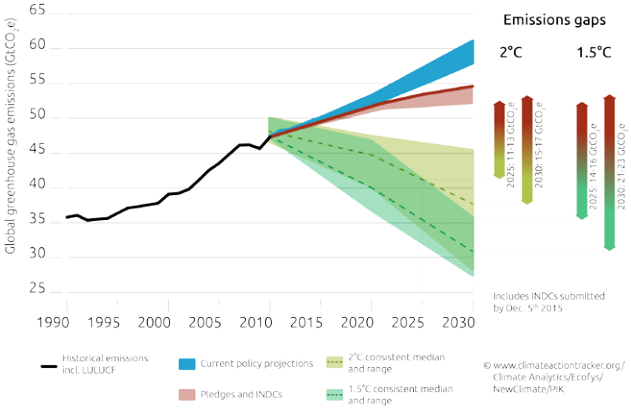
On the downside, the Paris climate pledges do have a serious shortcoming: they are not sufficient to prevent excessive global warming. Climate Action Tracker (CAT), a coalition of the much respected research institutes Climate Analytics, Ecofys, New Climate Institute and the Potsdam Institute for Climate Impact Research (PIK), has brought the optimism about the Paris outcome down to earth.

CAT reveals that, compared to the 3.6°C warming by 2100 that is projected to result from current policies in a business-as-usual scenario, the National Determined Contributions (NDCs) adopted in Paris will probaly lower global warming only by about 0.9°C to 2.7 °C – but only if all governments fully implement their pledges. Translated into global GHG emissions trajectories, there is still a large emissions gap of 15bn tCO_2e between those estimated 55bn tCO_2e emitted in 2030 already taking into account the Paris national mitigation commitments and those 40bn tCO_2e that scientists believe should not be exceeded to keep global average temperature rise below 2°C.

How and to what extent, the voluntary carbon market can contribute to achieving the Paris climate goals and help closing the wide emissions reduction gap will decisively depend on final design and operationalization of the implementation mechanisms introduced by the Paris Agreement. Its Article 6 creates the space for market-based mechanisms. These would allow countries to trade „internationally transferred mitigation outcomes" (ITMOs) either via „Cooperative Ap-

家同意在温室气体排放达到顶峰后迅速降低，为了在本世纪下半叶达到全球净零排放的目标。他们进一步地同意通过每五年盘点一次的国家气候计划建立排放轨迹。他们展示出了强大的集体意志，要用各个经济领域的全面脱碳来结束化石燃料驱动发展的时代，同时他们向市场发出了清晰明确的政治信号，即向繁荣清洁经济转变是不可避免的、不可逆的和不可抗拒的。

反面来说，巴黎气候承诺有一个严重的不足：他们不足以阻止全球过度变暖。气候行动追踪组织（CAT）是颇具威望的研究院所的联盟，包括气候分析所、Ecofys、新气候研究所和波茨坦气候影响研究所（PIK），他们对巴黎带给世界的结果表示不容乐观。



Global GHG Emissions and the Existing Emissions Reduction Gap
全球温室气体排放和现存的减排差距
Source / 图片来源: Climate Action Tracker

气候行动追踪组织发现，如果现有政策保持不变的话，到2100年预计将会提高3.6摄氏度，与之相比，在巴黎通过的国家自主贡献（NDCs）可能只能降低全球变暖0.9摄氏度，达到2.7摄氏度 — 这是在所有政府充分履行自己的承诺的前提下。转化成全球温室气体排放轨迹的话，到2030年，已经考虑到巴黎国家减排承诺的情况下预计会达到550亿吨二氧化碳当量排放量，科学家认为全球平均温度上升不应超过2摄氏度，这就意味着不能超过400亿吨二氧化碳当量，在两者之间还有150亿吨二氧化碳当量的巨大差距。

自愿碳市场能够怎样帮助实现巴黎气候目标，以及弥合这巨大的减排缺口，这要取决于巴黎协议出台的最终设计和运作机制。它的第6条为市场机制创造了空间。这将允许各国交易"国际性可转让减排成果"（ITMOs），通过"合作方法"或是通过一个新的更强调实现可持续标准的全球市场机制。不同于为发达国家从发展中国家购买减排单位而设计的清洁发展机制，巴黎协议下的这两个市场机制可以潜在地包括任何国家，转移也可以是任何方向的。参与交易方之间

proaches“ or within a new global market mechanism that puts more emphasis on the fulfilment of sustainability criteria. Unlike the CDM, which was created for developed countries to purchase emissions reductions units from developing ones, the two market-based mechanisms under the Paris Agreement could potentially include any country, and transfers could flow in any direction. Any transfer of emissions reductions among parties must therefore ensure that ITMOs are clearly defined and that each emissions reduction is counted only once. This will be a key topic as climate negotiators discuss the new global market-based mechanism, tentatively being called the “Sustainable Development Mechanism” (SDM).

