



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



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## Green Markets & Climate Challenge

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建筑节能项目展示 — 华北地区德国建筑节能解决方案

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## In Focus

### China's Perennial Air Pollution Problem – Light at the End of the Tunnel? 中国常年污染问题 — 隧道尽头的光明？

Representing a major environmental challenge that has led to increasing economic and social costs, China has promised to take decisive action on the pressing issue of air pollution. Ongoing efforts had produced notable results before air quality took a turn for the worse throughout late November and early December, with fine particle matter (PM) 2.5 levels having reached as high as 1,400 and 900 in the cities of Shenyang and Beijing, respectively, far exceeding the recommended safety level of the World Health Organization (WHO) of 25 micrograms per cubic meter. Guarding against rising pollution levels, on 7 December, Beijing's municipal government issued its first-ever red alert since the inception of the four-colored air pollution alert system in October 2013. This means that outdoor construction sites, schools and kindergartens will be shut down, car usage will be notably limited and factories will be instructed to slow down or stop production altogether. A second red alert was issued between 19 and 22 December.

#### Causes for Increased Air Pollution Levels

But what has led to this recent “airpocalypse” in North China, especially around Beijing and surroundings? Besides fumes from industrial production and dust from construction sites, emissions from the ever-increasing volume of traffic cause the air quality to deteriorate.

Furthermore, the concentrated burning of coal during winter is a major cause for a worsening air quality. In North China, 40 percent of energy consumed in urban buildings comes from coal-fired central heating. Between 2005 and 2012 alone, average annual heat consumption in Chinese households increased by 50 percent. This makes coal-fired central heating a key contributor to an increase in air pollution levels in the region. Another reason for the recent spike in PM2.5 levels is the weather. Humidity levels and air circulation patterns play an essential role in increasing or decreasing smog over urban areas. This is especially true for Beijing, with large mountain ranges to the North and West and many industrial areas to the East and South. Relatively high humidity in usually dry November and

空气污染作为主要环境挑战的代表，已经导致了经济和社会成本不断提升，对此中国已承诺将采取果断行动解决这一紧迫问题。而在现有努力产生明显效果之前，空气质量在11月底到12月初期间急剧恶化，沈阳和北京两地PM2.5指数分别高达1400和900，远远超过国际卫生组织建议的安全值25微克/立方米。12月7日，北京首次启动自2013年10月推出空气污染四色预警的重污染红色预警，以应对不断加重的雾霾天气。这意味着户外建筑工地会停工，学校和幼儿园会停课，汽车的使用会得到明显限制以及工厂会按指示减少或停止生产。12月19日至22日启动了第二次红色预警。

#### 导致空气污染不断加剧的原因

究竟是什么导致了中国北方地区，尤其是北京及周边地区的“空气末日”？除了工业生产废气和建筑工地粉尘，日益增大的交通流量导致了空气质量的下降。



*Thick layers of smog blanketing China's capital Beijing in early December*  
12月初浓雾笼罩下的中国首都北京

Source / 图片来源: zmescience.com

此外，冬季燃煤集中供暖是导致空气质量不断恶化的一个重要原因。在中国北部，城市建筑物40%的消费消耗来自于燃煤集中供暖。仅在2005到2012年间，中国家庭年平均消耗的热量增加了50%。这使得燃煤集中供暖成为该地区空气污染的主要因素。还有一个推动近期PM2.5值暴涨的原因是天气。湿度水平和空气循环模式在决定城市上空烟雾的增加和减少方面起到至关重要的作用。这一点对北京尤其适用，因为

December combined with absent North-West winds have trapped the polluted air over vast areas of North China and the capital Beijing in particular. Besides instituting counter-measures, such as closing down polluting factories or construction sites, only stronger winds or rainfall can effectively lift the cover of smog over the region. The rapid increase of air pollution in late November and early December was therefore a combination of weather and man-made factors.

### China's "War on Pollution"

In early 2014, Chinese Premier Li Keqiang declared a "War on Pollution". Almost one year earlier, China instituted the Action Plan on Air Pollution Control and Prevention (2013-2017), which provides a total of 261 billion EUR for investments into industrial and mobile source pollution control and improving the energy structure. The Action Plan represents China's toughest plan to combat air pollution so far and features ambitious targets. The whole Beijing-Tianjin-Hebei region for example needs to achieve a 25 percent reduction in PM2.5 from 2012 levels by 2017, which would result in 60 micrograms of PM2.5 per cubic meter in 2017 down from 89 micrograms in the year 2012.

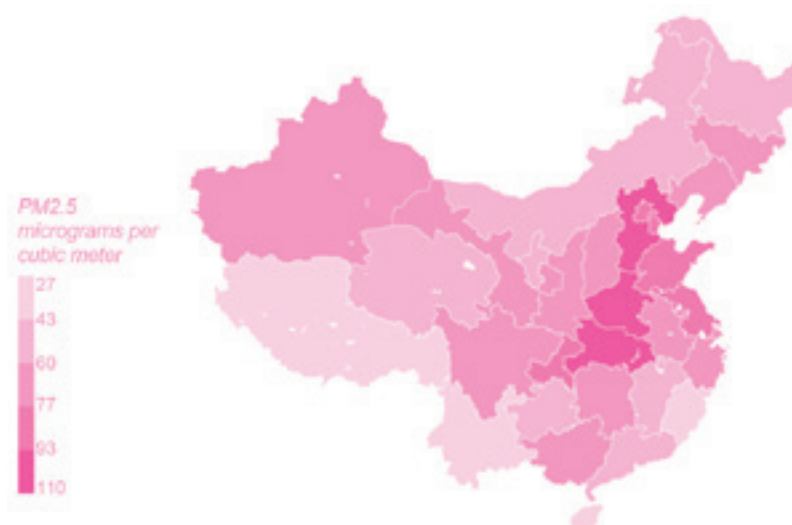
Coal is one of China's key targets in the war against pollution, as the fossil fuel accounts for two thirds of the country's primary energy consumption, more than one third higher than the world average. Actively targeting coal as a major source of pollution, the action plan calls for a negative coal consumption trend and bans the construction of new coal-fired power plants in the Beijing-Tianjin-Hebei, Yangtze and Pearl River Delta regions along the eastern and southern coast of the country. Additionally, China aims to achieve a reduction of the proportion of coal in the energy consumption mix to 65 percent by 2017. Going one step further, in early December 2015, the central government also announced that it will upgrade coal-fired power plants to reduce discharged emissions by 60 percent before 2020, effectively saving around 100 million tons of coal and 180 million tons of carbon dioxide annually. China's measures to curb coal consumption, in connection with the country's economic adjustment, have already produced notable results. Overall consumption of coal fell by 4.7 percent year-on-year between January and October to 3.23 billion tons.

北京西北部群山环绕,东南部为工业地区。与往年同期干燥的气候相比,11和12月份湿度相对较高,加上西北风的欠缺困住了中国北部尤其是首都北京大部分区域的污染物。除了采取应对措施,例如关闭制造污染的工厂和工程,只有强风或强降雨才能有效地驱逐这一地区的雾霾。因此,11月底和12月初重度污染的环境可以说是天气和人为因素共同导致的。

### 中国打响应对大气污染战役

在2014年年初,中国总理李克强宣布,打好治理大气污染攻坚战。差不多一年前,中国制定了《大气污染防治行动计划(2013—2017年)》,提供2610亿欧元用于投资控制产业和移动源污染以及改善能源结构。该行动计划代表了中国迄今为止最艰难的空气污染治理战役以及雄心勃勃的目标。例如,整个京津冀地区,2017年PM2.5与2012年相比下降25%,这将导致PM2.5从每立方米2012年的89微克下降至2017年60微克。

煤炭是中国在打赢污染攻坚战的关键目标之一,因为化石燃料占中国一次能源消费量的三分之二,比世界平均水平高三分之一。该行动计划积极瞄准煤炭污染作为主要来源,呼吁煤炭消费趋势负增长,并禁止在京津冀以及东南沿海的长三角和珠三角地区新建燃煤电厂。此外,中国的目标是到2017年煤炭在能源消费结构中的占比降低到65%。进一步讲,在2015年12月初,中央政府还宣布要升级燃煤电厂,到2020年之前减少60%的排放量,每年有效地减少约1亿吨煤和1.8亿吨二氧化碳。中国抑制煤炭消费的举措,加上中国经济结构调整,已经产生了显著的成效。1月至10月煤炭总消费量下降至32.3亿吨,同比下降4.7%。



Air pollution levels in Chinese provinces in the first quarter of 2015

2015年第一季度中国各省污染级别

Source / 图片来源: qz.com



Coal is also on the Beijing municipal government's radar. The capital, known for its bad air, plans to subsidize residents of its rural districts with 53 million EUR to replace over 1.8 million tons of low-quality with high-quality coal. This is insofar relevant as more than 22 percent of coal samples from Beijing, 26 percent from Tianjin and more than every third sample from the province Hebei, which encloses Beijing on all sides, failed to meet national standards for coal quality, making the use of low-quality coal another important source of air pollution in the region. Further targeting the CO<sub>2</sub>-laden fossil fuel, the municipal government has ordered the closure of all major coal-fired power stations by the end of next year. Beijing's policy makers have also identified the rapidly rising traffic volume as a key source of pollution. Planning to adopt the world's strictest emissions standards for vehicles beginning in late 2017, standard light vehicles must cut their emission output by 40 percent while heavy motor vehicles, such as buses, need to reduce their emissions by half.

