



Federal Ministry for the
Environment, Nature Conservation,
Building and Nuclear Safety



econet china



The German Chamber Network

econet monitor

Green Markets & Climate Challenge

June 2016 6月刊



Source / 图片来源: Petra Dirscherl / pixelio.de

WITH ARTICLES INCLUDING: 更多内容:

Grid Integration and Renewable Energy in China: Developments & Market Potential
中国的可再生能源发电并网: 发展现状和市场潜力

Assessing Passive Building Performance in China – Revision Required?
中国被动式建筑评估 — 需要修改?

Mitigating Liability Risks under the Revised Chinese Environmental Protection Law
在新修订的《中华人民共和国环境保护法》下减轻责任风险

www.econet-china.com

Content / 目录

IN FOCUS _____ 3

Grid Integration and Renewable Energy in China: Current Developments and Market Potential

中国的可再生能源发电并网: 发展现状和市场潜力

Building _____ 7

Sustainable Urbanization: "China EU Future City" in Shenzhen

可持续城镇化: 深圳中欧未来城

Energy _____ 10

Assessing Passive Building Performance in China – Revision Required?

中国被动式建筑评估 — 需要修改?

Environment _____ 15

Information Trip to Germany on Sustainable Solid Waste Management

固体废弃物可持续管理赴德考察团

Politics _____ 17

Mitigating Liability Risks under the Revised Chinese Environmental Protection Law

在新修订的《中华人民共和国环境保护法》下减轻责任风险

Fairs & Events _____ 22



econet china

Greentech made in Germany | 实践德国绿色科技

Your Trusted Partner for Success in China's Green Market!

econet china is the only industry initiative for promoting German Know-How for sustainability in China. Coordinated by German Industry and Commerce Greater China (AHK/GIC), it is dedicated to bridging German Green technology providers with the Chinese markets by providing first-hand information, networking and marketing opportunities.

econet china supports German SMEs in the sectors of building, energy and environment that are interested in entering the market, strengthening companies' positioning and ability for exploring business opportunities in China.

With more than 10 years of experience, econet china offers a wide range of services that can benefit your business at different stages. From market intelligence to general marketing coverage, from project leads to networking events. More tailor-made activities are available to meet your specific needs and connect you with your targeted industry stakeholders.

Learn more about econet china at www.econet-china.com or contact the econet team at inquiry@econet-china.com

您在中国绿色市场值得信赖的伙伴!

作为独家在华推广德国可持续发展领域技术知识的行业组织, 德中生态商务平台(econet china)是德国商会大中华区旗下, 集资讯、人脉与市场推广为一体的专业机构, 致力于连接德国绿色技术方与中国市场的需求。

她面向在建筑、能源与环保行业的德国中小企业, 提供市场准入、企业定位和业务拓展等专业支持。

凭借超过10年在中国市场的经验, 德中生态商务平台提供各种广泛的服务内容, 以满足企业在不同发展阶段的需要, 从行业资讯到总体市场推广方案, 从项目信息到行业交流活动, 更多定制服务可满足您的独特需求并与目标行业客户建立联系。

欲了解更多, 请访问www.econet-china.com或联系 inquiry@econet-china.com

In Focus

Grid Integration and Renewable Energy in China: Current Developments and Market Potential

中国的可再生能源发电并网：发展现状和市场潜力

The Chinese energy market and China's dependency on energy imports will further grow in the coming decades and electricity produced from coal-fired power plants will be increasingly replaced by renewable energy sources as well as natural gas. Since 2009, China is the world's largest energy consumer with a current share of 22% of global energy consumption, which is estimated to further grow in the future. In consideration of these facts and in view of declining domestic resources, China's import dependency will increase considerably from 15% today to an estimated 27% in 2035, thereby overtaking Europe. Furthermore, the country will be responsible for approximately one third of global CO₂-emissions until 2035. Hence, the transition of the energy sector to the application of more sustainable technologies already forms an integral part of the Chinese energy policy.

In this context, renewable energy sources are seen as a useful tool in the battle against import dependency and greenhouse gas emissions. Thus, the new 13th Five-Year Plan (2016-2020) aims to further reduce energy intensity by 15% and to increase the proportion of renewable energy from 12% in 2015 to 15% in 2020.

Renewable energy and curtailment rates

In the last five years, China has doubled its investment in renewable energy and therefore emerged as a worldwide leader in the energy production from wind and water power as well as photovoltaics (PV): In 2015, a total capacity of 130 gigawatts (GW) of wind power generation, 320 GW of hydro power generation and 43 GW of PV were installed in the Middle Kingdom. According to the National Energy Administration (NEA), China plans to further raise the installed capacity of these three energy sources up to 200, 350 and 150 GW respectively, by 2020. In this regard, the grid integration of renewable energy plays a crucial role for the Chinese energy sector.

However, in comparison with the fast development of renewable energy and in consideration of the goals

在未来几十年里，中国能源市场和中国能源进口依赖将持续增长，燃煤发电将越来越多地被可再生能源和天然气发电所取代。自2009年以来，中国是世界最大的能源消费国，占全球总消费的22%，预计未来还会进一步增长。考虑到这些事实，鉴于国内资源量日益下降，中国的进口依赖度将从今天的15%大幅上升到2035年的27%，从而超越欧洲。此外，到2035年中国的二氧化碳排放量将占到全球的约三分之一。因此，向更有可持续性的能源技术过渡便成为了中国能源政策的一个重要组成部分。

在这种情况下，可再生能源被认为是对抗进口依赖性和温室气体排放的有力武器。因此，新的十三五规划（2016-2020）提出了进一步将单位GDP能源消耗降低15%，将非化石能源占一次能源消费比重从2015年的12%提高到2020年的15%的目标。

可再生能源弃风弃光问题

在过去的五年里，中国对可再生能源的投资增加了一倍，从而成为能源生产领域里风力、水力和光伏的世界领导者：2015年中国的风力发电总装机容量为130GW，水力发电装机容量320GW，光伏装机容量43GW。据国家能源局（NEA）称，中国计划到2020年将这三种能源的装机容量分别提升至200、350和150GW。在这方面，可再生能源并网对中国能源部门起着至关重要的作用。



Grid integration of renewable energy plays a crucial role for the Chinese energy sector

可再生能源并网对中国能源部门起着至关重要的作用

Source / 图片来源: Rainer Sturm / pixelio.de

for renewable energy capacity in 2020, strengthening and upgrading the Chinese electricity grid as well as connecting renewable energy to it lag behind. Additionally, power supply surpasses demand by 20% to 25%. Moreover, conventional power production in China currently lacks flexibility and until the beginning of 2016 electric utility and system operating companies highly prioritized electricity from coal-fired power plants. An additional challenge for the energy sector is the geographic distribution of electricity production and consumption. Water power is mostly generated in the southwest, wind power in the northwest and northeast and utility-scale PV in the north and the west, whereas high electricity demand areas are situated in the south and the east. In combination, these issues cause high curtailment rates of renewable energies: While in the first quarter of 2016 a total of 5.3 GW of wind and 7.2 GW of PV capacities were added in China, the curtailment rates amounted to 26% and 14% respectively.

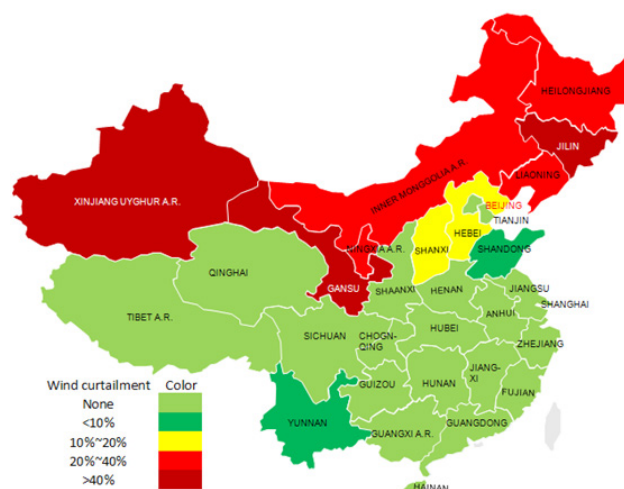
Grid infrastructure and electricity market mechanisms

The Chinese government has identified these challenges for the transition of the energy sector already several years ago. Thus, among others the state investment into the electricity grid infrastructure grew by 42% since 2008 and amounted on average to roughly 50% of the annual total investment in the energy sector in the last years. As a result, the Chinese power supply system expanded by 39% in the period from 2008 to 2014.

In 2014, 781 billion CNY (approx. 106 billion EUR) were spent for the energy sector in total while 412 billion CNY (approx. 55.9 billion EUR) – more than half of it – were invested to strengthen the grid. Therefore, approximately 74,000 km of power infrastructure (≥ 35 kV) were added in 2014. Hence, China's electricity grid (≥ 35 kV) amounted to a length of 1.63 million km in 2014 – consisting with 98% mostly of alternating current (AC) power lines.