The Paris market-based mechanisms would not fully go into effect until 2020 when countries become accountable for their national contributions to the global effort for the first time, but its rules will be debated over the coming years – with important conversations happening during the next climate summit in November 2016 in Marrakesh, Morocco. It remains to be seen how many countries will choose to incorporate offsets originally developed for the voluntary carbon markets to achieve their climate targets in the most cost-efficient way. In this case, offsets would fall under UNFCCC rules as soon as they were traded internationally.

New Sources of Demand for Voluntary Carbon Offsets

According to an internal paper drafted early 2016 by the UNFCCC CDM Executive Board, in the short term until 2020, only select supra-national or national carbon offset purchase programs supported by the most ambitious and climate-friendly governments remain the best and most reliable source of demand for these otherwise stranded CER offsets. The CDM EB estimates that the annual demand from Results-Based Finance (RBF) initiatives could amount to around 30 million CERs. These RBF programs pay money for determined climate protection results using a voluntary or semi-voluntary approach.

Looking into the future and beyond 2020, a reason for certain optimism among CDM project developers and voluntary carbon offset suppliers is the aviation industry. The transport sector has not been included in the Paris Agreement but because of strong political pressure to reduce air transport GHG emissions, the International Civil Aviation Organization (ICAO) has set a “global aspirational goal” of carbon-neutral growth starting in 2020 and is progressing on designing a global market-based mechanism (GMBM) to reduce

的任何减排转移必须保证国际性可转让减排成果定义明确，并且每个减排只能算一次。这是气候谈判代表讨论新的全球市场机制的一个关键问题，姑且称之为“可持续发展机制”（SDM）。

在2020年各个国家首次为他们对全球的国家贡献负责任之前，巴黎市场机制并不会完全生效，但在未来的几年中会持续讨论它的规则 — 2016年11月在摩洛哥马拉喀什举办的下一届气候峰会将会产生很重要的对话。有多少国家会选择纳入最初为自愿碳市场开发的碳抵消，以最具成本效率的方式达到他们的气候目标，这还有待观察。在这种情况下，碳抵消一旦进行国际交易，就要遵守联合国气候变化框架公约的规则。

自愿碳抵消新的需求来源

根据一份2016年初联合国气候变化框架公约清洁发展机制执行委员会起草的内部文件显示，在短期内直到2020年，只有选择那些由最有决心的和最气候友好的政府支持的超国家的或国家的碳抵消购买项目，他们仍是这些标准核证减排碳抵消其他最好的和最可靠的需求来源。清洁发展机制执行委员会估计来自基于成果的融资计划（RBF）的年需求量达到约3000万核证减排量。这些RBF项目为使用自愿或半自愿方式的确定的气候保护成果付款。

展望2020年之后的未来，清洁发展机制项目运营者和自愿碳抵消提供方的一个可以确定乐观的领域在于航空业。交通运输领域还没有被纳入巴黎协议，但因为减少航空业温室气体排放的强大的政治压力，国际民航组织（ICAO）设立了“全球进取目标”，要在2020年启动碳中和增长及促进全球市场机制设计，相应地减少航空碳排放。最近的一次国际民航组织航空运输局的报告估计，全球市场机制覆盖下的航空业将产生2.88亿至3.76亿吨二氧化碳当量的碳抵消需求（这取决于他们能够多有效地通过其他手段减少排放）。如果国际民航组织的市场机制包含了清洁发展机制或是专门的自愿碳市场标准如认证碳标准、黄金标准、美国碳注册，或气候行动储备，那么它会对正在一个相对停滞的市场急切寻找买家的碳抵消提供者形成一个巨大的需求推力。

在这个东京和巴黎机制过渡的不确定的阶段，一些新的自愿气候保护倡议可能会产生亟需的核证减排量额外需求，也可能会产生其他的碳抵消需求。这些倡议旨在加强公共和私人领域对减缓气候变化的承诺，以弥合现有政策保持不变状态下的温室气体排放、现在巴黎国家自主贡献减排承诺以及气候科学认为保

airline emissions accordingly. A recent presentation by ICAO's Air Transport Bureau estimates that airlines covered by the GMBM will generate an offset demand of between 288m tCO_2e and 376m tCO_2e by 2030 (depending on how effectively they are able to reduce emissions by other means). If the CDM or dedicated voluntary carbon market standards such as the Verified Carbon Standard, the Gold Standard, the American Carbon Registry, or the Climate Action Reserve were folded into an ICAO market-based mechanism, it could be an enormous demand push for offset suppliers that are currently struggling to find buyers in a relatively stagnant market.