### Improvements in Air Quality

Since its announcement in 2014, China's war on pollution has produced visible results. Data from Greenpeace East Asia shows that pollution levels in China on average decreased by 16 percent year-on-year in the first half of 2015. The average concentration of PM2.5 in 74 major Chinese cities went from 72 micrograms in 2013 to 54 micrograms per cubic meter in the first ten months of 2015. The capital Beijing in particular was able to reduce air pollution in a major way, as average PM2.5 concentration fell by over 20 percent compared to 2014 levels. However, Beijing's average PM2.5 concentration of 78 micrograms is still more than double the government target of 35 micrograms and three times the WHO standard. Furthermore, over 80 percent of Chinese cities still fail to meet national air quality standards. Nevertheless, China's year-on-year improvements have shown that despite the recent "airpocalypse" that veiled Beijing and the surrounding areas in a thick layer of smog, the decrease of average PM2.5 levels – partly due to favorable weather conditions – is definitely an important step in the right direction.



*Coal-fired power plants are a major source for air pollution in China*

燃煤电厂是中国空气污染的主要来源

Source / 图片来源: asiatown.net

煤炭也是北京市政府的雷达。首都空气不好众所周知，因此北京计划补助农村地区居民5300万欧元用高质量煤替换180万吨低质量煤。这一计划是很相关的，因为北京逾22%的煤样，天津26%以及河北省逾三分之一的煤样没有达到国家质量标准，这些低质量的煤炭成为了该地区另一重要的污染来源。另外针对负载二氧化碳的矿物燃料，市政府下令到明年年底关闭所有主要燃煤电厂。北京决策者还确定了迅速上升的交通量作为关键污染源，并计划于2017年年底开始实施史上最严格的机动车排放标准。标准轻型机动车排放量降低40%，而重型机动车，比如公交车排放量需要减半。

### 空气质量好转

自2014年开始，中国治理大气污染战争产生了明显的效果。绿色和平东亚分部的数据显示，2015年上半年平均污染水平与去年同期相比下降了16%。中国74个主要城市PM2.5平均浓度从2013年的72微克/立方米下降到2015年前十个月的54微克/立方米。尤其是首都北京治理效果明显，PM2.5平均浓度与2014年相比下降20%。然而，北京市PM2.5平均浓度78微克/立方米依旧高于政府目标35微克/立方米的两倍还多，是世界卫生组织的三倍。

此外，中国超过80%的城市依旧没有达到国家空气质量标准。尽管如此，中国与去年同期水平相比的进步体现了尽管北京和周边地区近些年来笼罩在末日般的浓雾之中，PM2.5平均浓度的下降，部分源于有利的气候条件，一定是今后正确方向的重要一步。

# Building

## “Showcase” – German Energy Efficiency Solutions in Buildings in North China 建筑节能项目展示 — 华北地区德国建筑节能解决方案



To celebrate innovative German energy efficient technologies and services, German Industry & Commerce Greater China Beijing on 30 October 2015, with the support of the German Ministry for Economic Affairs and Energy (BMWi), held a presentation of five selected building projects in Beijing. More than 100 participants from German and Chinese ministries, enterprises and organizations of the building sector in China as well as media representatives attended the one-day event series, comprising of a factory visit, expert symposium and official award ceremony.

The Showcase was organized within the framework of the Energy Efficiency Export Initiative of the BMWi, which has supported, already since 2007, especially German small and medium enterprises (SMEs) in establishing and expanding their business relations in China and other countries.

During the morning session, participants were invited to join an excursion to Boysen Exhaust Systems' newly-constructed factory and administration building in Langfang in North China's Hebei province – representing one of the five selected projects of the Showcase. Michael May, General Manager of Boysen Exhaust Systems in Shenyang as well as Dipl.-Ing. Gary Su and Jochen Geschke of the cooperation partner Shanghai CND Construction Consulting took the guests on an exclusive tour, in order to illustrate the applied energy-saving solutions of the industrial plant. The overall complex consists of a production and logistics area as well as a three-storey office building. During the visit, participants had the chance to experience the production facilities and German building technologies first-hand. The different systems installed in the building, such as the lighting or cooling systems, centrally converge and are monitored and regulated by a customized building automation system, guaranteeing optimal energy usage and production operations.

为表彰德国创新节能技术和服 务，德国工商大会在德国经济能源部的支持下于2015年10月30日在北京举办了五个获选项目的展示会。100多位来自中德政府机构、企业和组织的建筑界专业人士以及媒体记者参加了为期一天的活动。除了工厂参观外，活动还包括专家研讨会和颁奖典礼。

本次建筑节能项目展示活动是在德国能效出口倡议框架下举行的。自2007年起，该项目致力于支持德国中小企业在中国和其他国家建立和拓展业务。

在上午的参观活动中，与会者受邀参观位于河北省廊坊市波森尾气系统有限公司的新建工厂以及办公大楼。该项目是五个获选建筑之一。沈阳波森尾气系统有限公司总经理Michael May先生以及该公司合作伙伴上海东坡工程咨询有限公司的苏世焜先生和Jochen Geschke先生陪同参观，并讲解工厂所使用的节能技术。整个工业园区包括生产和物流车间，还有一座三层的办公大楼。在参观过程中，与会者有机会亲身体验生产设备和德国建筑技术。建筑内安装的不同系统，例如照明和制冷系统，均由中央自动控制系统集中调控和管理，保证生产经营过程中能源的最佳利用。



*Exclusive visit of the factory and administration building of Boysen Exhaust Systems in Langfang, Hebei province*

参观位于河北省廊坊市波森尾气系统有限公司工厂和办公大楼



In the afternoon, an expert symposium in Beijing, as the second part of the Showcase, was opened and hosted by Mike Hofmann, General Manager of German Industry & Commerce Greater China Beijing. In a subsequent welcoming speech, Gunnar Will from the BMWi provided an overview of the Energy Efficiency Export Initiative and highlighted the importance of efficient energy-saving technologies and products for China. As a substantial percentage of total emissions in China stems from the building sector, in particular from heating and cooling, energy efficiency and innovative building technologies are central elements for reducing energy costs and curbing the overall output of carbon emissions.

Subsequently, Dr. Stefanie Schmitt from Germany Trade and Invest (GTAI) informed the participants about green building in China from a German perspective. Despite the many energy saving initiatives launched in the Chinese building sector during the past years, there still remain a number of challenges when it comes to implementing solutions, offering market opportunities for German green building technologies and know-how, especially in the areas of energy efficient elements, vocational training as well as passive house materials. As green building also needs to be economically viable, further opportunities arise in the context of raising China's green building standards.

Following the keynote speeches, representatives of the five selected buildings – exemplifying a broad spectrum of innovative German energy efficiency technologies – held presentations that offered unique insights into each of the projects.

当天下午,专家研讨会作为项目展示的第二部分在北京开幕。德国工商大会北京代表处总经理Mike Hofmann先生主持开幕式。在随后的欢迎词中,德国经济能源部能效出口倡议项目副主任Gunnar Will先生简述了该倡议的概况,并强调了高效节能技术和产品对于中国的重要性。中国温室气体排放量有相当一部分比例来自建筑行业,特别是在供暖和制冷方面。节能和创新的建筑技术是降低能源成本和遏制碳排放的核心要素。



Mike Hofmann, General Manager of German Industry & Commerce Greater China Beijing, opened and hosted the expert symposium in Beijing  
德国工商大会北京代表处总经理Mike Hofmann先生主持专家研讨会开幕式

随后,来自德国联邦外贸与投资署的Stefanie Schmitt女士介绍了德国角度下的中国绿色建筑。尽管在过去几年中在中国建筑领域开展了一系列节能倡议,但在众多领域仍有不少挑战:比如实施解决方案,为德国绿色建筑技术和专门知识提供市场机会,特别是能效领域、职业培训以及被动式房屋材料。绿色建筑也需要在经济上可行,因此在提高中国绿色建筑标准的大环境下将会出现更多的机会。



The Showcase highlighted German solutions for enhancing building energy efficiency and informed about related market opportunities in China  
项目展现了德国在节能建筑的解决方案并介绍了中国相关市场的机会

Stefan Schirmer and Yang Zhang from the German Energy Agency (dena) informed the participants about the “German-Chinese Efficiency House” in the North Chinese city of Harbin. The residential building excels for example in the area of heat recovery technology, achieving a 75 percent recovery rate. The application of energy efficient windows and doors in North China’s cold climate was therefore paramount. Additionally, intensive training on construction sites proved to be essential, in order to transfer the necessary know-how to the on-site construction workers.

Introducing the “Xingfubao Certified Passive House Project” in Urumqi in West China, Bernd Franke from ifeu – Institute for Energy and Environmental Research Heidelberg and Bo Xiong of Dacheng Industrial highlighted the integrated concept of the mixed-usage building. Housing residential as well as office and business units, the building represents the first in China’s cold climate zone to be certified by the German Passive House Institute (PHI), achieving a more than 80 percent energy savings rate for heating, compared to new buildings in Urumqi. After a coffee break, which participants used for further discussion and networking activities, Dr. Dirk A. Schwede from energydesign Shanghai provided insights into the “German Enterprise Centre” located in the German-Chinese Ecopark in Qingdao. The project, with a 45 percent energy savings rate compared to Chinese reference buildings, combines sustainable, green technologies with German architecture, achieving a windows coverage rate of up to 40 percent.

Prof. Dr.-Ing. Mike De Saldanha and students from the Darmstadt University of Applied Sciences focused in their presentation on the cooperation aspect of the “Sino-German Energy Conservation Demonstration Center” in Shenyang. German and Chinese students together designed the architectural concept of the demonstration building that incorporates both, regional Chinese building materials and German green building know-how and products to make for a connecting atmosphere.