China focuses in this context on extending the ultra-high-voltage (UHV, ≥ 800 kV) electricity transmission network to connect production and consumption areas. The Middle Kingdom also plans to further invest especially in UHV-transmission in the future to connect the northern and southern as well as the western and eastern provinces. Thus, the NEA announced in mid 2015 that during the period from 2015 to 2020 a total of 2,000 billion CNY (271.4 billion EUR) will be

然而,和可再生能源的快速发展相比,并考虑到2020年可再生能源装机容量的目标,加强和升级电网以及可再生能源并网的工作没跟得上。此外,电力供给超过电力需求的20%到25%。中国目前的传统电力生产缺乏灵活性,直到2016年初电力公司和电网仍然优先使用燃煤发电。能源部门还有一个挑战是电力生产和消费的地理分布。水电主要在西南生产,风电在西北和东北,大规模光伏在北部和西部,而电力需求最多的则是在东南沿海。总的来说,这些问题导致了较高的弃风弃光率:2016年第一季度中国新增风力装机5.3GW,弃风率26%,新增光伏装机7.2GW,弃光率14%。



Wind power curtailment levels by province in the first quarter of 2016
2016年第一季度各省弃风率水平

Source / 图片来源: Azure International

电网基础设施和电力市场机制

中国政府早在几年前就认识到了这些能源领域转型的挑战。因此,2008年来在电网基础设施上的国家投资增长了42%,相当于近年来能源领域平均年投资总额的50%。结果是中国的供电系统从2008至2014年间扩大了39%。

2014年,能源领域总花费7810亿人民币(相当于1060亿欧元),其中超过一半投资在加强电网上,具体是4120亿人民币(相当于559亿欧元)。2014年增加了约74000千米电网(≥ 35 kV)。因此中国的电网(≥ 35 kV)在2014年达到了163万千米,其中98%主要是交流电线。

在这样的背景下,中国把重点放在扩展特高压(UHV, ≥ 800 kV)电力传输网络上,用来更好地连结电力生产地和消费地。中国还计划未来进一步投资,特别是连结南北和东西地区的跨省特高压电网。因此国家能源局在2015年中宣布从2015到2020年期间总投资2

spent for upgrading the grid infrastructure. Hence, a doubling of the overall length of the electricity grid can be expected while already until 2017 ten large-scale UHV projects shall be completed.

Another integral part of the current transition of the Chinese energy sector is the implementation of market mechanisms and reforms. Since November 2015, several direct electricity trading centers were inaugurated in China. Their aim is to facilitate electricity sales from power generation plants to large consumers, which should lead to a more efficient electricity supply. Besides, power trading can be standardized, regulated better and put under more specific and transparent contracts.

An additional important step towards an improved grid integration of renewable energy is the recent policy announcement on renewable energy – Document 625, issued by the Chinese government in late March 2016 –, which aims at reducing the high curtailment rates of energy from hydro, solar and wind sources. The key aspect presented in the document is the guaranteed output purchase from renewable energy by grid companies, which amounts at least to a defined number of hours allocated to the generators.

Furthermore, a national electricity pricing reform is expected to be rolled out in 2017 which should lessen the monopoly position of the power grid companies in terms of electricity sales. As a result, power grid companies will only be allowed to demand service fees verified by the government, based on the actual costs for transmission and distribution.

All in all, the structure of the Chinese power sector is currently shifting towards a more open and flexible market, while being still dominated by state-owned enterprises.

Technologies and solutions for grid integration

Market mechanisms and reforms, grid strengthening and development, utilization of UHV-transmission and an increased flexibility on the supply side are important measures to enhance the grid integration of renewable energy in China. Another essential contribution can be provided by distributed energy supply, storage technologies, micro and smart grids, smart meters as well as a more flexible demand side.

Especially an efficient integration of renewable energy sources into the national grid and a smarter consump-

tion of 100 billion RMB (271.4 billion EUR) for upgrading grid infrastructure. According to the forecast, by 2017 ten large-scale UHV projects shall be completed, and the total length of the grid will be doubled.



China's national grid plan for 2020

到2020年中国国家电网规划

Source / 图片来源: Stratfor

目前中国能源领域转型的另一个必不可少的部分是市场机制和改革的实施。2015年11月以来,几个直接电力交易中心在中国成立。他们致力于促进从电厂到广大消费者的电力销售,这会导致更有效的电力供给。此外,电力交易可以标准化,更好地监管,以及按照更加具体而透明的合同执行。

2016年3月底中国政府宣布的625号文件《可再生能源发电全额保障性收购管理办法》为提高可再生能源并网水平迈出了重要一步,它旨在降低目前过高的弃水、弃光和弃风率。文件中的要点是保证电网公司对可再生能源全额收购,确保一定的保障性收购小时数。此外,计划在2017年推行全国电力价格改革,这将会削弱国家电网在电力销售上的垄断地位。电网公司只允许收取政府批准的服务费,该费用以传输和分配的实际成本为依据。总的来说,目前中国的电力结构转向更为开放灵活的市场,尽管仍是国有企业占主导地位。

并网的技术和解决方案

市场机制和改革,电网加强和发展,特高压电网的应用,以及供给侧灵活性的增强是加强中国可再生能源并网的重要措施。除此之外,分布式能源供应,存储技术,微型及智能电网,智能电表,还有需求侧的灵活性也对此有所贡献。特别是可再生能源有效地接入国家电网,以及更加理性的消费是中国未来成功转向可持续能源发展的关键。因此在2010年,中国宣布到2020年建立智能电网体系,为此计划投入1000亿欧元,同时制定了到2017年每户家庭都安装智能电表

tion are crucial for China's successful transition to a more sustainable energy future. Therefore, in 2010, the Middle Kingdom announced the setup of an integrated smart grid by 2020, with a planned budget of 100 billion EUR and aims among others to install smart meters in every household until 2017. At the end of 2015, smart meters were already utilized in 94% of Chinese households.

Business opportunities for foreign companies

As a result of market reforms and investment as well as pilot projects, promising market opportunities for German companies operating in the fields of grid integration and renewable energy arise. Among others, they occur in the areas of grid strengthening, development and digitalization as well as a more flexible electricity generation and demand. In particular, German companies have considerable, especially in China requested experience and know-how when it comes to transformers, controlling and sensor technologies as well as solutions for high-voltage transmission.

Additionally, opportunities arise in the fields of safe and secure data transmission and the modernization of sub- and distribution stations. Providers of systems for cables and breakers and consultation services also face promising market opportunities. Another fast growing market with attractive business developments emerges due to China's smart grid implementation plan, including the increased application of demand side management solutions and micro grids, storage solutions as well as charging stations for electric vehicles. Finally, distributed energy supply and offshore wind power also offer promising potentials for foreign companies in the Chinese market.

的目标。截至2015年底,已有94%的中国家庭安装使用了智能电表。

外国企业的商业机会

由于市场改革和投资,试点项目的展开,在电网并网和可再生能源领域对德国企业有很多前景良好的市场机会。它们首当其冲地出现在电网增强、发展和数字化,以及发电用电灵活性方面。特别是德国公司在变压器、控制器和传感器以及高压输电解决方案等领域有大量中国亟需的经验和技能。



German know-how in the fields of transformers, controlling and sensor technologies as well as solutions for high-voltage transmission is requested in China

德国公司在变压器、控制器和传感器以及高压输电解决方案等领域有中国亟需的技术

Source / 图片来源: cwe.cn

此外,在数字安全传输和子站和配电站的现代化方面市场前景较好。电缆和断路器系统提供商还有咨询服务提供商也有不错的市场机会。由于中国的智能电网建设计划,以下这些市场同样增长快速前景良好:需求侧管理解决方案应用和微型电网,存储解决方案,以及电动汽车充电站。最后,分布式能源供给和海上风电也为外国公司在中国市场上提供了很好的潜力。

Event Information / 活动信息

On behalf of the Energy Export Initiative of the German Federal Ministry for Economic Affairs and Energy (BMWi), German Industry & Commerce Greater China Beijing plans to organize a business trip on grid integration and renewable energy for German enterprises to China in the first half of 2017. Please contact econet china for further information.



受德国联邦经济和能源部委托,在能源出口倡议框架下,德国工商大会北京将于2017年上半年组织德国企业电网并网和可再生能源来华考察团。更多信息请联系econet china。

Contact person:
Mr. Bernhard Felizeter
Phone: +86-10 6539 6650
Email: felizeter.bernhard@bj.china.ahk.de

联系人:
傅利泽 先生
电话: +86-10 6539 6650
邮件: felizeter.bernhard@bj.china.ahk.de

Building

Sustainable Urbanization: “China EU Future City” in Shenzhen

A contribution by Stefanie von Schaubert, Euro Sino Invest

可持续城镇化：深圳中欧未来城

由欧洲易赛Stefanie von Schaubert供稿

During the past years, urbanization in China increased continuously in speed. While in 1990 about 26% of the total population lived in urban areas, the share already amounted to 56% by the end of 2015 and is expected to rapidly increase further in the future. This is reshaping both, the physical environment and the cultural fabric in China. Therefore, China has started to increasingly focus on the topics environmental protection, sustainability, quality and innovation in recent years. Furthermore, the sensibility for environmental issues is growing and with it the willingness to invest in environmental technologies and green building. These developments open up promising opportunities for European companies from the respective sectors.

As a pilot project for sustainable urbanization, the “China EU Future City” (CEFC) aims to bring European technologies to the Chinese market and help European small and medium enterprises (SMEs) to enter the market by developing a low-carbon city that integrates industrial, commercial and residential zones in a sustainable and advanced way. CEFC will promote exchanges and cooperation in a wide range of aspects regarding sustainable urban development. The CEFC project had its official beginning last year, along the EU-China Urbanization Partnership Forum in Brussels. The project is being developed in close cooperation with local and international authorities and partners such as the European Commission, the Chinese National Development and Reform Commission (NDRC) and the Shenzhen government. In charge for the development, realization and financing of the project is Huan De (HD), a German developer which has been active in the Chinese building sector for more than 10 years.

CEFC is being conducted in an innovative district of Shenzhen, a major city in the southern Chinese Guangdong province. Situated directly North of Hong Kong Special Administrative Region, Shenzhen was one of the fastest-growing cities in the world during the 1990s and the 2000s and emerged as a major financial center in southern China.