In this uncertain phase of transition between the Kyoto and Paris mechanisms, some new voluntary climate protection initiatives could generate the much needed additional demand for CERs but also for other carbon offsets. These initiatives aim to ramp up public- and private- sector commitments for climate change mitigation to close the large remaining gap between business-as-usual GHG emissions, current Paris NDC reduction pledges and those GHG emission levels considered safe by climate science to keep global warming below the critical 2°C.

Just to name two particularly successful initiatives: The World Bank's Carbon Pricing Leadership Coalition, officially launched at the Paris climate talks, includes 74 countries and more than 1,000 companies that support carbon pricing. The Science-Based Targets initiative, which launched in September 2014, aimed to get 100 companies to set emissions reductions targets in line with a 2°C temperature rise threshold by the end of 2015; 174 companies, from Coca-Cola to Sony, have already signed up to date.

A recently published report prepared by the New Climate Institute for We Mean Business, a coalition of organizations working with thousands of the world's most influential businesses and investors and promoting a low carbon economy, expects that by 2030, business could cut its GHG emissions by 3.2bn to 4.2bn tCO_2e per year below current trends, if businesses joined climate change initiatives and took action as planned. That's equivalent to up to 7-9% of the world's 2010 emissions of approx. 48bn tCO_2e. Via such self-imposed commitments, business could even reduce emissions by around 10bn tCO_2e or roundabout two thirds of required emissions reduction, assuming that the signatory states of Paris really implement their pledges.

Though it is too early to tell whether these initiatives will translate into substantial carbon offset purchases

持全球变暖在2摄氏度以内的安全警戒线温室气体排放水平之间的巨大差距。

举两个特别成功的倡议为例：世界银行的碳定价领导联盟，在巴黎气候谈判正式启动，包括74个国家和超过1000家支持碳定价的公司。基于科学目标倡议，于2014年9月启动，旨在使得100家公司设定2015年底保持2摄氏度升温临界值的减排目标；迄今已有174家公司，从可口可乐到索尼，已经签约。

"We Mean Business"是一个和数千家全世界最有影响力的企业和投资者合作的促进低碳经济的组织联盟，一份最近发布的新气候研究所为之准备的报告预测，如果企业加入气候变化倡议并按计划执行行动，到2030年，企业能够每年消减32亿至42亿吨二氧化碳当量的温室气体排放。这相当于高达全世界2010年总排放量约480亿吨二氧化碳当量的7%至9%。通过这种自愿承担的承诺，企业甚至能减少约100亿吨二氧化碳当量的碳排放或间接减少三分之二要求的碳排放，如果巴黎协议的缔约国确实实现他们的承诺的话。

Initiative	Scenario 1: Direct Impact (in bn tCO_2e)	Scenario 2: Systemic Impact (in bn tCO_2e)
SCIENCE BASED TARGETS Companies set emission reduction targets based on keeping temperature change below 2ºC.	1.9	5.0
EP100 Companies commit, over 25 years, to doubling their economic output from each unit of energy (energy productivity).	0.3	2.4
RE100 Companies commit to using 100% renewable electricity.	1.2-1.5	4.5-5.7
ZERO DEFORESTATION Companies commit, by 2020, to using no commodities that cause deforestation.	0.5-1.2	0.7-1.5
LOW CARBON TECHNOLOGY PARTNERSHIP INITIATIVE (LCTPi) Companies work to develop and use more low carbon technology in their industry. The industries analyzed here are: • Renewables • Chemicals • Cement • Energy efficiency in buildings • Low carbon transport fuels • Climate smart agriculture • Forests and forest products as carbon sinks	N/A	9-10
Total (Taking into account overlaps)	**3.2-4.2**	**approx. 10***

* Overlaps between initiatives mean the impact is smaller than the sum of the individual initiatives.

Potential Emissions Reductions by Voluntary Climate Action Initiatives
自愿气候行动倡议的潜在减排量
Source / 图片来源: We Mean Business

虽然判断这些倡议是否能很快化为实质性的碳抵消购买还为时过早，市场参与者们期望很多这些自愿承

any time soon, market participants expect that many of the self-imposed targets could potentially require their member signatories to look beyond emissions reductions in their direct control and consider sourcing third-party carbon offsets at large scale.