In a concluding presentation, Dipl.-Ing. Gary Su, on behalf of Boysen Exhaust Systems, shared further insights into the factory and administration building in Langfang. Making industrial production more sustainable, the building achieves a 50 percent energy savings rate. Intelligent systems, for instance for heat recovery from industrial fumes and exhaust air or the innovative sunlight management and lighting systems that dynamically adapt to changing daylight conditions,

主题演讲过后,五个获选建筑的代表为听众介绍了每个项目的独到之处。这五座建筑展现了德国建筑节能技术的广泛应用。

来自德国能源署的Stefan Schirmer先生和张杨先生介绍了哈尔滨市的“溪树庭院”住宅建筑项目。该建筑的杰出之处在于其先进的热回收技术 – 该建筑的热回收率高达75%。节能门窗在中国北方寒冷气候中的应用至关重要。此外,施工现场的集中培训也是必要的,以便把必要的知识传授给现场的施工工人。

在介绍乌鲁木齐“幸福堡”被动式建筑时,来自海德堡能源和环境研究所的Bernd Franke先生以及乌鲁木齐高新技术开发区大成实业有限责任公司的熊波女士突出介绍了建筑的综合性用途。该建筑集住宅、办公和商业用途为一体,是中国寒冷气候区第一座得到德国被动式房屋协会 (PHI) 认证的被动式建筑。与乌鲁木齐新建建筑相比,“幸福堡”实现了取暖超过80%的节能率。



*Participants during subsequent discussions and networking*  
会议结束后与会者交流讨论

与会者在茶歇中进行了热烈的讨论和交流后,来自设能建筑咨询有限公司的Dirk A. Schwede博士为大家展示了位于青岛生态园的德企中心。该建筑与中国其他建筑相比实现了45%的节能率。并且它使用了德国建筑中可持续与绿色的技术,实现了高达40%的窗墙比。

来自达姆施塔特应用技术大学的Mike De Saldanha教授和学生们的在他们的演讲中突出了沈阳中德节能示范中心项目的中德合作。德国和中国学生一起设计了示范项目的建筑理念,该理念结合了中国区域建材以及德国绿色建筑的技术和产品,两者有机地融合于一体。





*All five selected buildings were officially awarded and presented to participating decision makers and stakeholders of the Chinese building sector  
中国建筑界参会的决策者见证了五个获选建筑的颁奖典礼*

guarantee the sustainability of achieved energy efficiency savings. Describing the five pioneering building projects and involved German enterprises and institutions in detail, German Industry & Commerce Greater China Beijing published a bilingual German-Chinese brochure in connection to the symposium.

During the event's concluding session, an award ceremony marked the highlight of the Showcase. For the successful application of innovative energy efficiency solutions "Made in Germany" in North Chinese buildings, all five selected projects were officially awarded by Gunnar Will of the BMWi, Georg Leube from the German Embassy in Beijing and Mike Hofmann from German Industry & Commerce Greater China Beijing. In connection to the celebratory session, a dinner together with the participating stakeholders of the Chinese building sector offered additional opportunities for extended discussions and networking activities.

The Showcase successfully presented the achievements of the five pioneering building projects and further strengthened the awareness level of German products and solutions for building energy efficiency. Moreover, it provided a useful platform for future co-operation among German and Chinese stakeholders in the field of green building in China.

在最后的演讲中, 苏世焜先生作为波森尾气系统公司的代表, 进一步分享了工厂和办公楼的情况。该建筑达到了50%的节能率, 实现了工业生产的可持续化发展。从排放的尾气和焊接气体里回收热量、创新的阳光和照明系统的管理使得热回收可以适应不断变化的日光条件。这些智能系统保证了能源效率节约的可持续性。

德国工商大会还出版了双语手册作为此次研讨会的延伸, 该手册详细介绍了这五个领先建筑项目, 以及所包含的德国企业和机构。

最后的颁奖仪式把整个展示项目活动推向了高潮。为表彰“德国制造”创新节能技术在中国北方地区的成功使用, 德国经济能源部的Gunnar Will先生, 德国驻华使馆的Georg Leube先生以及德国工商大会北京代表处总经理Mike Hofmann先生为所有五个项目颁发证书和奖牌。颁奖仪式结束后, 中国建筑界与会的决策者共进晚宴, 进一步增进交流和讨论。

此次节能项目展示展现了五个开拓性建筑项目的成果, 进一步加强德国的产品和建筑节能解决方案的认知程度。此外, 它为德国和中国的决策者在中国绿色建筑领域未来的合作提供了一个有用的平台。

## The Passive House for an Energy-Optimized Production Site in North China

A contribution by Ludwig Rongen, RoA Rongen Architects

### 华北被动房屋造就能源优化生产场所

来自隆恩建筑事务所的路德维希-隆恩教授的客邀文章

From 30 November to 12 December 2015, representatives from 196 countries were deliberating on the topic of climate protection during this year's United Nations Climate Change Conference in Paris. Their aim was to find sustainable solutions on how to reduce CO<sub>2</sub> emissions in the long term and mitigate the risks and effects of environmental disasters caused by a changing climate. In the run-up to Paris, at the end of June 2015, China submitted its Intended Nationally Determined Contribution (INDC). In it, China has promised to peak emissions by 2030, lower emissions per unit of GDP by 60 percent to 65 percent from the 2005 level, increase the share on non-fossil fuels in primary energy consumption to around 20 percent and raise the forest stock volume by around 4.5 billion cubic meters compared to the 2005 level.

Although China has been at the forefront of promoting sustainable development in recent years, dangerously high air pollution levels throughout late November and early December caused Beijing's municipal government on 7 December to issue its first-ever red alert, strongly recommending citizens not to leave their apartments or at least to wear a protective mask when going outside. As over one third of energy consumed in urban buildings in China comes from coal-fired heating, finding solutions to minimize building energy demand becomes essential. In terms of green building solutions, the passive house standard is the globally-acknowledged, highest standard in energy saving building construction. Incorporating locally produced building components into the construction process is key in establishing an ambitious while at the same time affordable passive house standard for buildings in China.

#### "Green Manufacturing" in Northeast China's Heilongjiang Province

Sayyas Windows Co., Ltd. in Harbin, the capital of Northeast China's Heilongjiang province, is China's biggest timber window manufacturer and produces passive house windows certified by the German Passive House Institute. So far, the company has manufactured passive house windows covering more than 50,000 square meters for energy efficient buildings in

2015年11月30日至12月12日,来自196个国家的代表在今天的联合国巴黎气候变化大会上共同商议气候保护议题。他们的目标是找出能够长期减少碳排放以及减缓气候变化带来环境灾害的风险和影响的可持续方案。在巴黎大会的筹备阶段,2015年6月底,中国递交了国家自主贡献(INDC)。在这份文件中,中国承诺二氧化碳排放在2030年达到峰值,单位国内生产总值二氧化碳排放比2005年水平降低60%到65%,非化石能源占一次能源消费比重达到20%左右,森林蓄积量比2005年增加45亿立方米。

虽然中国近年来一直走在促进可持续发展的前沿,但危险的空气高度污染从十一月底持续到十二月初,使得北京市政府在12月7日首次发布了红色警报,强烈建议市民不要离开室内,或至少出门时戴口罩。在中国的城市建筑中超过三分之一的能源消耗来自于燃煤取暖,因此找出使建筑能源需求最小化的方案就变得至关重要。在绿色建筑解决方案方面,被动房标准是全球公认的节能建筑施工的最高标准。在中国建立一个有雄心的、同时也负担得起的被动房屋标准,关键是将当地生产的建筑零件纳入到施工过程中。

#### 中国东北黑龙江省的“绿色生产”

位于中国东北黑龙江省省会哈尔滨的森鹰窗业有限公司是中国最大的木窗制造商,它生产的被动窗获得了德国被动房研究所的认证。迄今为止,该公司生产的被动窗覆盖了国内超过5万平方米的节能建筑。森鹰在哈尔滨的新制窗工厂自2014年9月开建至今,它就是按照被动房标准设计的,这证明节能建筑产品的



Aerial perspective of the overall project

总体工程空间透视图,黑龙江哈尔滨

Source / 图片来源: RoA Rongen Architekten 隆恩建筑事务所



China. To prove that the manufacturing of energy saving building products can also be accomplished in a low-carbon environment, the new window manufactory of Sayyas in Harbin – under construction since September 2014 – was itself designed according to the passive house standard. Upon completion, the project will be the first passive house manufactory in China and the largest one worldwide.

The challenge of creating this highly energy efficient window manufactory in line with the passive house standard was brought to Prof. Dipl.-Ing. Ludwig Rongen and RoA Rongen Architects in 2012, a company with many years of expertise in the field of passive house construction in China. The size of the ambitious passive house project is around 70.000 square meters, including a passive house office building with around 5.000 square meters. After completion of the building phase, the overall production site will consist of approximately 200.000 square meters in total. During the early stages of the building process, RoA Rongen Architects selected a curtain wall instead of a composite thermal insulation system for the office building and production hall, even though a composite thermal insulation system would have been able to easier manage thermal bridges. In the case of the curtain wall, the architects needed to handle thermal bridging due to the necessary connections between it and the bearing construction. Nevertheless, a curtain wall made from metal combined with mineral wool for thermal insulation presents a solid and recyclable solution, taking into account the building's lifecycle.

Besides its minimized energy consumption, the new production site will feature a variety of sustainable low-carbon solutions:

- All applied materials are recyclable
- Photovoltaic panels will supply the production site with green electric power
- Only environmentally friendly timber windows are used
- A heat recovery system uses waste heat to warm up the buildings during winter

Overall, the new manufactory is an innovative, forward-looking example of how to realize a sustainable certified passive house production site while positively contributing towards a greener environment.