近年来中国的城镇化进程不断加速。1990年中国大约有26%的人口居住在城市，截止2015年底已增至56%，且预计在未来仍会迅速增长。这一进程正在影响中国的自然环境和文化结构。正因如此，中国开始越来越重视环保，可持续，质量和创新等议题。另外中国对于环境问题的敏感度正在上升，对于环保技术和绿色建筑的投资意愿也不断加大。这给欧洲相关行业（如交通，建筑材料，可再生能源，智能电网以及生命科学）的企业提供了巨大的机遇。

中欧未来城项目作为可持续城镇化示范项目，其目标是通过开发融合产业，商业和住宅的可持续高端低碳城市向中国引入欧洲技术并帮助欧洲中小型企业进入中国市场。中欧未来城将促进可持续城镇化发展领域的广泛交流与合作。



Masterplan “China EU Future City” in Shenzhen

深圳中欧未来城总体规划

Source / 图片来源: www.urban-park.eu

中欧未来城项目伴随着2015布鲁塞尔中欧城镇化伙伴关系论坛于去年正式启动。此项目的开发将在与当地和国际机构和伙伴，如欧盟委员会，中国国家发展与改革委员会以及深圳市政府的紧密合作下完成。环德集团负责中欧未来城项目的开发，实施和投资。环德集团是来自德国的开发商，活跃于中国建筑市场10年有余。此外几家知名的欧洲集群和伙伴如慕尼黑工业大学也参与此项目。

中欧未来城项目位于中国南部广东省的重要城市-深圳市，坐落于深圳的创新区域。深圳位于香港特别行

The project is aimed to create a low-carbon and green city that integrates sustainable urban life with high-tech industries. It can be divided into three zones:

- Sustainable Urbanization Park (Zone A) will be the demonstration zone to fully implement the sustainable strategies for China's urbanization. It will showcase the application of European and Chinese products and designs in order to promote and encourage further advancements towards a more sustainable urbanization. Important fields are IT and smart city, new energy, modern service industry, environmental protection, culture and creativity as well as sustainable construction.
- Life Science Park (Zone B) addresses the high demand of China in the lifestyle, sports and health sectors. It will combine European companies, manufactures, research and development (R&D) institutions, training centers, and all kinds of organization in the health industry. This includes the areas biotechnology and food science, medical products, beauty and body care, sports as well as senior life and care.
- Industry 4.0 business and production center (Zone C) targets European SMEs in smart industry 4.0, new materials, high-end equipment manufacturing, smart logistics, IT and big data. Here, advanced and new products will be showcased and promoted. The zone will include a 4.0 incubator, a big data center, a 4.0 campus, a R&D center and a vocational school for industry applications.

Design guidelines for sustainability

CEFC will be a demonstration project to fully implement sustainable strategies for China's urbanization. Therefore, several environment-friendly technologies are being evaluated for their practicability. They include applications for energy efficiency and renewable energies, which will partially be produced locally (wind, solar, geothermal), waste and water management, environmentally efficient transport and sustainable indoor environments. Furthermore, various design guidelines are taken into account:

- Solar access to the site: daylight reduces needs for artificial lighting, passive solar systems and heating
- Building orientation: inappropriate building location can seriously jeopardize the level of comfort required of adjacent buildings, streets and open spaces, particularly in terms of solar radiation and view

政区北部,是上世纪90年代和本世纪初世界上发展最快的城市之一,也是中国南方的主要金融中心。

该项目旨在打造融合可持续城市生活和高新产业的低碳绿色城市。项目可分为以下三大区域:

- A区,可持续城市化园区,是全面落实中国城市化可持续发展战略的示范区域。该区域将展示中欧产品 and 设计的应用,促进可持续城市化的进一步发展。重要领域包括IT和智慧城市,新能源,现代服务业,环保,文化创意和可持续建筑。
- B区,生命科学园区,用于应对中国在学习方式,运动和健康领域的巨大需求。该园区将综合欧洲企业,制造,研发机构,培训中心,以及健康产业相关的各种组织。领域包括生物技术和食品科学,医疗产品,美容和身体护理,运动健身以及养老。
- C区,产业4.0和生产中心的目标群体是欧洲智慧产业4.0,新材料,高端设备制造,智能物流,IT和大数据领域的中小型企业,在此将对高新产品进行展示和推广。该区包含4.0孵化器,大数据中心,4.0校园,研发中心以及一所产业应用职业学校。



In the exhibition center advanced and innovative new products will be showcased and promoted

展览中心

Source / 图片来源: www.urban-park.eu

可持续性设计导则

中欧未来城是全面落实中国城市化可持续发展战略的示范项目,因此我们也正在评估几种可持续技术的可行性,其中包括能源效率和可再生能源(部分将就地生产,如风能,太阳能,地热),废物和水管理,环保型交通和可持续室内环境。此外,也将考虑不同的设计导则以确保中欧未来城项目的效率和可持续性:

- 太阳能接入:日光可降低对人工照明,被动式太阳能系统以及热能的需求
- 建筑朝向:错误的建筑区位可能严重影响附近建筑,街道以及开放空间的舒适水平,尤其是在阳光照射和视野方面

- Walkable distances: in order to be functional, neighborhoods must contain in a 400 meter-diameter circle all the local/daily facilities and primary activities
- Active fronts: direct fronts and related paving emphasize commercial viability and street vitality
- Diverse green spaces: range of natural life and creation of habitats for many plant and animal species
- Social and aggregation spaces: a must to achieve the target of social integration and to become a magnet for the surroundings

Opportunities for participation

Based on the promising market opportunities for German and European advanced technologies in the areas of green building and sustainability in China, the Future City aims to introduce a wide range of environmental protection technologies, equipment and products from Europe to China.

There are several ways for companies to get involved in the project, for instance by supplying products, services and advanced technologies for construction, becoming a member of the cluster as well as a part of the project by opening up representative offices, engaging in the extensive network and buying or renting production facilities. Further opportunities to participate emerge by displaying products and introducing advanced technologies to China as well as by cooperating with European and Chinese universities, research agencies and companies and promoting R&D. For their expansion, companies can get financial support from the "ESI Technology Expansion Fund" (ESI-TEF), which aims to bring medium sized European high-tech companies into the Chinese market. The fund is managed by Euro Sino Invest, an investment company with China-Europe focus working closely together with HD. Companies which participate in the project can further profit from a large sales network through the various partners that are involved. Thus, CEFC will be an ideal environment for European and Chinese companies to enhance their business activities in China and at the same time contribute to a more sustainable urbanization process.

CEFC will be built in six phases over the next ten years. The ground breaking of the first phase took place on the 17th of June during the 4th International Low Carbon Forum in Shenzhen.

- 可步行距离：周边400米直径内应包含所有日常设施和主要活动
- 强烈的社区认同：周边不同社区从内部可辨识
- 营造活跃的社区外围：外墙和相关的铺设突出商业的便利性和街道的活力
- 多元的绿色空间：包含多种自然生物，为各种动植物创造栖息地
- 社交聚集区：需有社交娱乐空间，实现新发展的社交融合目标，成为吸引周边人群的社交聚集地。



Sustainable neighborhood at CEFC
中欧未来城可持续社区

Source / 图片来源: Euro Sino Invest

参与机遇：

鉴于德国和欧洲绿色建筑和可持续化领域的高新技术在中国的巨大市场机遇，中欧未来城将向中国引进大量欧洲环保技术，设备和产品。

企业可通过多种方式参与项目，如供应产品，服务以及建设所需的技术理念，成为集群的成员，在中欧未来城开设代表处，加入关系网以及购买/租赁生产设备。除此以外，还可在中欧未来城展示企业产品，向中国市场引入其先进技术，与欧洲和中国大学，研究机构和公司进行合作，促进当地研发。

在推广方面，企业可得到来自欧洲易赛科技导入基金的资助，该基金旨在帮助欧洲中型高新技术企业进驻中国市场，基金由欧洲易赛投资集团管理。欧洲易赛为专注中国和欧洲市场的投资公司，与中欧未来城的开发商环德集团紧密合作。参与企业也将受益于项目参与伙伴的强大销售网络。因此，中欧未来城将是欧洲和中国企业拓展业务，为更加持续的城镇化进程贡献力量的理想之地。

中欧未来城将分六期建设，十年内完工。项目第一期的奠基仪式将于2016年6月17日在深圳第四届国际低碳城论坛上举行。

Energy

Assessing Passive Building Performance in China – Revision Required?

A contribution by Christoph Mitterer, Hartwig Künzle, Florian Antretter and Sabine Lamprecht, Fraunhofer Institute for Building Physics IBP

中国被动式建筑评估 — 需要修改?

来自弗劳恩霍夫建筑物理研究所的Christoph Mitterer, Hartwig Künzle, Florian Antretter和Sabine Lamprecht的客邀文章

„Made in Germany“ is very popular in China and recognized as proof of quality. However, German approaches cannot always be transferred to other regions and cultures without adaptation. The German Passive House Standard for instance is such a German development which attracts more and more attention. Its principles support China in moving forward towards energy efficient buildings, which has already been demonstrated in many pilot projects. Yet, designers need to be aware that the methods, that are developed for and commonly used in Europe, may not be adequate for the greatly varying building practice and climate conditions in other countries.

The North American Passive House Institute (PHIUS) learned through practical experience that buildings which are designed according to the classic passive house standard still have a number of shortcomings in some US-American climate zones:

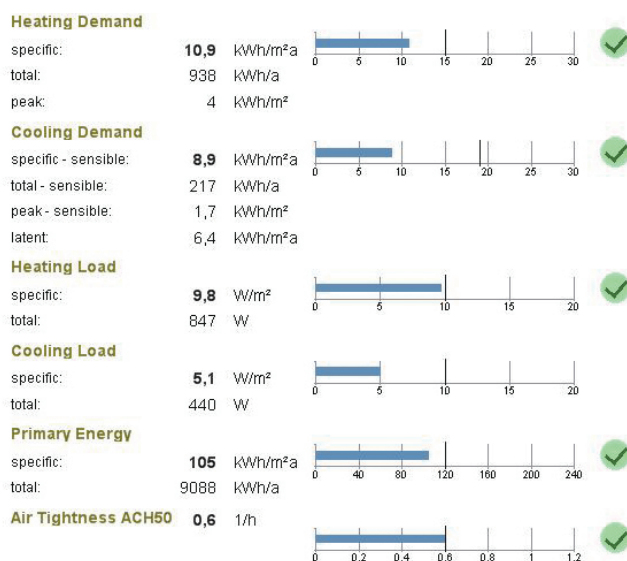
- Due to the different architectural traditions and other energy-cost structure in USA, the investment in high-performance insulation and other passive measures pays off more slowly than for example in Germany. Thus, acceptance and application tend to be lower.
- In hot and humid climate the energy-saving building style often results in uncomfortable conditions and sometimes hygienic problems due to insufficient dehumidification.
- Designing heating, ventilating, and air conditioning (HVAC) systems based on standard passive house calculations may underestimate the effect of daily load variations.