Some Remarkable Trends and Initiatives Regarding the Supply of Voluntary Carbon Offsets

As a means of adaptation to adverse circumstances, some voluntary carbon market participants have recently launched several promising initiatives aimed at lifting carbon offset prices to healthy levels again.

An innovative instrument are co-benefits quantifications which look to separate the values from additional ecosystem and social services from carbon offset projects. The core idea in economic terms is to reveal the value of the many „positive external effects" generated by a project in order to provide project developers with an alternative or higher financing stream.

In this context, a key development for the voluntary carbon market was the inclusion of climate change mitigation into the UN's new 17 Sustainable Development Goals (SDGs) that have been adopted in September 2015. The SDGs are designed to replace the eight Millenium Development Goals, which were introduced in 2001, and served as a focus for international aid and development finance from UN member countries. The new goals not only take account of the effect that climate change has on achieving the original development goals, but explicitly list tackling climate change as one of the goals.

As a reaction, the Gold Standard launched a comprehensive stakeholder consultation last year on how to include the revised UN SDGs into its upcoming Gold Standard 3.0. This third Gold Standard version will be fundamentally re-designed and also seeks to quantify co-benefits ranging from health and gender to water and biodiversity protection, so that projects providing more co-benefits can potentially access new financial streams from green funds, impact investments, and more, or sell verified co-benefits claims as a separate asset in the world's environmental commodity markets.

UPM's "Sichuan Rural Poor-Household Biogas Development Programme" (CDM PoA 2898, GS 1239) is a premier example of a high-grade carbon offset project with enormous extra value. Under the umbrella of this Programme of Activities (PoA), 400.000 low-income farmer households in China's Sichuan province

担的目标能潜在地要求他们的签约成员能看得更远，超越在他们的直接控制范围内减排，考虑大范围地采购来自第三方的碳抵消。

自愿碳抵消供给的一些显著趋势和举措

作为适应不利环境的一种手段，一些自愿碳市场参与者最近推出了一系列有希望的倡议，旨在将碳抵消价格提升到健康水平。

一个创新的手段是量化共同利益，将额外的生态系统和社会服务的价值从碳抵消项目的价值中分离开来。经济方面的核心理念是揭示很多项目的"正外部效应"价值，为了给项目运营者提供一个可选项或更高的融资流。

在这样的背景下，自愿碳市场发展的关键一步是2015年9月通过的将减缓气候变化纳入联合国新的17个可持续发展目标（SDGs）。这些目标是为取代2001年开始的作为联合国成员国国际援助和发展融资的焦点和八个新千年发展目标而设计。新的目标不仅考虑到气候变化对实现原有发展目标的影响，而且明确地将应对气候变化作为目标之一。

相对应的，黄金标准去年发布了全面的利益相关者咨询，包括如何将修订的联合国可持续发展目标纳入到即将推出的黄金标准3.0中来。第三版黄金标准将根本性地重新设计，并追求量化共同利益，从健康到性别到水资源和生物多样性保护，使提供更多的共同利益的项目能够有机会接触新的来自绿色基金、影响力投资等等的资金源，或出售核证的共同利益作为世界环境商品市场的一个单独资产。

UPM公司的"四川农村中低收入家庭户用沼气发展项目"（CDM PoA 2898, GS 1239）是一个有很高附加值的高质量碳抵消项目的突出例子。在这一规划类（PoA）项目的框架下，中国四川省的40万个低收入农户家庭装上了小型沼气池和高效无烟沼气炉灶。

该项目每年减少近90万吨二氧化碳当量的温室气体排放，对减缓气候变化有着强大的积极影响，除此之外，这个项目也大大提高了四川150多万低收入农户的生活质量，帮助促进当地社区的可持续性发展。

根据一项北京科技大学环境可持续排水技术研究中心（CSES）将于今年秋季发布的关于规划类项目共同利益的科学研究表明，四川户用沼气规划类项目能够

have already been equipped with proven mini biogas digesters and efficient smoke-free biogas cook stoves.

Beyond its strong positive impact on climate change mitigation with an annual GHG emissions reduction of almost 900,000 tCO_2e, this PoA also substantially improves the lives of more than 1.5 million members of poor rural households in Sichuan and helps promoting a sustainable future for the local communities.

According to an ongoing scientific study on the PoA's co-benefits by the Centre of Sustainable Environmental Sanitation (CSES) at the University of Science and Technology Beijing to be published this autumn, the Sichuan Household Biogas PoA contributes verifiably and notably to the achievement of at least 14 out of 17 UN SDGs.

So, what does this all mean for the future role of voluntary carbon offsetting? The next chapter provides some selected conclusions.