制造也能在低碳环境中完成。建成后,该项目将会成为中国首个及世界最大的被动房工厂。

路德维希-隆恩教授和隆恩建筑事务所2012年接受了这项挑战,按照被动房标准建造这座高能效制窗工厂,该事务所在中国已有多年建造被动房方面的经验技术。这一被动房的宏大项目占地7万平方米,其中包括5000平方米被动式办公楼。施工阶段完成后,整体生产场所将包括大约20万平方米的面积。在建设过程的早期阶段,隆恩建筑事务所为办公楼和厂房选取了幕墙代替复合保温系统,尽管复合保温系统会更容易管理热桥。在使用幕墙的情况下,建筑师需要处理连接幕墙和支承结构之间不可避免的热桥。不过考虑到建筑的生命周期,由金属结合矿物棉制成的保温隔热幕墙是一个固体可回收解决方案。



*Thermal insulation of the production hall*

建造过程中的制窗厂房保温隔热层

Source / 图片来源: RoA Rongen Architekten 隆恩建筑事务所

除了能源消耗最小化以外,新的生产场所还会采用各种可持续低碳解决方案:

- 所有使用的材料都是可回收的
- 光伏板给生产场所提供绿色电力
- 使用的木窗必须环境友好
- 热回收系统使用余热进行冬季供暖

总体而言,新的工厂是一个很好的例子,它在如何实现获认证的可持续被动房生产场所以及为绿色环保做出积极贡献方面具有创新性和前瞻性。



# Energy

## „The New Normal“ – New Perspectives for China’s Environmental and Energy Policy?

A contribution by Cora Jungbluth, Bertelsmann Stiftung

### “新常态”——中国环境能源政策的新视角？

来自贝塔斯曼基金会的Cora Jungbluth的客邀文章

China’s development model has been characterized by the primacy of quantity for three decades. Putting it sharply, the Chinese recipe for development was to increase economic growth, no matter the price. From the 1990s onwards, the country achieved high, partially two-digit growth rates. In 2009, China replaced Germany as the “export world champion” and in 2010 it displaced Japan from place two of the largest economies in the world. According to the World Bank, about 400 million Chinese have been lifted out of absolute poverty since the end of the 1980s. This rapid economic development, however, has also led to a continually increasing demand in energy and resources, with devastating consequences for the environment and the people. At slightly above 28 percent, China had the highest share in the global CO<sub>2</sub> emissions in absolute figures in 2013 and about a third of the water reserves are considered highly polluted. In addition, more than one third of the soil is affected by erosion and desertification and some Chinese cities can even be classified as uninhabitable due to the intense air pollution.

The country will be fighting the consequences of its unsustainable development for more than the foreseeable future in its economic and social development. This will also have a considerable effect on the global economy due to the sheer dimensions of the problem. China’s energy mix is one of the main causes of these environmental problems. While renewable energies and hydropower – in spite of rapid increases in recent years – account for barely ten percent of the primary energy consumption, coal is still the main energy source with a share of about two thirds. Many Chinese households also use it as fuel. This drives up China’s CO<sub>2</sub> emissions and fuels the omnipresent air pollution. The global problem of climate change is therefore closely linked to China’s energy policy, and especially the question of how China wants to reduce its dependency on coal and thus its emissions.

中国的发展模式三十年来以数量优先为特征。不客气地说，中国的发展方案是不计成本地加强经济增长。从1990年起中国达到了很高的增长率，部分高达两位数。2009年中国超过德国成为了“世界出口冠军”，2010年中国取代日本成为世界第二大经济体。根据世界银行的数据，八十年代末以来约有4亿中国人脱离了绝对贫困。

然而这种高速经济发展也导致了能源和资源需求的持续增加，给环境和人类造成了破坏性后果。2013年中国二氧化碳排放量绝对数字占全球比例最高，略高于28%，约三分之一的水储量被认为是高度污染的。此外，超过三分之一的土壤受到侵蚀和沙漠化的影响，一些中国城市因为受到强烈的空气污染，甚至可以划分为不适宜人类居住。

中国将在经济和社会发展方面未来长期与其不可持续的发展造成的后果作斗争。这也将对全球经济产生显著影响，因为问题规模庞大。

中国的能源结构是环境问题的主要原因之一。尽管这些年经济高速增长，可再生能源和水电只占一次能源消费的百分之十左右，煤炭仍然是最主要的能源，约占三分之二。很多中国家庭使用煤炭作为燃料。这推动了中国的二氧化碳排放和无处不在的空气污染。

因此全球气候变化问题也和中国的能源政策有紧密联系，特别是关于中国打算如何减轻对煤炭的依赖性和随之而来的排放问题。

因此中国在今年11月30日至12月12日在巴黎举办的第二十一届联合国气候变化大会（COP-21）上备受关注。在国家自主贡献文件（INDC）中，中国计划到2030年碳排放强度比2005年水平降低60%-65%。

直到最近中国主要认为工业化国家应该为气候变化负责。虽然国家主席习近平在巴黎大会的开幕讲话上

China therefore was in the spotlight during this year's climate conference (COP-21), held from 30 November to 12 December 2015 in Paris. In its Intended National Determined Contribution (INDC), the country intends to reduce its CO<sub>2</sub> emissions by 60-65 per cent by 2030, as compared to 2005. Until recently, China mainly saw the industrialized countries as being responsible for climate change. Although Chinese President Xi Jinping in his opening speech in Paris declared that climate change could only be fought through international cooperation, he also emphasized the continued need to consider different national circumstances when reducing emissions. However, since China is now also massively suffering from the consequences of environmental degradation and climate change, there is a good chance that the government will actually put its INDC into practice.

Formally and on paper, the connection between the environmental and economic development has played a role in China for quite some time: In 1972, the country participated in the UN Conference on the Human Environment (UNCHE) in Stockholm. It passed its first environmental law as early as in 1979. In the two following decades, however, economic growth moved to the forefront. Only the 9th Five-Year Plan (1996-2000) mentioned the subject "Protection of the Environment" again briefly. Since the 10th Five-Year Plan (2001-2005), it has been given an entire chapter, reflecting its increasing political importance and rising awareness on the highest decision-making level. The implementation in practice, however, has been lagging behind official declarations, since development of the economy was not to be impaired. In many places, problems have grown worse instead of becoming better in the last years, leading to increasing local environmental protests in the population, for example from the urban middle class, increasingly putting pressure on political decision-makers.



*Coal briquettes commonly used for heating and cooking in China's capital Beijing*

在北京煤球通常用来取暖做饭

Source / 图片来源: Cora Jungbluth

宣布气候变化只能通过国际合作进行斗争,但同时他也强调减少排放仍需考虑不同的国情。无论如何,因为中国现在也深受环境恶化和气候变化之苦,政府还是有很大可能将自主贡献目标付诸实际行动。

书面形式上来说,中国的环境和经济发展之间的关系在相当长的时间内扮演了重要角色:1972年中国参加了斯德哥尔摩联合国人类环境会议。早在1979年中国通过了第一部环境法。然而在接下来的二十年里,经济增长成为了首要任务。只有在九五规划(1996-2000)中再次提到了“环境保护”这一主题。十五规划(2001-2005)以来,有一整章环保相关的内容,这反映了它日益增长的政治重要性和最高领导层这方面的意识日渐加强。

然而在实际执行层面,情况落后于官方声明,因为经济发展没有受到损害。在许多地方,环境问题在过去几年间变本加厉,导致当地群众如城市中产阶级对此发声抗议,这也对政府施加了越来越多压力。

2012年以来中国经济增长率萎缩,反映了中国近期发展很可能为可持续地处理环境和资源问题打开了一个新的视角,因为它直接导致能源和资源消耗下降。同时中国正处在全面改革进程之中,要重新平衡它的发展模式,从单纯的基于数量转向“新常态”,即注重质量的增长模式。

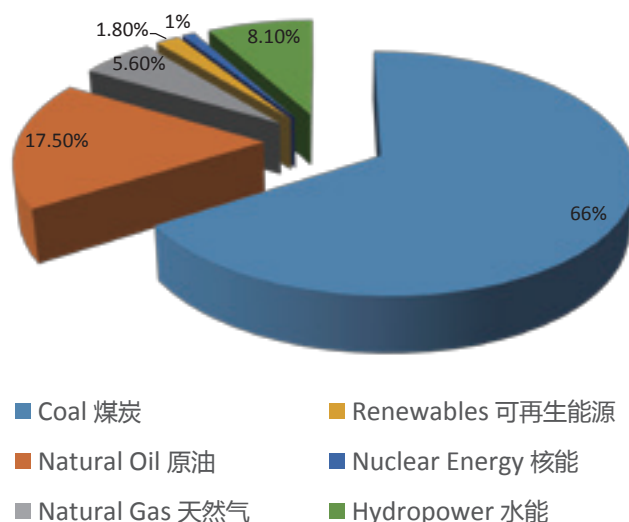
The shrinking of China's economic growth rates since 2012 reflects a more recent development that might open up new perspectives for China in sustainably tackling its environmental and resource problems, as it directly leads to dropping energy and resource consumption. At the same time, the country is in the midst of a wide-ranging reform process, rebalancing its development model and moving away from a purely quantity-based towards a "New Normal", quality-centered growth model. According to calculations from Bertelsmann Stiftung and Prognos AG, the Chinese economy on average will grow by only 5.4 percent annually until 2035. The government may use this situation to propel the project of a "green low-carbon economy", announced in the 12th Five-Year Plan (2011-2015), substantially forward. The reform program, passed in November 2013, already considers the changed framework of China's economic development and suggests possible focus areas for China's future environmental and energy policy: The "polluter-pays-principle" is to be applied more strongly, the environmental administration is to be made more independent and – particularly relevant in light of more transparency and independence in administration – government officials are to be held responsible life-long for environmental damage.