In various climate zones, hygrothermal assessment is a critical necessity: Improper hygrothermal design can quickly lead to catastrophic failure in the building

“德国制造”在中国非常受欢迎并被认为是质量保障。然而德国的方法如果不能因地制宜的话,就无法总是成功地转移到其他地区和文化中去。例如德国的被动房屋标准就是这样一个越来越受关注的发展趋势。它的原则是支持中国向节能建筑转变,这在很多试点项目都得以证实。然而,设计师们必须要意识到,在欧洲开发和通行的方法可能不一定适用于其他国家各种各样的建筑实践和气候条件。

北美被动房屋研究院 (PHIUS) 通过实践经验了解到,按照经典被动房屋标准设计的建筑仍然在美国一些气候区域存在缺陷:

- 由于美国不同的建筑传统和其他能源成本结构,对高性能隔热层和其他被动建筑设施的投资回报比德国的例子更为缓慢。因此,接受和应用往往是较低的。
- 湿热气候的节能建筑风格常会导致不适的情况,有时没有很好地除湿会引发卫生问题。



Passivehouse certificate criteria for Europe

欧洲被动房屋证书标准

Source / 图片来源: Fraunhofer IBP

structure. With high solar radiation, the lack of comfort assessment is also a significant issue which has led to serious overheating problems. Experiences show that a purely energetic consideration is insufficient to obtain buildings that are not only energy-efficient but also comfortable and permanently damage-free and resilient under extreme weather conditions.

Institutional players and authorities in China are aware that adaptations to the local requirements are necessary and thus they are working on appropriate standards for passive houses in China. Not only the revision of climate-specific building energy performance targets is challenging, also the computation method should be reviewed. The commonly used methodology for the energy concept design of Passive Houses is the static monthly balance calculation method. However, it neglects some influences which do not affect very much the performance of buildings in cold and temperate climates, but which might have negative effects on the building performance in various parts of China with hot and humid climates.

Static calculation methods with limitations

The monthly balance-based method as it is for instance described in the DIN EN ISO 13790 (2008) norm depends strongly on overall heat transfer coefficients, temperature difference, and considered time periods for heating or cooling. The underlying equations describe the monthly averages of the thermal losses or gains through the building envelope with air-exchange and the internal gains and losses. As depicted in the upper semicircle of the diagram, static monthly energy balance calculation methods allow primarily assessing the performance of a building design in relation to the exchange of heat, air and solar radiation.

For an estimation of the total annual heating demand in moderate climate zones, this monthly method is often adequate. However, when it comes to hot and humid or mixed climate zones not only heating of buildings is relevant but also cooling and dehumidification need to be addressed. Buildings with very high requirements on comfort, energy efficiency and sustainability may not be appropriately designed with static calculation methods. They lack the ability to assess certain dynamic factors of the energy balance such as storage effects or ventilation profiles that occur under real conditions. For instance, it is impossible to assess the thermal time lag and related overheating in summer.

- 设计基于标准被动房屋计算方法的暖通空调 (HVAC) 系统可能会低估日负荷变化的影响。

在不同的气候区域, 湿热评估是一个必要的关键因素: 不当的湿热设计可能会立刻导致建筑结构的灾难性失败。太阳辐射较高时, 缺乏舒适性评估也是一个显著的问题, 会导致严重的过热问题。经验表明单纯的能源的考量不足以使得建筑不仅节能, 而且舒适, 同时在极端天气条件下长久免遭灾害并迅速复原。

中国政府和机构意识到因地制宜的必要性, 因此他们在制定适合中国的被动房屋标准。具有挑战性的不仅是修订不同气候特性的建筑节能目标, 还有改进计算方法。被动房屋节能设计通常使用的方法是静态的月平衡算法。然而它忽略了一些对寒冷及温和气候区的建筑节能影响不太大、但对中国很多湿热气候区的建筑节能有强烈负面影响的因素。

有局限性的静态计算方法

以月平衡为基础的方法, 以在DIN EN ISO 13790 (2008)标准中的为例, 强烈依赖于总体传热系数, 温度差, 并考虑供暖和制冷的时期。基本方程描述了建筑外墙通过和外界的热交换损失或获得的热量以及内部热损失和热获得的月平均值。正如下图中所描绘的上半个圈, 静态月能源平衡算法允许主要评估建筑设计的关于热交换、空气和太阳辐射的表现。



Principles of passive building design

被动式建筑设计准则

Source / 图片来源: Fraunhofer IBP

要估计温和气候区的全年热需求, 这种月平衡法通常足够了。然而当涉及到湿热地区或混合气候区, 不仅

There are considerable limitations of static monthly balance methods, especially for building design in mixed and hot and humid climate zones:

- Static calculation methods are clearly limited in assessing cooling loads and cooling demands as well as related dehumidification requirements accurately. In those cases, dynamic simulation should improve the design by assessing thermal time lag more accurately.
- Solar radiation generates frequently comfort issues such as overheating in the shoulder seasons. Continuous comfort cannot be ensured based on static calculations.
- Static energy balance methods are unable to address moisture control in energy efficient buildings and building components. The appropriate envelope design for different climate zones from very cold to hot and humid requires distinctly different approaches regarding air tightness and moisture control layer within building components.
- Multi-zone modeling with interaction of the zones of more complex buildings such as a mixed-use larger building is not possible.

Dynamic hygrothermal whole-building simulation

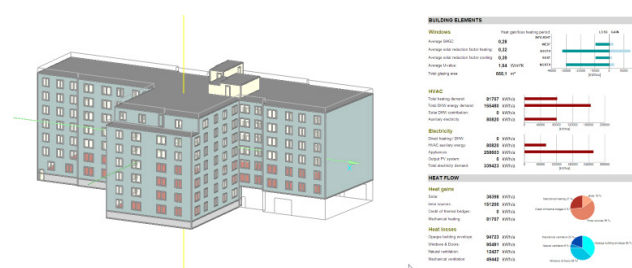
As depicted in the lower semicircle of the diagram a professional building simulation should also address the dynamic behavior and the moisture management in building components and rooms. This is especially important in climates where cooling and dehumidification of the indoor air play an important role. Dynamic heat and moisture processes in the building and in building components influence the energy demand as well as comfort and durability qualities. Effects of thermal inertia need to be taken into account as well as moisture buffering. The common static calculation tools ignore hygrothermal interaction between a building's interior and its envelope. The more detailed consideration of dynamic processes in a dynamic hygrothermal whole building simulation aims at further reduction of the energy demand, elimination of limitations in indoor comfort (overheating or overcooling for example) and avoidance of possible damage.

In addition to accounting for the thermal response of buildings and building components it is necessary to also understand the moisture conditions and the

是建筑的供暖,制冷和除湿问题也要解决。具有高度舒适性、节能和可持续要求的建筑可能使用静态计算方法设计就不太合适。它们缺乏评估某些能源平衡的动态因素的能力,例如在实际条件下的存储效果和通风效果。它不能评估夏季的热时间滞后和相关的过热现象。

静态月平衡法有相当大的局限性,特别是在混合和湿热气候区的建筑设计中:

- 静态算法在评估制冷负荷和制冷需求以及准确评估除湿需求方面有明显的局限性。在这种情况下,动态模拟应该通过更准确地估算热时间滞后来提高设计。
- 太阳辐射经常会影响舒适性,比如平季的过热。静态计算不能保证连续的舒适性。
- 静态能源平衡法无法解决节能建筑和建筑构件的湿度控制。对于不同的气候区,从严寒到湿热,需要完全不同的方法来完成合适的外墙设计,具体包括建筑构件内的气密性和防潮层。
- 无法完成带有综合建筑如多功能大楼的区域间相互作用的多区域建模。



Multi-zone model for a passive house

被动房屋的多区域模型

Source / 图片来源: Fraunhofer IBP

动态湿热整体建筑模拟

如前图中所描绘的下半个圈,专业的建筑模拟也应该处理动态行为以及建筑构件和房间的湿度管理。这在室内空气的制冷和除湿比较重要的气候区显得尤为重要。建筑和建筑构件的动态热湿变化影响了能源需求以及舒适度和耐久性。在湿度缓冲中也要考虑到热惯性的影响。常见的静态计算工具,忽略了建筑内部和外墙之间的湿热交换。在动态湿热整体建筑模拟的动态过程中更具体的考量,是为了进一步地减少能源需求,改善室内舒适度的不足(如过冷过热),以及避免可能发生的损害。

effects of humidity. Long-term exposure to high humidity can cause damage in building components, and also significant health problems may result from mold growth on humid surfaces. Furthermore, hygrothermal whole-building simulation allows a detailed depiction of user behavior while common static tools neglect cultural and climatic differences by using average values. Dynamic calculation methods allow designers to compare different building concepts for mitigation of humidity problems already in the planning stage. Moreover it is also important to consider the dynamic assessment of thermal protection for summer conditions. Since simulations are based on user-specified climate and on user-defined ventilation, HVAC and internal loads, the simulations can accurately predict the situation at hand.

PHIUS combines static and dynamic hygrothermal calculation

In March 2015 PHIUS+ 2015 – a climate-specific passive building standard for North America – was developed as the result of a research project conducted by PHIUS and its partners supported by the U.S. Department of Energy's (DOE) Building America grant. The new standard yields ambitious but attainable climate-specific building energy performance targets that substantially cut carbon emissions and energy consumption in buildings that provide superb comfort, indoor air quality, and resilience.