The Importance of Voluntary Carbon Offsetting in a Post-Paris World

Despite some fresh dynamics in some sectors, today's international voluntary carbon market is still far too small in comparison to the dimension of the global climate change challenge. In addition, this market currently suffers from similar structural over-supply as it is known from the EU ETS. Consequently, the average price for a carbon offset unit is much too low to keep sufficient existing projects alive or incentivize the required volume of investments in new projects to encourage scaling up this market and its climate protection impact notably.

However, in perspective as from 2020 onwards, voluntary carbon offsetting will become ever more important under the conditions of the Paris Agreement. Ambitious voluntary climate action by the private or public sector, that is in line with science-based targets, goes beyond current regulatory requirements and includes voluntary carbon offsetting, can help closing the emissions reduction gap still existing inspite of Paris and put us back on track to achieving carbon neutrality until the end of this century, at the latest.

Especially German companies with subsidiaries or business activities in China, that are not subject to legal GHG reduction obligations, can use ambitious voluntary carbon offset programmes to improve their competitive position and lead by example in their host country, thus helping to spread the idea of voluntary carbon offsetting also among Chinese businesses without compliance duties.

证实显著地对联合国17个可持续发展目标中的至少14个做出贡献：

Contribution of the Sichuan Household Biogas PoA to Achieving UN Sustainable Development Goals
四川户用沼气规划类项目对联合国可持续发展目标做出贡献
Source / 图片来源: United Nations, adjusted by UPM

那么，这一切对自愿碳抵消未来的作用意味着什么？下一章提供了一些结论。

后巴黎世界自愿碳抵消的重要性

尽管在有些领域有新动态，今天的国际自愿碳市场和全球气候变化挑战的维度相比仍然太小了。此外，和欧盟碳交易体系的结构类似，这个市场正遭遇着供给过度的问题。因此，碳抵消单位平均价格对保持足够的现有项目存活或激励新项目的所需投资来说都是大大过低的，不足以鼓励扩大市场，也不足以让它对气候保护影响显著。

然而2020年之后，自愿碳抵消在巴黎协议的条件下会变得越来越重要。私人或公共部门雄心勃勃的自愿气候行动符合以科学为本的目标，超越法规要求，包括自愿碳抵消，可以有助于弥合巴黎协议后仍然存在的减排差距，最迟在本世纪末让我们回到实现碳中和的正轨上来。

特别是在中国有子公司或业务活动的德国企业，他们法律上没有温室气体减排的义务，可以利用雄心勃勃的自愿碳抵消计划以提高他们的竞争地位并且在他们的所在国以身作则，这样也有助于在没有承担责任的中国企业中传播自愿碳抵消的想法。

Fairs & Events 展会与活动

China Wind Power 2016
Beijing, China · 19.10.2016 - 21.10.2016
国际风能大会暨展览会
北京，中国·2016年10月19日 - 21日
chinawind.org.cn

Eco Expo Asia
Hong Kong, China · 26.10.2016 - 29.10.2016
国际环保博览
香港，中国·2016年10月26日 - 29日
hktdc.com/fair/ecoexpoasia-en

New Energy Auto Show
Shanghai, China · 01.11.2016 - 05.11.2016
节能与新能源汽车展
上海，中国·2016年11月1日 - 5日
neas.ciif-expo.com

China Sustainable Building Expo
Shanghai, China · 13.11.2016 - 15.11.2016
上海国际先进建筑技术展览会
上海，中国·2016年11月13日 - 15日
greenbuildingchina.com/en

Water Expo China
Beijing, China · 15.11.2016 – 17.11.2016
中国水博览会
北京，中国·2016年11月15日 - 17日
water-expo-china.hk.messefrankfurt.com

China International Energy Forum & Exhibition
Beijing, China ·28.11.2016 - 30.11.2016
中国国际能源峰会暨展览会
北京，中国·2016年11月28日 - 30日
energy-tech.com.cn/en

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ESCO Committee of China Energy Conservation Association
中国节能协会节能服务产业委员会
emca.cn

Alternative Energy 替代能源网
alternative-energy-news.info

China Energy Web 中国能源网
china5e.com

China Greentech Initiative 中国绿色科技
china-greentech.com

China Renewable Energy Society (CRES) 中国可再生能源学会
cres.org.cn

China Renewable Energy Centre 国家可再生能源中心
cnrec.org.cn

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dena.de

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bmwi.de

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export-erneuerbare.de

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renewableenergyworld.com

Renewables International 国际可再生能源
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bmub.bund.de

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Climate Protection & CDM 气候保护与清洁发展机制

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China Climate Change Info-Net 中国气候变化信息网
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中国可再生能源行业协会
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