Apart from this, energy consumption is to be made more efficient and emissions of environmental hazardous substances by companies and households are to be reduced. The industry-political strategy "Made in China 2025" announced in 2015 provides measures for the development of a "highly efficient, clean, low-carbon, recycling-based green production system" by 2025. One key factor for this will be the sustainable adjustment of China's energy mix. The draft of the 13th Five-Year Plan (2016-2020), to be passed in the spring of 2016, even speaks of an "energy revolution" in this context. Development of renewable energies is to be accelerated and clean use of fossil fuels, such as the intensified use of clean coal and the safe use of nuclear power, are to be promoted. In the transport sector, development of public transport and rail-bound traffic as well as the use of bicycles – once the preferred means of transport in Chinese cities – are declared goals. Additionally, the Chinese government continues to further promote electric mobility and new energy vehicles (NEVs).

Most of these measures, however, are not new but based on pre-existing plans and projects. According to the Mid- and Long-Term Plan for the Development of Renewable Energy (MLPDRE), passed as early as

根据贝塔斯曼基金会和Prognos公司的预测，到2035年中国经济的平均年增长率仅为5.4%。十二五规划(2011-2015)宣布，政府可能借此情形来大力向前推进“绿色低碳经济”项目。

2013年11月通过的改革方案已经考虑到了中国经济发展的变化框架，并提出中国未来环境能源政策可能的重点领域：要加强执行“污染者付费原则”，环境治理将更加独立自主，尤其是在管理更加透明和独立方面，以及政府官员将为环境危害终身负责。



Composition of China's primary energy consumption in 2014  
2014年中国一次能源消费构成

Source / 图片来源: Author according to BP Statistical Review of World Energy 2015

作者根据英国石油公司世界能源统计回顾2015整理

除此之外，还要提高能源效率，以及在企业生产和家庭生活中降低有害物质的排放。2015年宣布的产业政治战略“中国制造2025”提供了到2025年建设“高效、清洁、低碳、循环利用的绿色生产体系”的发展措施。中国能源结构的可持续调整将会是一个关键因素。

将在2016年春季通过的十三五规划草案甚至在内容中提到了“能源革命”。要加快发展可再生能源，促进使用清洁化石燃料，如加强使用清洁煤和安全使用核电。在交通运输部门，目标是要发展公共交通和轨道交通，以及促进自行车的使用。此外，中国政府将继续推行电动汽车和新能源汽车。

然而，这些措施大多并不新鲜，而是基于已存在的计划和项目。根据早在2007年通过的可再生能源中长期发展规划(MLPDRE)，到2010年可再生能源(包括水电)在一次能源消费中的份额应达到10%。实际



2007, the share of renewable energies (including hydropower) was to reach 10 percent of the primary energy consumption by 2010. With approximately 8.2 percent, the target was not reached, since development and use of renewable energies turned out to be more difficult (e.g. infeed and transport) than expected. The Chinese government nevertheless appears to stick with its 15 percent renewable energy target for 2020. Another plan intended to close small coal mines with a mining volume below 90.000 tons per annum between 2005 and 2008, to remove outdated production capacities and to reduce overall coal usage. At the end of the period, 1.057 mines had been closed, only amounting to 7.5 percent of all coal mines scheduled to be closed.

The environmental and energy policy situation in China shows that the Chinese central government is willing to implement painful measures to further environmental protection and adjust the country's energy mix. However, apart from technical problems, effective implementation is still difficult to achieve: At dropping economic growth rates, a growing economy still remains the top priority; resulting in the fact that clean, efficient and economically viable energy consumption may remain "nice-to-haves".

The same is true for China's contribution in fighting global climate change. The country – not being alone in this assessment – will continue to show increasing international commitment as long as this does not lead to any major national disadvantages. Due to the urgency of problems and disasters related to climate change occurring in China and all over the world, a sustainable redesign of China's environmental and energy policy should be a key priority for the country's top decision-makers.

*The views set out in this article are those of the author and do not reflect the official opinion of the Bertelsmann Stiftung.*



*Air pollution in China's largest city Shanghai, in the eastern Yangtze River Delta*  
中国最大城市上海的空气污染

Source / 图片来源: Cora Jungbluth

结果是8.2%，没有达到目标，因为发展和使用可再生能源比想象中更为困难（如进料和运输）。

然而，中国政府仍坚持2020年可再生能源的目标为15%。另一计划是在2005到2008年之间关闭采矿量在9万吨以下的小煤矿，以清除过时产能，以及降低整体用煤量。到期时共关闭了1057座煤矿，只有全部煤矿的7.5%计划要被关闭。

中国的环境和能源政策表明，中国的中央政府愿意实施艰苦卓绝的举措，来进一步保护环境，调整国家的能源结构。

然而除了技术上的问题，有效实施仍有许多困难：经济增长率下降时期，经济增长仍然是重中之重；也因此导致了清洁、高效、经济的能源消耗仍是可望不可及。中国在应对全球气候变化方面的贡献也是如此。

中国不是唯一一个面临这种挑战的国家，只要不会导致严重的国内损失，中国会持续加强国际承诺。由于中国和世界各地出现的的气候变化导致的问题和灾害的紧迫性，可持续地重新设计中国环境能源政策对于最高决策层来说应是重中之重。

本文仅代表作者观点，并不反映贝塔斯曼基金会的官方意见。

# Environment

## Phasing Out Nitrous Oxide Emissions in Nitric Acid Production – International Action Group Initiated by Germany

*A contribution by Silke Karcher, German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety*

### 逐步淘汰硝酸生产过程中的一氧化二氮排放 — 德国发起的国际行动小组倡议

来自德国联邦环境、自然保护、建设和核安全部的Silke Karcher博士的客邀文章

On the sidelines of the COP21 Climate Conference in Paris, Germany has launched a new initiative: The Nitric Acid Climate Action Group. The vision is to phase out of nitrous oxide ( $N_2O$ ) emissions from nitric acid production by 2020. This article provides an outline of the initiative.

#### Why targeting $N_2O$ from nitric acid production?

Nitric acid is used mostly as a raw product for nitrogen fertilizer production. Manufacturing will therefore continue as it is needed for food production. However, a by-product of nitric acid production is nitrous oxide ( $N_2O$ ).  $N_2O$  has a GHG-effect 264 times higher than  $CO_2$ . The bad news: In many cases the  $N_2O$  is just vented into the atmosphere. The good news: It can be abated easily and at a low cost. However, a significant part of nitric acid-producing installations worldwide are not abating, especially in developing countries and economies in transition. In nitric acid production around 8.85 kg of  $N_2O$  are created unintentionally for every ton of nitric acid produced. This corresponds to around 2.3 tons of  $CO_2$  equivalents for each ton of nitric acid. Abatement is achieved mainly through  $N_2O$ -destroying catalysts in the production process or in the tail gas treatment. Abatement efficiency reaches up to 97 percent, depending on the technology used. Current average abatement rates are often somewhat lower than that, with abatement costs estimated at about 1 to 3 EUR per ton of  $CO_2$  equivalent.

#### From carbon market projects to sector transformation

Over the last decade, the international carbon market had incentivized abatement in many installations via clean development mechanisms (CDM) and joint implementation (JI) projects. About half of the nitric acid production facilities in developing countries were covered by CDM projects. Installing abatement

在巴黎第二十一届联合国气候变化大会期间,德国发起了一项新的倡议:硝酸气候行动组。愿景是到2020年逐步淘汰硝酸生产过程中的一氧化二氮( $N_2O$ )排放。本文给出了关于这项倡议的一个概述。

#### 为什么把一氧化二氮作为从硝酸生产中淘汰的目标?

硝酸通常用作生产氮肥的原材料,因此作为食物生产不可或缺的一部分,硝酸的生产将会持续进行。它同时会产生一种副产品一氧化二氮( $N_2O$ )。一氧化二氮造成的温室气体效应比二氧化碳高264倍。坏消息是:很多情况下,一氧化二氮就直接排放到大气中去了。好消息是:一氧化二氮减排成本低廉,方便易行。然而,全球范围内大部分硝酸生产装置并没有做减排处理,特别是在发展中国家和转型经济体。



$N_2O$  has a GHG-effect 264 times higher than  $CO_2$ .  
一氧化二氮造成的温室气体效应比二氧化碳高264倍。  
Source / 图片来源: pixelio.de / Sigrid Harig

在硝酸生产过程中,每生产一吨硝酸会产生大约8.85千克一氧化二氮。这相当于约每吨硝酸产生了2.3吨二氧化碳当量。人们主要通过生产过程或尾气处理中

technology is therefore easily achieved, provided the necessary will is there. In total, about 100 CDM projects were registered in the nitric acid production sector. In China alone, 44 CDM projects were registered, followed by eight in India, five in South Africa and four in Brazil. However, with the carbon market currently not offering profitable prices, even installations that once mitigated  $N_2O$  are now stopping to do so. Usually, the crucial decision is whether to invest in replacing a used-up catalyst or not. Also, for lack of incentive, almost no new abatement projects are getting started.

The cumulated mitigation potential until 2020 is estimated at well above 200 million tons of carbon dioxide equivalents ( $CO_2e$ ). That corresponds to more than eight times the annual emissions of the Netherlands. This potential can be addressed nationally by emission standards, by including the installations in a national Emission Trading Scheme (ETS) directly or as an offset, or via other economic incentives. In the European Union  $N_2O$  from nitric acid production is included in emissions trading. Before, it was regulated via emission standards. Since 1990 overall emissions were reduced by around 95% in Europe. China is currently addressing a similar problem through economic incentives: the destruction of HFC-23, fluoroform, an unwanted by-product of producing HFC-22. According to China's INDC, the country will "achieve effective control of emissions of HFC-23 by 2020." Initially, HFC-23 abatement had also been incentivized by the CDM. The strategic idea of the Nitric Acid Climate Action Group is to build on the mitigation the carbon market had induced in the sector and combine supporting and incentivizing pre-2020 mitigation efforts with the transformative intent to achieve self-regulation by implementing countries as early as possible. To this end, the group is offering consultation and, where deemed necessary, also help in financing abatement until 2020. By 2020, strategies for sustainable abatement can be developed and post-2020, these potentials are expected to be part of the core of each country's own contribution.