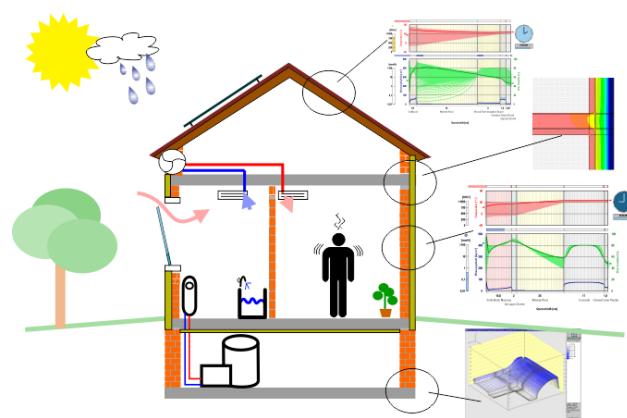
Designing such buildings requires specialized design tools to achieve targeted performance and quality assurance. The tools must enable the designer to meet the energy performance criteria of the envelope and the appropriate mechanical systems and – critically – to guarantee proper moisture control performance of all systems before the detailed construction design phase. The hygrothermal analysis reduces the risk of potentially catastrophic design flaws, thereby reducing the risk of moisture related problems for designers, builders, and building owners.

PHIUS and Fraunhofer IBP jointly developed a software tool which couples the balance-based method currently employed to design passive buildings to hygrothermal whole-building simulation software. Using PHIUS data and expertise, developers at Fraunhofer IBP were able to produce a simulation tool suited to North America's large variety of climate zones. The comprehensive output of simulations enables the planner to determine if the building meets passive house criteria and run further building performance

除了计算建筑和建筑构件的热响应,了解湿度情况和它的影响也是很重要的。长期暴露在高湿度条件下可能导致对建筑材料的损害,潮湿表面的霉菌生长也会导致显著的健康问题。此外,湿热整体建筑模拟允许对用户行为的一个详细描述,而常见的静态工具采用平均值,忽视了文化和气候的差异。动态计算方法使设计者能够比较不同的建筑理念,早在规划阶段缓解湿度问题。此外,考虑夏季条件的热保护的动态评估也是很重要的。由于模拟是基于用户指定的气候和用户定义的通风,暖通空调和内部负荷,因此模拟可以准确地预测手头的情况。

PHIUS结合静态和动态湿热计算

2015年3月,北美被动房屋研究院及其合作伙伴在美国能源部(DOE)的专款支持下,作为一项研究项目的结果开发了PHIUS+ 2015,一项针对北美地区特定气候的被动房屋标准。新的标准产生了有雄心但可实现的特定气候建筑节能目标,大幅削减建筑的碳排放和能源消耗,提供卓越的舒适性,室内空气质量和可恢复性。设计这样的建筑需要专门的设计工具,以实现有针对性的性能和质量保证。这种工具必须使设计者能够达到外墙节能标准以及合适的机械系统,更严格地说,在具体施工设计过程之前保证所有系统适当的湿度控制。湿热分析减少了潜在的严重设计失误的风险,从而对设计者、建筑者和业主来说减少了湿度相关问题风险。



PHIUS+ 2015 yields ambitious but attainable climate-specific building energy performance targets

PHIUS+ 2015产生了有雄心但可实现的特定气候建筑节能目标
Source / 图片来源: Fraunhofer IBP

北美被动房屋研究院和弗劳恩霍夫建筑物理研究所联合开发了一个软件工具,它将目前采用的设计被动式建筑的基于平衡的方法与湿热整体建筑模拟软件结合到了一起。使用北美被动房屋研究院的数据和专业知识,弗劳恩霍夫建筑物理研究所的开发者们就能

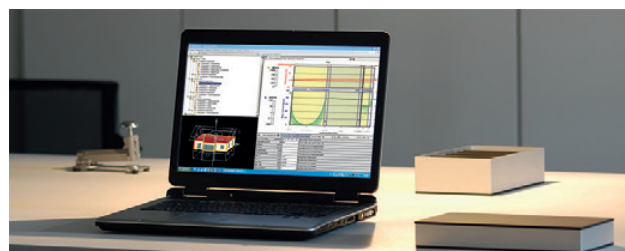
analyses within the same software tool. While the static monthly balance method simplifies the required steps and the time required to design a passive house, it might not be detailed enough to consider the different characteristics of all climate zones and building types. The results from a dynamic simulation are more precise and offer a more realistic depiction of the actual behavior of the building and its interaction with mechanical equipment in terms of comfort and energy efficiency. As the new created software dramatically improves the quality and efficiency of the design process, PHIUS has included in-class session on the software in trainings for Certified Passive House Consultants (CPHCs) since 2013.

The combination of both approaches into one tool has high potential to transform the passive building design process also in China by making very complex processes accessible to more design professionals. Passive buildings as well as other energy efficient buildings are also called Low-load Building which means that they generally have a low cooling demand. At the same time this represents a real challenge in climate regions with warm and humid summer conditions. Since the sensible cooling load is small, standard air-conditioning systems often fail to reduce the latent heat load appropriately. This results in high indoor humidity conditions which pose severe health risks and structural damage. Therefore, international efforts have started to solve this problem by adapting HVAC design based on the analysis of the dynamic hygrothermal behavior of the building envelope and the interactions of the user.

Problems with the latent heat load are one example that may be overlooked by the classic passive house design. However, this is not the only issue facing static design methods that work with monthly averages of the outdoor climate. As soon as the outdoor temperature gets close to the designed indoor temperature or swings around it, the building's thermal storage capacity and to a certain extent also its moisture buffering potential have great influence on comfort and energy demand. This calls for a detailed analysis of the building's performance which escapes static design methods. Therefore a revision of the current passive house design method appears to be important to assure good passive building design in the large variety of Chinese climate zones.

Further information about hygrothermal whole building simulation and climate-specific passive building design is available at our website.

够制作出适合北美各种气候带的模拟工具。模拟的全面输出使规划者能够确定该建筑是否达到被动房屋标准,用同一个软件还能进一步地运行建筑性能分析。尽管静态月平衡法简化了所需步骤和设计被动房屋的所需时间,但它可能不够详细,无法考虑所有气候区和建筑类型的不同特点。动态模拟的结果更加精确,并提供了更现实的对建筑实际表现和它与机械设备在舒适性和节能方面相互作用的描述。因为新开发的软件极大地提高了设计过程的质量和效率,自2013年来,北美被动房屋研究院将软件课堂会话包含在被动房屋注册顾问培训(CPHCs)中。



PHIUS and Fraunhofer IBP jointly developed hygrothermal whole-building simulation software

北美被动房屋研究院和弗劳恩霍夫建筑物理研究所联合开发了湿热整体建筑模拟软件

Source / 图片来源: Fraunhofer IBP

将两种方法结合到一个工具中在中国也有很高的潜力,通过为设计师们将复杂的过程化繁为简,来改变被动式建筑的设计过程。被动式建筑和其他节能建筑也被称为低负荷建筑,这意味着他们通常来说制冷需求较低。同时这在有着温暖潮湿夏季的气候区是一个真正的挑战。由于合理的制冷负荷较小,标准空调系统经常无法适当减少潜在的热负荷。这就导致在室内高湿度条件下会产生严重的健康风险和结构损害。因此国际社会已经开始努力解决这个问题,基于建筑外墙的湿热表现和用户互动的动态分析来调适暖通空调设计。

潜在热负荷问题是在经典被动房屋设计中容易被忽视的一个例子。然而,这并不是使用户外气候月平均值的静态设计方法的唯一问题。室外温度一旦接近设计的室内温度或在它周围波动,建筑的储热能力和某种程度来说也是它的水分缓冲潜力对舒适性和能源需求有很大影响。这就要求对建筑用静态设计法无法测量的性能做出详细分析。因此目前的被动房屋设计方法的修订对于在中国形态各异的气候区保证良好的被动式建筑设计似乎是很重要的。

关于湿热整体建筑模拟和特定气候下的被动式建筑设计的更多信息请参见我们的网站。

Environment



Information Trip to Germany on Sustainable Solid Waste Management

固体废物可持续管理赴德考察团

Within the framework of the market development program of the German Federal Ministry for Economic Affairs and Energy (BMWi), the consultancy enviacon international and German Industry and Commerce Greater China Beijing jointly organized a delegation trip on the topic of sustainable solid waste management to the German cities of Munich and Augsburg. The information trip that was conducted in line with the “German Mittelstand” initiative of the BMWi, took place from May 29 to June 2. During the course of the trip, the participating Chinese decision makers from politics, science and the Chinese waste management industry had the opportunity to visit a series of German reference projects, institutions and companies, as well as the world’s leading trade fair for water, sewage, waste and raw materials management - IFAT 2016.

The multilateral program provided the participants the unique opportunity to gain insights of Germany’s latest market developments and technologies in the fields of waste treatment and disposal. It also focused on the topics of planning and innovative solutions, as well as policies on sustainable solid waste management. Moreover, a roundtable for information exchange, networking opportunities and exclusive visits to waste treatment plants were organized.

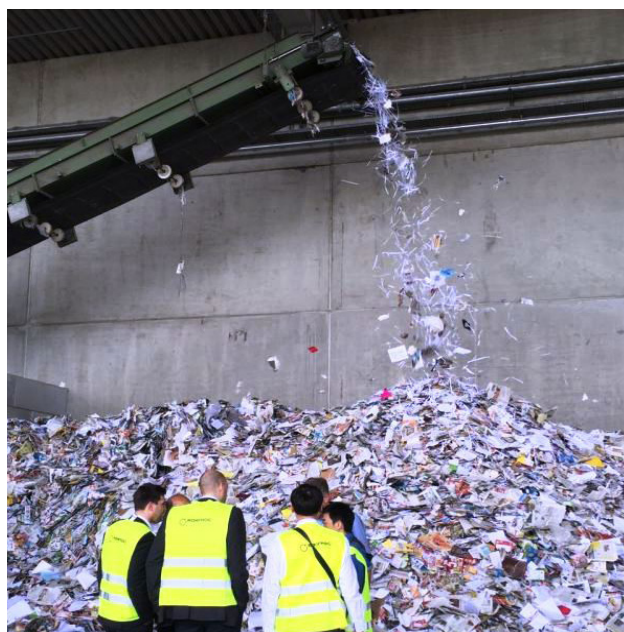
The visit of the company ROHPROG, which offers disposal concepts for the waste cycle, marked the beginning of the official program of the trip and provided the delegation with insights about the waste-paper industry in Germany and respective solutions. Especially the way how waste-paper is being collected and afterwards recycled was presented in detail. In the afternoon, the delegation attended a meeting with the Bavarian State Ministry for the Environment and Consumer Protection and discussed the state of play of the legal framework for environmental protection and issues concerning waste management with leading employees of the ministry. The discussion was followed by a state reception in the evening.

On the following day, the delegation participated in a roundtable meeting and obtained information on several aspects regarding sustainable solid waste man-

在德国联邦经济能源部的市场发展计划框架下,咨询公司 enviacon international和德



国工商大会北京代表处联合组织了固体废物可持续管理考察团,前往德国城市慕尼黑和奥格斯堡。本次考察依据经济能源部的“德国中小企业倡议”进行,从5月29日持续至6月2日。在考察行程中,来自中国政界学界及废弃物管理业界的决策者们有机会访问一系列德国示范项目、机构和公司,以及在慕尼黑举办的世界领先的黑水、污水、废弃物和原料管理展览会IFAT 2016。多边计划为参与者们提供了独一无二的机会,来了解德国在废弃物管理和清理方面最新的技术和市场发展情况。它同时侧重于规划、技术和解决方案,以及废弃物可持续管理方面的创新和政策。此外,还组织了圆桌交流、社交活动和单独访问垃圾处理厂。访问提供废弃物循环处理方案的ROHPROG公司标志着考察活动的正式开始,让代表团了解到德国的废纸工业和相应的解决方案。特别是详细介绍了废纸的收集回收方法。此外,中国参与者们可以通过实地考察体验废纸处理设备,获取一手信息。下午,代表团出席会议,与巴伐利亚州环境和消费者保护部官



Participating Chinese decision makers paid a visit to a waste-paper treatment facility in Germany

参团的中国决策者们考察德国废纸处理设备

agement. At the conference, eight German experts gave presentations on a wide range of topics. Firstly, the delegation from the Middle Kingdom was briefed on the general framework and the technological focus of the German-Chinese economic relationships and cooperation in the waste industry. This introductory session was followed by a presentation on environmental technologies as well as an illustration of the potentials of Germany's sustainable waste industry for the international market. Subsequently, the focus of the roundtable was shifted to the practical tier. Hence, the Chinese representatives were able to gain insights into leading waste management practices, were informed about the dual education system in the fields of waste management, as well as cooperation possibilities, especially regarding waste incineration. In addition, the event offered further opportunities for extended discussions and networking activities.

The afternoon comprised a guided tour at the IFAT trade fair and exhibition as well as a visit to the booth of the Fraunhofer Institute. Besides the presentation and discussions on the utilization of waste for bio-energy as well as optimized waste and wastewater collection at the Fraunhofer booth, the Chinese delegation had the chance to experience German technologies and solutions for instance in the fields of waste-to-energy, air pollution control, recycling and waste sorting systems.

The program's concluding day consisted of two additional company visits. Firstly, the delegation was taken on an exclusive tour through the waste heat and power plant and the organic waste fermentation plant of the company AVA in Augsburg. Secondly, the Chinese representatives visited the Munich branch of the enterprise Special Waste Disposal Bayern. At the disposal operation they were offered the opportunity to gain further knowledge about the past development of the treatment of hazardous waste in Germany as well as its principles and essential technologies.

Overall, the variety of the program, including lectures, discussions and reference visits, allowed the Chinese participants to successfully deepen their knowledge. The information trip thereby contributed to the development and strengthening of relations between the participating representatives from Chinese and German enterprises and institutions. As a result, the trip provides a useful starting point for future cooperation among German and Chinese stakeholders in the fields of sustainable solid waste management and environmental technologies.

员代表讨论环境保护法律框架的当前状况和关于废弃物管理的议题。讨论结束之后代表团受到了州政府的晚宴款待,中国的决策者和德国代表能够进一步交流他们的想法和规划。

第二天,代表团参加了圆桌会议,得到了一些关于固体废弃物可持续管理不同视角的信息。在这次会议上,八位德国专家就广泛的议题发表了演讲。首先,他们向中国代表团介绍了废弃物工业领域的中德经济关系和合作的总体框架和技术焦点。介绍进行完之后,是一个关于环境技术的报告,以及关于德国可持续废弃物处理产业在国际市场上的潜力的报告。宏观的介绍之后,圆桌会议的重点转向实践层面。因此,中国代表能够获得废弃物处理实践的领先见解,同时也了解了废弃物管理领域的双轨教育体制,以及合作的可能性,尤其是在垃圾焚烧和垃圾焚灰用于金属生产方面。此外,这次活动为进一步扩展讨论和社交活动提供了机会。下午由向导带领代表团参观IFAT展会,前往访问了弗劳恩霍夫研究所的展台。在那里讨论和演示的内容除了关于废弃物生物能应用外,还有废物废水优化收集,中国代表团有机会体验德国在废弃物转化为能源、大气排放控制、回收和垃圾分类系统等各方面的技术和解决方案。

考察活动最后一天又参观了两个公司。代表团先是独家参观了位于奥古斯堡的AVA公司的余热发电厂和有机废弃物发酵厂。然后参观了巴伐利亚特殊垃圾处理公司的慕尼黑分部。在处理设备旁他们能够进一步了解德国危险废弃物处理的历史发展、操作原则和必要技术。



Presentation of waste sorting systems at the trade fair IFAT 2016 in Munich
慕尼黑IFAT 2016展会上垃圾分类系统的展示

总体而言,本次考察活动形式多样,包括讲座、研讨和实地考察,使中国的参与者能够成功深化知识,与废弃物处理和环境保护方面的德国专家加强联系。考察团为发展和深化参与双方中德两国企业和机构之间的关系作出了贡献。因此,此行为中德两国在固体废弃物可持续管理和环境技术领域未来的合作打下了很好的基础。

Politics

Mitigating Liability Risks under the Revised Chinese Environmental Protection Law

A contribution by Chao Du and Sebastian Wiendieck, Rödl & Partner

在新修订的《中华人民共和国环境保护法》下减轻责任风险

来自Rödl & Partner的Chao Du和Sebastian Wiendieck的客邀文章

After decades of ruthless exploitation of the Chinese environment, the relatively lax People's Republic of China Environmental Protection Law (EPL) was comprehensively revised in January 2015. The reform brought several changes, significantly strengthening the legal basis for environmental protection. Due to a stricter enforcement and increase of inspection activities by the Chinese authorities, managements of companies, in particular those handling potentially dangerous substances, are well advised to be aware of necessary approvals/licenses, comply with the respective content and implement required internal organization measures – for the benefit of the company but also to minimize the risk of personal liability. This article aims to give a brief overview over the recent legal changes, most essential permits and internal organization requirements.

Recent legal changes and practical enforcement

One of the primary amendments of the revision of the EPL relates to the tightening of sanctions for certain environmental violations. Under the revised EPL, authorities are enabled to impose higher penalties on a recurring daily basis, thereby significantly increasing pressure on non-compliant companies. Moreover, a short-time detention of up to 15 days against responsible management staff was introduced as a new form of sanction. Besides stricter sanctions, the revised law further requires the implementation of certain internal organization requirements.

In addition to the requirement to establish an Environment Responsibility System the law now expressly stipulates the obligation of enterprises to implement Emergency Response Plans as a precaution against environmental accidents. Public participation measures were also strengthened, in particular through the extended applicability of class actions to a wider circle of environmental organizations. Although the number of

经过对中国环境几十年的掠夺式利用，原本相对宽松的《中华人民共和国环境保护法》（“环保法”）在2015年一月全面修订。改革带来了一些变化，显著加强了环境保护的法律依据。

由于中国当局更为严格的执法和检查活动的增加，建议公司的管理层，尤其是那些处理潜在危险物质的公司，了解必要的批准/许可，遵守相关的内容并实施要求的内部组织措施——为公司的利益，也为将个人责任的风险降到最低。本文旨在将近期的法律变化、重要许可和内部组织要求做一个简要概述。

近期的法律变化和实际执行

环保法修订的一个主要修正涉及对某些环境违法行为更严格的制裁。根据修订后的环保法，当局能够重复地按天处以更高的罚款，从而对不符合要求的企业大大施加压力。此外，作为制裁的一种新形式，引入了对负责的管理人员长达15天的拘留。除了更严格的制裁措施，修订后的法律还提出实行一些内部组织要求。



Plant inspections by Chinese authorities sharply increased after the explosion in Tianjin in August 2015

2015年8月天津爆炸案之后，中国政府部门对工厂的检查急剧增加
Source / 图片来源: panthermedia.net / ti_to_tito

class actions until now can be considered rather low, this measure has strong potential to create pressure on polluting enterprises.

Regarding the enforcement of the revised EPL, there has been a noticeable increase compared to the rather lax enforcement of environmental regulations in the past. The enormous explosion at a container storage site in the port of Tianjin in August 2015, which was caused by the improper storage of highly dangerous chemicals and lead to over 170 casualties, further triggered a rapid increase of plant inspections across the country. The investigations carried out in the aftermath of the accident can be seen as a good example on how a company's management might be subject to investigations and held responsible for violations of environmental regulations.

In Tianjin the whole management was taken into custody and subject to investigations few days after the explosion. It turned out that the company severely violated storage regulations, had operated without the required licenses in the past and had no effective emergency response system in place. Although the Tianjin accident is of exceptional scale and the investigation was closely followed by the public, it is normal practice that the management of a company will be the prior subject of investigations in the event that environmental regulations are breached – or in worst cases – accidents incurred.

Licenses and approvals for production companies

Setting up a production site in China requires various registrations and approvals of different authorities. Besides the documents described in the following, further documents might be necessary, depending on the individual business scope.

One of the most relevant approvals, necessary for all construction projects in China, is the approval of the Environmental Impact Assessment (EIA). Construction projects in this regard relate to any erection, modification or renovation of any building. During the EIA the environmental impact of the construction and future operation of the project on the surrounding environment is assessed.