*Nitric acid's main industrial use is for the production of nitrogen fertilizers*

硝酸的主要工业用途是生产氮肥

Source / 图片来源: Amazone GmbH & Co. KG / Wikimedia

的一氧化二氮破坏催化剂达到减少一氧化二氮的目的。根据所使用的技术,可以达到97%的减排率。现在的平均减排率通常比这要低,估测减排成本在每吨二氧化碳当量1到3欧元。

### 从碳市场项目到行业转型

在过去的十年中,国际碳市场通过清洁发展机制(CDM)和联合履行机制(JI)在很多设备中加强了减排。清洁发展机制项目覆盖了发展中国家大约一半的硝酸生产设备。

如果人们有了必要的认识,安装减排技术就很容易实现。在硝酸生产行业共注册了大约100个清洁发展机制项目。光在中国就注册了44个清洁发展机制项目,其次是印度有8个,南非有5个,巴西有4个。然而,随着碳市场难以提供有利价格,现在人们也停止安装减少一氧化二氮排放的设备。通常情况下,关键决定在于是否投资更换用完的催化剂。由于缺少激励,几乎没有新的减排项目启动。

到2020年的累计减排潜力预测超过2亿吨二氧化碳当量( $CO_2e$ ),相当于荷兰的年排放量八倍以上。这种潜力可以通过排放标准在全国范围内解决,通过包括全国碳排放权交易系统(ETS)的直接作用或作为补偿,或通过其他经济激励。在欧盟,硝酸生产过程中的一氧化二氮已纳入排放交易系统。之前通过实行排放标准来管理。1990年以来,欧洲已减少了共约95%的排放量。



Project Type 项目类型	Discontinued before end of crediting period 信用期中中断	Termination of mitigation activity before, upon or shortly after end of crediting period 信用期前，进行中或结束后随即终止 减排行动	Aim for renewed crediting period 计划信用期结束后 继续	Continue outside of CDM 清洁发展机制 外继续
Biomass energy 生物能	26%	53%	32%	45%
CMM 煤矿瓦斯	22%	22%	11%	67%
EE households 能效家庭	38%	55%	38%	14%
EE industry 能效行业	28%	28%	39%	39%
EE own generation 能效提高项目	12%	12%	16%	78%
Fossil fuel switch 化石燃料开关	9%	9%	47%	82%
Hydro 水电	19%	21%	32%	51%
Landfill gas 垃圾填埋气	31%	50%	28%	37%
Methane avoidance 避免甲烷排放	23%	51%	26%	45%
N <sub>2</sub> O 一氧化二氮	63%	81%	14%	10%
Solar 太阳能	12%	22%	37%	57%
Wind 风能	7%	7%	46%	55%

*Nitric acid identified as the project type most vulnerable of stopping GHG abatement*

硝酸被认定为温室气体减排最易被中断的项目类型

Source / 图片来源: NCI / Ecofys

### How does the Acid Climate Action Group address the issue?

The Nitric Acid Climate Action Group offers information on global, regional and national abatement potentials, available technology and estimated costs as well as successful political instruments to ensure abatement. The group provides financial support for the development and implementation of abatement strategies and helps with financial analysis, including due diligence support. The idea is to work together with governments who are willing to commit to introduce or maintain lasting N<sub>2</sub>O abatement in the nitric acid producing sector. Those countries are invited to join the group. The German Ministry for the Environment offers to enter into dialogue with any country as well as business organizations and companies considering making this commitment. Generally the group initiated by Germany is offering consultation on technical and regulatory issues concerning N<sub>2</sub>O abatement in nitric acid production. Where deemed necessary grants for financing country specific expertise are possible.

中国正在通过经济手段处理类似的问题：减少HFC23的排放，它也叫三氟甲烷，是生产HFC22的有害副产品。按照中国国家自主贡献文件，中国计划“在2020年达到对HFC23排放的有效控制”。HFC23的减排最初也是通过清洁发展机制的激励来实现的。

硝酸气候行动组的战略思想是建立在碳市场在这一领域已促进的减排基础上，结合对2020年之前努力减排的支持和鼓励，加上实施减排国家尽早实现自我调节的变革的意图。为此，行动组提供咨询服务，并且在认为有必要时，帮助到2020年的减排融资。到2020年应发展出可持续减排战略，2020年之后这些减排潜力应该是每个国家自主贡献的核心部分。

### 硝酸气候行动组怎样解决这个问题？

硝酸气候行动组提供关于以下问题的信息：全球、地区和国家减排潜力，可行的技术和预测成本以及保证减排的有效政策工具。行动组为减排战略的发展和实行提供资金支持和财务分析帮助，包括尽职调查支持。

Depending on specific circumstances, such as for example the economic strength of an interested partner, the action group can offer help in financing abatement for an intermediate period. Prerequisite for any financing of abatement is the commitment to ensure lasting abatement.

Financing of abatement will be result-based, meaning that payments are disbursed ex-post upon successful monitoring and third-party verification of the abatement. Buying CERs generated by the abatement is generally seen to be the most straightforward way in achieving this goal. Since methodologies are available and registration of projects can be quick this applies not only to existing CDM projects but also to installations which are only starting abatement.

### Who can participate?

All countries and institutions who want to support the aim of the Action Group are invited to sign the declaration “Transforming a sector – N<sub>2</sub>O abatement in nitric acid production”, available on the group’s website. Countries willing to contribute financially or to introduce and maintain N<sub>2</sub>O abatement are invited to join the group.

Currently the German Ministry for the Environment is in conversation with potential participants. This includes several countries considering joining as donors, several countries considering joining as implementing countries as well as several companies interested in supporting the initiative. The group explicitly invites countries already addressing the issue through national strategy, or intending to do so, to join.

### The full potential

If N<sub>2</sub>O from nitric acid production can be phased out by 2020 that could lower the mitigation gap (i.e. the amount of GHG emitted too much for staying on a 2° compatible pathway) by 70-80 million tons of CO<sub>2</sub> equivalents, or the current total emissions of Portugal.

The total potential 2016-2020 is 300-400 million tons of CO<sub>2</sub> equivalents, the potential to be realized as part of each countries climate strategy from 2021-2030 amounts to 600-800 million tons. The initiative has set out to help making sure that as much as possible of these GHG emissions will not occur.

Further information is available at [www.nitricacidaction.org](http://www.nitricacidaction.org)

他们想要和愿意致力于在硝酸生产领域引进或保持一氧化二氮减排方案的政府合作。行动组邀请这样的国家加入。德国联邦环境部向任何考虑作出减排承诺的国家、商业组织和公司开放加入对话的机会。一般来说德国发起的这项倡议会在关于硝酸生产中的一氧化二氮减排问题上提供技术方面和管理方面的咨询服务。如认为有必要也可能根据国家情况提供专业资助。

根据具体的情况,例如有兴趣的合作伙伴的经济实力,行动组可以为提供中长期资金支持。任何减排融资的先决条件是承诺保证持续减排。

减排融资将以结果为基础,意味着在通过对减排成功监控和第三方核实之后才能支出款项。购买减排生成的核证减排量通常被认为是实现这一目标的最直接的途径。由于方法可行且项目注册快捷,这不仅适用于已有的清洁发展机制项目,同时也适用于刚开始减排的装置。

### 谁可以参加?

所有想要支持行动组目标的国家机构和机构都被邀请签署一项声明“行业转型——减少在硝酸生产过程中一氧化二氮的排放”,这项声明可以在行动组的官网上找到。愿意进行资助或引进和保持一氧化二氮减排的国家被邀请参加这个组。

现在德国环境部与可能的参与者进行交流。这包括一些考虑作为赞助者加入的国家,一些考虑作为实施者加入的国家,以及一些对支持该倡议感兴趣的公司。行动组明确邀请已经通过国家战略解决该问题或有意向这么做的国家加入。

### 全部潜力

如果到2020年一氧化二氮可以从硝酸生产中淘汰,那会降低7千万到8千万吨二氧化碳当量的减排缺口(即温室气体的排放量太大,超过了能够保持2°的兼容路径),这相当于现在葡萄牙的全部排放量。

2016年到2020年的全部潜力是3到4亿吨二氧化碳当量,作为各个国家2021年到2030年气候战略的一部分,待实现的潜力有6亿到8亿吨。

这项倡议已经开始帮助确保尽可能不会出现这些温室气体排放。

更多信息请参见[www.nitricacidaction.org](http://www.nitricacidaction.org)

# Politics

## Paris COP21 – A Historical Step against Global Warming

*A contribution by Thomas Forth, German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety*

### 第21届联合国气候变化大会 — 对抗全球变暖的历史性步伐

来自德国联邦环境、自然保护、建设和核安全部的Thomas Forth的客邀文章

“The Paris Agreement is a victory for people, for the common good, and for multilateralism. It is a health insurance policy for the planet. It is the most significant action in years to upload our Charter mandate to save succeeding generations.” UN Secretary General Ban Ki-moon and others spoke on the Paris Agreement with numerous superlatives. German Chancellor Angela Merkel called it just the historical turning point in fighting global warming. The reason why international climate negotiation reaches such a positive outcome is two-fold. At the one hand, one could feel a prevailing mood of parties to take this step now, however nearly until the end the afterwards achieved consensus was challenged. At the other hand, the brilliant French diplomacy managed to involve all parties in an active and productive role, even if they have brought forward positions far outside the mainstream thinking.