In this regard it is analyzed, whether intended projects comply with applicable environmental laws and emission standards/volumes as well as whether the installation of sufficient precaution measures is intended. The exact scope of the EIA depends on the expected en-

除了要求建立环境责任制,法律现在明确规定企业有义务落实应急预案,作为对环境事故的预防措施。公众参与措施也得到了加强,特别是通过更大范围的环保组织集体诉讼的扩展适用。虽然到目前为止集体诉讼的数量相当低,但这一措施在对污染企业施加压力方面有很大潜力。

关于修订环保法的执行,相比过去环境法规执法不严的情况有明显增强。2015年8月由于高度危险化学品保管不当导致超过170人伤亡的天津港集装箱存储区巨大爆炸事件,进一步引发了全国各地工厂检查的急剧增长。事故发生后进行的调查可以看作是对公司的管理层如何会受到调查并对违反环保法规担责的范例。

在天津爆炸发生数天后整个管理层均被拘留并受到调查。原来该公司严重违反存储规定,过去一直无证经营且没有有效的应急体系。虽然天津事故是例外且公众密切关注该调查,但通常违反环保法规 — 或在最坏的情况下 — 事故发生时公司的管理层将首先成为事件调查的对象。

生产企业的许可和审批

在中国设立生产基地需要不同主管部门的各种登记和审批。除了下面提到的文件,可能还需要其他文件,这取决于各自的经营范围。

对中国所有建设项目必需的最相关的一个审批,是环境影响评价(“环评”)的审批。在这方面的建设项目涉及任何建筑物的任何建造、改造或更新。在环评中会对施工和项目今后的运作对周围环境的影响进行评估。



Prior to starting production in China, various approvals and licenses of different authorities are required

开始在中国进行生产之前,需要取得不同政府机关要求的各类批准和许可

Source / 图片来源: panthermedia.net / scanrail

vironmental impact. Whereas for small scale projects with very low emissions the registration of a mere EIA assessment form is sufficient, large scale projects with high emission output generally require the creation of a comprehensive EIA report by a specially licensed institution.

Concerning the competent authority for submission of the EIA-Forms or Reports, the provincial governments or local Environmental Protection Bureaus are responsible, unless certain investment limits are exceeded which start at USD 50 million. Due to the fact that substantial changes in the manufacturing process might require a new environmental assessment, it should be ensured on a continuous basis that the actual business operations are in line with the activities stated and approved in the EIA.

Oftentimes neglected by the local authorities as well as respective companies is the issuance of a Project Completion Approval. Prior to the start of business operation, the competent Environmental Protection Bureaus shall perform the acceptance of the respective facility by inspecting submitted documentation as well as factual circumstances. The application for "Approval Inspection" shall generally be submitted within three months after trial operations. The scope of the inspection includes the functionality of environmental protection measures and monitoring systems, the successful conduction of the Environmental Impact Assessment, the feasibility of emission volume limits as well as the full remediation of environmental damages incurred during the constructing process. Regarding necessary supporting documents to be submitted for the Approval Inspection, the required scope depends on the scope of the Environmental Impact Assessment. Usually a form or report has to be prepared by a licensed Environmental Monitoring Institution. Due to the fact that the exact requirements and procedures in this regard vary throughout the different provinces, clarification with the competent authorities is strongly advised.

Of particular importance prior to the start of business operation is an inquiry with the local authorities regarding the issuance of a Pollution Discharge Permit. Pollution Discharge Permits stipulate the specific types of pollutants emitted by a respective enterprise as well as the corresponding emission limits. The permits thereby serve as an allocation instrument of the competent authorities for specific pollutants and limit the total emission in certain regions. Generally, the obtainment of such permits is required for all companies that emit pollutants prior to the start of business operation.

在这方面会分析拟建项目是否符合适用的环境法规和排放标准/容量以及是否配备足够的预防措施。环评的具体范围取决于预期的环境影响。而对于非常低排放的小规模项目,仅登记环评评估表就够了,对于高污染物排放的大型项目一般需要由专门的许可机构出具一份全面的环评报告。

关于提交环评表格或报告的主管机关,由省级政府或地方环保局负责,除非超出50万美元起始的投资限额。由于在生产过程中大的变化可能需要一个新的环境评估,应确保实际业务操作在连续的基础上均符合环评中声明并核准的活动。

地方当局及相关公司经常忽视工程竣工验收的签发。在企业正式运营前,主管环保局应通过检查提交的文件以及实际情况,对所属设施进行验收。通常应于试运营后的三个月内,提交“批准检查”的申请。

检查的范围包括环境保护措施和监测系统的功能,环境影响评估的成功实施,排放量的限制以及对建设过程中所产生的环境损害所进行全面整治的可行性。关于须提交审批检查所需的证明文件,其所规定的范围取决于环境影响评估的范围。通常,表格或报告必须由具备许可证的环境监察机构编制。由于不同的省份在这方面的确切要求和程序各不相同,强烈建议与主管部门核实。

特别重要的是,在经营开始前,应向当地有关部门做一个关于排污许可证签发的咨询。排污许可证规定了各企业排放污染物的具体类型以及相应的排放限制。



*Especially in provinces with "chronic" water or air pollution special attention should be applied to a Pollution Discharge Permit
尤其是受到慢性水污染或空气污染的省份, 特别要注意应使用污染排放许可
Source / 图片来源: Dieter Schütz / pixelio.de*

Nevertheless, in practice the content and extent of the licenses varies across the different regions in China. Against this background it is important to inquire with the competent authorities whether such permits are issued and if sufficient emission quota is available for the intended production activities. Especially in provinces with “chronic” water or air pollution, e. g. Beijing and Hebei-Province, special attention should be applied in this regard.

Internal organization requirements

The revised EPL requires companies that discharge pollutants to implement an Environmental Protection Responsibility System. Such companies have to stipulate a responsible person in charge of environmental related issues. Although the law does not contain many details as to the qualifications of the responsible person or specific duties, it is recommended to appoint a person with relevant background for this position that is involved in the continuous supervision of the production activities.

Moreover, such person should ideally be employed on site, so he/she is able to react to any irregularities in the production process and is also available as a point of contact for the authorities if inspections are carried out. The responsibilities of the person in charge should be clearly documented as well as any activities such as

因而该许可证充当了主管部门对具体污染物及在某些地区限制总排放量的分配工具。

通常情况下,所有在经营开始前排放污染物的企业均应获取该项许可证。然而,实践中,在中国的不同地区,许可证的内容和范围也各不相同。在此背景下,询问主管机关是否签发此种许可证,且是否有足够的排放配额可用于预期的生产活动,显得尤为重要。特别在“长期”水或空气污染的省份,如北京市与河北省,应更重视该方面的适用。

内部组织要求

修订后的环保法要求对排放污染物的企业实行环保责任制。这些企业必须设定一位负责环保相关事务的负责人。虽然法律并未详细规定有关负责人的资格或具体职责,但建议任命一位对该职位有相关背景的人,参与生产活动的持续督导。

此外,理论上该人员应在当地被雇用,以便他/她能够对生产过程中的任何违规行为作出反应,且也可以作为当地机关进行检查时的联络人。该负责人的职责及对环保设备的定期评估,对该设备的维修保养等所有活动均应进行明确记载。在任命能胜任该职位的人员及监督该人员上的失误,可能会导致他/她的上司甚至该公司的法定代表人承担个人责任。



Companies using or storing hazardous chemicals should in particular ensure to comply with internal organization requirements

使用危险化学品或者对危险化学品进行仓储的公司尤其应当保证符合公司内部要求

Source / 图片来源: panthermedia.net / Baloncici

regular assessments of the environmental protection equipment, maintenance of such equipment etc. Failures in appointing a capable person or to monitor that person may result in personal liabilities of his/her superiors up to the legal representative of that company.

Additionally, according to the revised EPL and further specified by administrative measures, enterprises that handle or store dangerous chemicals or for any other reason carry the risk of potential environmental accidents, are required to formulate and file Emergency Response Plans with the competent Environmental Protection Bureau. Regarding the content of Emergency Response Plans, the law requires to stipulate immediate counter measures to be taken in the event of an emergency situation. In order to determine which measures are suitable, the individual circumstances of each case need to be closely analyzed.

In this regard aspects such as the used production materials, the internal production layout and the kind of surrounding environment need to be taken into account. In addition to counter measures, the law also requires to stipulate how affected residents and entities in close proximity to the company's premises as well as the relevant authorities shall be informed. Moreover, the internal organization for emergency cases, such as assignment of responsibilities, appointment of contact persons and stipulation of reporting lines have to be codified. To facilitate the cooperation with the authorities in emergency situations, the Emergency response Plan should furthermore be aligned to the respective Emergency Response Plans of the local authorities.

Conclusion

After the revision of the Environmental Protection Law of the People's Republic of China and a noticeable improvement of enforcement activities, companies are strongly advised to comply with relevant regulations. Although the environmental standards applied by many foreign invested enterprises are often above the average standard, it is nevertheless recommended to regularly assess, whether business operations are still in line with the obtained approvals/licenses and if the respective internal organization requirements are met. Both aspects can become particular important in the event of environmental accidents. The more it can be proved in such situations that operations complied with relevant regulations and that coordinated emergency measures were taken to reduce environmental damage, the better the chances to mitigate sanctions.