195 nations agreed to the Paris Agreement. At the end, it was a victory for multilateralism and much more than expected in recent months. Indeed, the new climate agreement overcomes the limitations of the Kyoto Protocol and provides a framework for the upcoming decades. Especially the bifurcated limits of the Kyoto Protocol that divided the world into two camps – developed and developing countries

“《巴黎协定》是人民的胜利，对共同利益，对多边主义的胜利。这是一个对地球的健康保障政策。这是多年来造福我们子孙后代最重要的更新宪章行动。”联合国秘书长潘基文和其它最高领导人提及《巴黎协定》时说道。德国总理默克尔将其称之为对抗全球变暖的历史转折点。国际气候谈判达到这样一个积极结果有双重的原因。一方面人们可以感到一种现在要采取行动的普遍情绪，尽管最后达成的共识曾遭受挑战。另一方面英明的法国主办方设法使各方进入积极且有建设性的角色中，即使他们提出的立场已远超出主流思想。

195个国家签署了《巴黎协定》。最后这是一个多边主义的胜利，人们得到的远比近几个月来期待的要多。事实上，新的气候协议克服了《京都议定书》的局限性，并为未来几十年提供了框架。特别是解决了

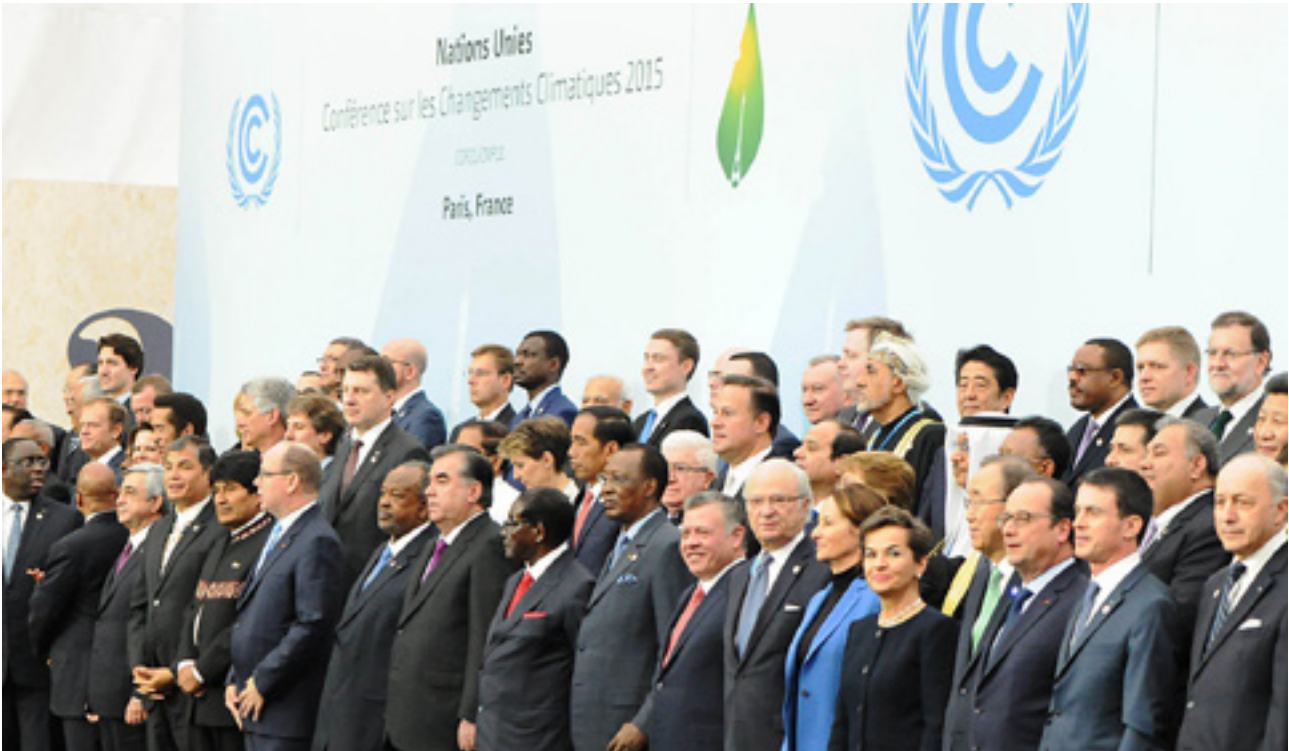


*The Paris Agreement represents a historical step against global warming*

《巴黎协定》是对抗全球变暖的历史性步伐

Source / 图片来源: un.org / Mark Garten





Leaders and representatives from 195 countries debated and agreed on a binding agreement in Paris

参与讨论和签署《巴黎协定》的195国领导人和代表

Source / 图片来源: UNFCCC 联合国气候变化框架公约

– have been resolved. On the basis of the Paris Agreement, all parties contribute to fight global warming. Nevertheless, the real differentiation between parties is well reflected in the light of national circumstances.

### Important Orientation given with the Preamble

The preamble lays the fundament for the agreement and serves as a valuable source of orientation for future climate action, which we should keep in mind while undertaking concrete activities. Clear progress has been achieved regarding the global objective to reach an emission pathway consistent with keeping the increase in the global average temperature to well below 2 °C above preindustrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above preindustrial levels.

Furthermore, climate change is acknowledged consistently as a common concern for all of humankind. That means that parties – when taking action to address climate change – should respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity. This enumeration lists the key interests and potential

《京都议定书》一分为二的局限性,即把世界分成发达国家和发展中国家两个阵营。各方面都在《巴黎协定》的基础上为对抗全球变暖做出贡献。然而他们之间的真正区别体现在他们的国情中。

### 前言的重要导向作用

前言为协定定下了基础,同时它是未来气候行动指导的有价值的来源,我们应该在执行具体行动时时刻牢记。在达成全球目标方面已取得明确进展,目标是排放路径保持全球平均温度比工业化前水平升高在2度以内,并努力将其限制在1.5度以内。

此外气候变化被公认为是全人类共同关注的问题。这意味着当采取行动应对气候变化时,应当尊重、促进和考虑到各个群体如原住民、当地社区、移民、儿童、老弱病残等的人权、健康权、发展权,还应该考虑到性别平权和代际平权。前言列举了必须反映在气候行动中的主要利益和潜在顾虑。否则将无法实现可持续发展和符合《巴黎协定》的合作机制。因此前言包括了长期视角和国际合作的健全架构。

### 国家自主贡献作出更有雄心的承诺

现有的188份国家自主贡献文件几乎涵盖了全世界所有的排放量,人们激烈讨论他们的雄心壮志。国家

concerns which have to be reflected in climate action. Otherwise, sustainable development and conformity with cooperative mechanisms of the Paris Agreement will not be obtained. The preamble thus contains a long-term perspective and sound architecture for international cooperation.

### INDC promises higher Ambition

With now 188 INDC – covering almost the world's total emission output – the question of ambition has been discussed intensely. Analyses of the INDC have shown that although the direction is right, the level of emission reductions is still significantly lower than needed. The temperature increase is more likely to reach 3 °C than 2 °C or 1.5 °C. To put it bluntly, the gap to step on the required pathway has to be reduced as soon as political consensus can be attained. The momentum from Paris may further the progression in national contributions over time. The Paris Agreement underlines with serious concern the urgent need to address the significant gap between the aggregate effects of parties' mitigation pledges in terms of global annual emissions of greenhouse gases (GHG) by 2020.

### Act Pre-2020

The agreement also stresses the urgency of accelerating the implementation of the convention and the Kyoto Protocol in order to enhance pre-2020 ambition. Pivotal progress in decisions for the second commitment period has been achieved at the Paris Conference, too. The expectation on enhanced pre-2020 ambition stems from the fact that there is a chance to lay a solid foundation for enhanced post-2020 ambition. This means that climate mitigation should focus on effective long-term and transformative mitigation. Having said this, it must be stressed that not harvesting low-hanging fruit is a pre-condition to mobilize resources for more cost-effective and strategic measures. If there is a common understanding the agreement speaks about, climate change mitigation action may be managed on a basis of economic rationality, allowing for "long-term effectiveness, meaning emphasizing the enduring benefits of ambitious and early action, including major reductions in the cost of future mitigation and adaptation efforts."

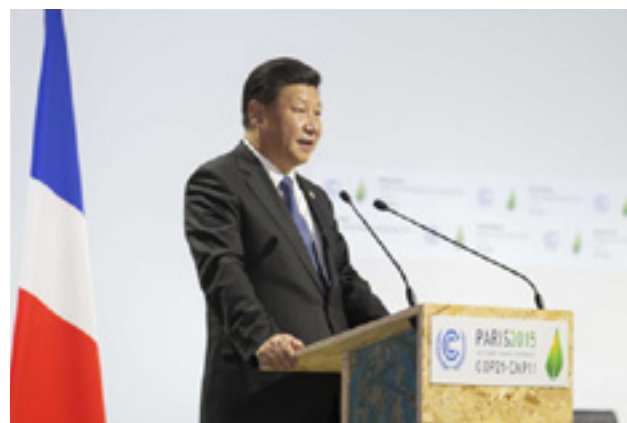
Pre-2020 ambition also means to see the world as it is. There are still a large number of countries – not only the least developed countries (LDCs) – where the basic needs of the population cannot be entirely met. One of the universal challenges is access to sustainable energy. This is especially true for Africa but can be solved

自主贡献的分析显示,虽然方向是对的,但减排水平仍然显著低于所需。由此能带来的温度升高更接近3度,而不是之前设想的2度或1.5度。坦率地说,一旦政治上达成共识,就必须减小减排路径差距。巴黎的势头可能进一步延长国家贡献的时间。《巴黎协定》强调,迫切需要解决缔约方承诺到2020年全球温室气体 (GHG) 年减排总量之间的显著差距问题。