此外,根据修订后的环保法及行政措施的进一步明确规定,处理或储存危险化学品的,或因任何其他原因存在潜在环境事故风险的企业,应制定应急预案并向主管环境保护局备案。关于应急预案的内容,法律要求规定在紧急情况下立即采取的应对措施。为了确定哪些措施是合适的,需密切分析每个案件的个别情况。



Enterprises that carry the risk of potential environmental accidents are required to formulate and file Emergency Response Plans
存在潜在环境事故风险的企业,应制定应急预案
Source / 图片来源: Hasan Anac / pixelio.de

如在所使用的生产材料,内部生产布局和周围环境的类型方面需要考虑在内。除应对措施外,法律要求明确对该企业住所附近的居民和单位的影响情况,并告知有关部门。

此外,对于紧急情况下的内部组织架构,如职责分配、联系人的任命和报告途径的规定应编纂入册。为了方便与有关部门在紧急情况下的合作,该应急预案应与地方部门的应急预案相一致。

结论

在<<中华人民共和国环境保护法>>的修订及执法活动的明显改善后,强烈建议企业遵守有关规定。虽然许多外商投资企业所适用的环境标准往往高于平均水平,但仍建议对企业经营是否符合已获得的批准/许可,且是否符合相应的内部组织要求进行定期评估。若发生环境事故,这两个方面将变得尤为重要。在这种情况下,越充分证明运营符合相关规定,且已采取协调应急措施以减少环境损害,越有机会减轻制裁。

Fairs & Events 展会与活动

BAU Congress China 2016
Beijing, China · 04.07.2016 - 06.07.2016
中国国际建筑科技大会及展览
北京, 中国·2016年7月4日 – 6日
bauchina.com

2nd China Smarter Cities International Expo 2016
Beijing, China · 29.07.2016 - 31.07.2016
第二届中国智慧城市国际博览会
北京, 中国·2016年7月29日 – 31日
csceexpo.net

AsiaSolar PV Conference & Exhibition
Shanghai, China · 25.08.2016 - 27.08.2016
亚洲太阳能光伏展览会
上海, 中国·2016年8月25日 – 27日
asiasolar.net

7th China International Energy-Saving Emission Reduction
and New Energy Industry Exposition
Shenzhen, China · 31.08.2016 - 02.09.2016
第七届中国(深圳)国际节能减排产业博览会
深圳, 中国·2016年8月31日 – 9月2日
eserexpo.com/en

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

IMPRINT

June 2016 Issue

Publisher:

German Industry & Commerce Greater China | Beijing
100004 Beijing

Editorial Team / Responsible for Content:

Bernhard Felizeter
(Head of Dept. Building, Energy & Environment Beijing / Chief Editor)
Assisted by: Qize Peng, Eike Matthies, Ivonne Shbaita, Carlotta Gmachl
With contributions by: Stefanie von Schaubert, Christoph Mitterer,
Hartwig Künzel, Florian Antretter, Sabine Lamprecht, Chao Du,
Sebastian Wiendieck

Subscription:

The Econet Monitor is published electronically and as hardcopy. Registration for its mailing list is free of charge. We will gladly add you to the list of recipients if you wish to be supplied electronically. A delivery of printed issues is not available. Please consider the respective issues at various trade fairs and events as well as at the offices of German Industry & Commerce Greater China.

Web Page for Subscription and Download:

www.china.ahk.de

The Econet Monitor is published nine times per year in the framework of the Carbon Market Project, implemented by German Industry & Commerce Greater China Beijing on behalf of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety.

All printed information (text, graphics, photos) are protected by intellectual property rights. Duplication, distribution or any other use of the material is only permitted with the express written consent of the publisher. We assume no liability for unrequested sent-in manuscripts. The publisher takes no responsibility for the timeliness, accuracy, completeness or quality of the information provided. Contributions identified by name do not necessarily represent the opinions of the editor or the editorial team and are the responsibility of the respective authors.

The greenhouse gas emissions of this issue of the Econet Monitor Magazine are offset by high-quality Gold Standard Certified Emission Reductions (GS CERs) from the Sichuan Household Biogas Programme of UPM Umwelt-Projekt-Management GmbH.

版本说明

2016年度 - 6月刊

出版商:

德中工商技术咨询服务北京分公司
北京 中国 100004

内容编辑团队:

Bernhard Felizeter (傅利泽) (建筑、能源与环境部总监 / 主编)
参与编辑人员: 彭起泽, 马迪思, 徐伊望, Carlotta Gmachl
客座撰稿: Stefanie von Schaubert, Christoph Mitterer, Hartwig Künzel, Florian Antretter, Sabine Lamprecht, Chao Du, Sebastian Wiendieck

参考信息:

Econet Monitor杂志有电子版和纸质版, 并免费发放。在德国商会办公地点及相关活动和展会上可以获取纸质版, 但不寄送。如果您希望客座撰稿, 或定期获得杂志的电子版, 请按背面联系方式联系我们。

参考网站:

www.china.ahk.de

Econet Monitor杂志是德国商会北京代表处发起的“碳市场项目”的一部分, 全年将发行九期。该项目由德国联邦环境、自然保护、建设和反应堆安全部赞助。

所有付诸印刷的信息(文本、图形、照片)都受到版权保护。任何转载和发布都必须经过出版商书面同意。出版商不对主动提供的手稿承担责任。作者对其署名的稿件承担责任。

本期德国商会德中生态杂志Econet Monitor印刷生成的温室气体排放由UPM环境项目管理有限公司四川户用沼气项目生成的高质量清洁发展机制黄金标准核证减排量(GS CERs)进行抵消。

The content of the Econet Monitor is based on sources including:
Econet Monitor 相关内容参考和引用了下列网站(未列完):

Green Technologies & Energy 绿色科技及能源

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

German Energy Agency 德国能源署
dena.de

German Federal Ministry for Economic Affairs and Energy
(BMWi) 德国联邦经济和能源部
bmwi.de

Energy Efficiency Export Initiative 能效出口倡议
efficiency-from-germany.info

Renewable Energies Export Initiative 出口计划网
export-erneuerbare.de

Europe-China Clean Energy Centre 中欧清洁能源中心
ec2.org.cn/en

RETech 回收技术
retech-germany.net

Renewable Energy World 可再生能源世界研讨会暨博览会
renewableenergyworld.com

Renewables International 国际可再生能源
renewablesinternational.net

Environment 环境

German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
德国联邦环境、自然保护、建设和反应堆安全部
bmub.bund.de

Federal Agency for Nature Conservation 联邦自然保护局
bfn.de

Sustainable China 可持续发展的中国
nachhaltiges-china.de

Federal Environmental Agency 德国联邦环境局
umweltbundesamt.de

The Guardian 卫报
guardian.co.uk/environment

Climate Protection & CDM 气候保护与清洁发展机制

CDM in China 中国清洁发展机制
cdm.ccchina.gov.cn

China Climate Change Info-Net 中国气候变化信息网
en.ccchina.gov.cn

Chinese Renewable Energy Industries Association (CREIA)
中国可再生能源行业协会
creia.net

Climate Focus 气候聚焦
climatefocus.com

Climate Works Foundation 气候工作基金会
climateworks.org

CO2 Trade 二氧化碳交易
co2-handel.de

German Emissions Trading Authority
德国温室气体排放量交易处
dehst.de

United Nations – CDM 联合国-清洁发展机制
cdm.unfccc.int

JIKO BMUB 德国联邦环境部 联合履约处
jiko-bmub.de

KfW Carbon Fund 德国复兴信贷银行碳基金
kfw.de/carbonfund

Studies & Publications 研究报告与出版物

Asian Development Bank 亚洲开发银行
adb.org/publications

Economist Intelligence Unit 经济学人智库
eiu.com

International Energy Agency 国际能源机构
iea.org/publications

World Bank - East Asia & Pacific 世界银行-东亚及太平洋地区
blogs.worldbank.org/eastasiapacific

Economy, Finance & Law 经济、金融与法律

Germany Trade & Invest 德国联邦外贸与投资署
gtai.de

Caijing 财经网
english.caijing.com.cn

Caixin 财新网
English.caixin.com.cn

Eco-Business 生态商务
eco-business.com

Environmental Finance 环境金融
environmental-finance.com

econet china team

德中生态商务平台团队



The German Chamber Network

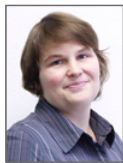
team beijing: / 北京团队 :



Mr. Bernhard Felizeter / 傅利泽 先生
Head of Department / 部门总监
Building, Energy & Environment - econet china
建筑、能源与环境部, 德中生态商务平台
+86-10-6539-6650
felizeter.bernhard@bj.china.ahk.de



Ms. Qize Peng / 彭起泽 女士
Assistant Project Manager / 助理项目经理
Building, Energy & Environment - econet china
建筑、能源与环境部, 德中生态商务平台
+86-10-6539-6651
peng.qize@bj.china.ahk.de



Dr. Ivonne Shbaita / 徐伊望 博士
Consultant / 顾问
Building, Energy & Environment - econet china
建筑、能源与环境部, 德中生态商务平台
+86-10-6539-6652
shbaita.ivonne@bj.china.ahk.de



Mr. Eike Matthies / 马迪思 先生
Trainee / 实习生
Building, Energy & Environment - econet china
建筑、能源与环境部, 德中生态商务平台
+86-10-6539-6652
matthies.eike@bj.china.ahk.de

team shanghai: / 上海团队 :



Ms. Verena Simon / 石瑞娜 女士
Head of Department / 部门总监
Building, Energy & Environment - econet china
建筑、能源与环境部, 德中生态商务平台
+86-21-5081-2266-1698
simon.verena@sh.china.ahk.de



Ms. Xiao Leng / 冷晓 女士
Manager / 经理
Building, Energy & Environment - econet china
建筑、能源与环境部, 德中生态商务平台
+86-21-5081-2266-1817
leng.xiao@sh.china.ahk.de



Ms. Wei Lu / 陆蔚 女士
Strategic Marketing Manager / 战略市场经理
Building, Energy & Environment - econet china
建筑、能源与环境部, 德中生态商务平台
+86-21-5081-2266-1690
lu.wei@sh.china.ahk.de

DEInternational Beijing
German Industry & Commerce Greater China | Beijing
Unit 0830 Landmark Tower II | 8 Dongsanhuan North Road
Chaoyang District | 100004 Beijing | PR China
德国工商总会大中华区 | 北京
中国北京市朝阳区东三环北路 8 号
亮马河大厦 2 座 0830 室
邮编 100004
Tel +86-10-6539-6633
Fax +86-10-6539-6689
E-Mail: info@bj.china.ahk.de
www.china.ahk.de

DEInternational Shanghai
German Industry & Commerce Greater China | Shanghai
25/F China Fortune Tower | 1568 Century Avenue
Shanghai 200122 | PR China
德国工商总会大中华区 | 上海
中国上海浦东世纪大道 1568 号
中建大厦 25 楼
邮编 200122
Tel +86-21-6875-8536
Fax +86-21-6875-8573
E-Mail: info@sh.china.ahk.de
www.china.ahk.de