### 2020前的行动

《巴黎协定》还强调了加快实施公约和《京都议定书》的紧迫性,以增强到2020年之前的信心。在巴黎大会上也达成了关于第二个承诺期的关键进程决定。对增强到2020年之前信心的期望源于这样一个事实,即有为增强2020年之后的信心打下坚实基础的机会。这意味着,气候减排应着眼于有效的长期措施和改革。说到这必须强调,能够为更加成本合理及富有策略性的措施调配资源的先决条件是不能只顾眼前利益。如果说《巴黎协定》说出了共识的话,那就是减缓气候变化行动要在经济合理性的基础上进行,考虑到“长期有效性,也就是说注重志向高远和早期行动的持续收益,包括能为以后减排和相应工作消减成本。”

2020年之前的信心也意味着看到世界的情况。仍然有大量的国家不能完全满足人民的基本需要,这不仅存在于最落后的国家中。一个普遍的挑战是获得可持续能源。这种情况在非洲尤为普遍,这一问题可通过加强可再生能源的发展来解决。除了一些地区的具体情况,《巴黎协定》还确定了发达国家加强支持资金、技术和能力建设的全面必要性。这需要以可预见的方式、以能够加强发展中国家2020年前行动为目标提供支持。



*Chinese President Xi Jinping during his speech at the Paris COP21 Climate Conference*

习近平主席在第21届联合国气候变化大会上讲话

Source / 图片来源: scio.gov.cn



through the enhanced deployment of renewable energies. Besides certain regional specifics, the agreement recognizes an overall necessity of enhancing the provision of finance, technology and capacity-building support by developed countries. This support needs to be provided in a predictable manner with the goal of enabling increased pre-2020 action by developing countries.

The backbone of the Paris Agreement is the magnitude of commitments, contributions and engagement of all parties involved. Furthermore, awareness has grown that there are important stakeholders – often with their own capacities – acting against climate change and climate resilience. On this grounds, it is an important step forward that the agreement calls for stronger and more ambitious climate action, performed not only by all involved parties, but also by non-party stakeholders, including the civil society, the private sector, financial institutions, cities and other sub-national authorities, local communities and indigenous peoples. Almost 700 major cities, regions, companies and investors from around the globe have promised to quickly and effectively help implement the Paris Agreement and accelerate the transformative changes needed to meet the climate change challenge. Especially the civil society will be playing a powerful role in tackling the challenge posed by a warming planet.

### Cooperative Character of the Paris Agreement

With utmost urgency, the new agreement not only asks for increasingly higher domestic ambitions over time, but also builds on the spirit of cooperation. Engagement of all parties in this sphere is more than desirable. A considerable number of INDC have differentiated between the domestic level of ambition, which they can achieve alone, and an additional area, where international cooperation and support is stated as a precondition. Even if most descriptions of the sphere of international cooperation are looking vague, they contain the basis for further elaboration. Through a “drill-down exercise”, aiming to shape general descriptions of climate mitigation actions down to a certain degree of concreteness, the need for cooperation could be rational and convincing. Even if international support and cooperation is needed, host countries should reflect on their role in cooperative climate mitigation action and where it is appropriate and feasible to pursue a development strategy of self-regulation. This is to avoid windfall gains, a re-defined addition in a political sense.

《巴黎协定》的支柱是参与各方承诺、贡献和履约的幅度。而且，重要决策者的意识增长了，他们在力所能及范围内开展对抗气候变化及帮助气候恢复的行动。在此基础上，《巴黎协定》为促进增强气候行动的决心迈出了重要的步伐，要执行行动的不仅包括参会各方，也包括无党派利益相关者，如民间社会、私营部门、金融机构、城市及区域政府机构、地方社区和土著民族。近700个主要城市、地区、公司和来自全球各地的投资者已经承诺，快速有效的帮助实施《巴黎协定》，加快应对气候变化挑战所需的转变。特别是民间社会将发挥强大的作用，应对气候变暖所带来的挑战。

### 《巴黎协定》的合作特性

新的条约不仅迫切要求各国以后制定更加雄心勃勃的国内计划，条约也建立在合作的精神上。在这一领域所有缔约方的参与都非常受欢迎。大量的国家自主贡献区分开了各国自主实现目标的决心程度，并为国际合作和支持创造了前提。即使国际合作领域的表述还太模糊和笼统，它们确是进一步详尽构划的基石。通过一种“渗入式”做法，旨在将缓解气候变化行动一般性表述具体到某个层面，这样合作也可以更加理性和更具说服力。即使需要国际合作和支持，东道国应在减缓气候变化行动的合作中反映其作用，并且在适当与可行的时候，发展自我管理的战略。这是为了避免意外收益，一种在政治意义上重新定义的额外性。



After long negotiations, a binding Paris Agreement was final reached on 12 December 2015

经过长时间的谈判，最终于2015年12月12日达成了有约束性的《巴黎协定》  
Source / 图片来源: UNFCCC 联合国气候变化框架公约

### 市场的关键作用

《京都议定书》的灵活机制，清洁发展机制（CDM）和联合履行机制（JI），在全球碳市场的发展方面起到



## Crucial Role of Markets

The flexible mechanisms of the Kyoto Protocol, Clean Development Mechanism (CDM) and Joint Implementation (JI) played a crucial role for the development of a global carbon market. Incentivized by the EU's Emission Trading Scheme (ETS) and public purchase programs by a few industrialized countries, mitigation contribution of the developed countries reached more than 1.5 Gigatons (Gt) of CO<sub>2</sub>e emission reductions. However, the flexible mechanisms have been suffering from a strange drift. Notwithstanding that they provided cost-efficient emission reduction at scale, demand declined dramatically for economic and political reasons. In particular the economic crises of 2008/9, the failure of the climate conference in Copenhagen in 2009 and the economic distortions resulting from windfall gains of some project types influenced demand and supply heavily and lead to disturbingly low prices for emission certificates far below abatement costs. For years, the perception of the need for such market mechanisms in most industrialized countries has been mostly negative. Against this backdrop, only a few parties still performed their purchase programs and supported market initiatives such as the Partnership for Market Readiness (PMR) performed by the World Bank, keeping the vision of a global carbon market alive.

Recently, however, signals for a stronger role of carbon markets came up. As follows are a few examples of innovative ones, which will play a decisive role in the Paris follow-up process on carbon market guidance, modalities, rules and procedures: the Carbon Pricing Leadership Coalition (CPLC), the G7 carbon market platform, the Pilot Auctioning Facility (PAF), the Transformative Carbon Asset Facility (TCAF) and the Nitric Acid Climate Action Group (NACAG). On NACAG, the newest initiative you will find a description in this Econet Monitor issue on page 16.

## The "Paris Mechanisms"

In the run up to Paris, carbon markets got more attractive again. However, no one could anticipate the all-embracing final decision, which has been in a critical stage until finding a balanced wording at the end of climate negotiations on Saturday morning. Now, stating this with some

了非常关键的作用。受到欧盟排放交易体系和少数发达国家公共采购项目的激励,发达国家的二氧化碳减排量多于1.5亿吨当量。然而,灵活的机制遭遇了奇怪的改变。尽管它们带来了成本经济的大规模减排,但是出于经济和政治原因需求还是大幅下降。尤其是2008到2009年的经济危机,2009年哥本哈根气候大会的失败以及一些项目意外收益导致的经济扭曲严重影响了供需,并且导致了碳核证价格极其低廉,远远少于减排成本。

数年来发达国家对于此种市场机制的态度非常消极。在这种背景下,只有一小部分缔约方仍在执行其收购计划,并支持市场举措,例如世界银行的市场准入伙伴项目(PMR),该项目旨在保持全球碳市场活跃的愿景。

但是在最近,巴黎会议上又出现碳市场应该起到更大作用的信号。下面是几点创新的项目,这些项目将会在巴黎会议后对碳市场指导、方式、规则和程序上起到决定性作用:碳定价领导联盟(CPLC)、G7碳市场平台、试点拍卖工具(PAF)、变革性碳资产基金(TCAF)以及硝酸气候行动组(NACAG)。有关最新项目硝酸气候行动组(NACAG)的详细内容请见本期杂志第16页。

## 巴黎机制

巴黎会议之前,碳市场再次备受关注。但是人们没有预见到一个受所有人欢迎的最终决定,谈判过程历经艰难,最终在周六早上达成了令各方满意的表述。现在重点来说,巴黎协定为今后碳市场提供了一个完整



*French Foreign Minister and chair of the COP21 Paris Climate Conference Laurent Fabius during negotiations in Paris*

法国外长和第二十一届联合国气候变化大会主席法比尤斯在巴黎谈判期间

Source / 图片来源: SG COP21 / Arnaud Bouissou

emphasis, the Paris Agreement provides a complete basis for future carbon markets. Article 6 of the Paris Agreement speaks not of markets, but of international transfer of mitigation outcomes (ITMO). The whole article is not limited to the ITMO concept or mitigation, though. Article 6.1, for example, also refers to cooperation on adaptation. The limiting factor comes in the form of the voluntary cooperation in the implementation of national determined contributions (NDC). Nevertheless, Article 6.1 does not open up the mechanisms under this Article to flexibility and cost-efficiency of domestic targets. This has been the function of the flexible mechanisms of the Kyoto Protocol. Under the Paris Agreement, cooperation has to lead to higher ambition.

The article builds the fundament for different types of cooperation, namely market-related and non-market-related cooperation. Overall, three main areas of voluntary cooperation are identified. On markets, there exist “cooperative approaches” in Articles 6.2 and 6.3 as well as a sustainable development mechanism (SDM) in Articles 6.4., 6.5 and 6.6. The third one is the so-called non-market approach in Articles 6.8 and 6.9.

Further preparing for the market mechanisms, the cooperative approaches need a decision on guidance, whereas the SDM needs clearly defined rules, modalities and procedures that have to be developed. These mechanisms are closely related to markets and allow for the international transfer of mitigation outcomes. The breakdown of market-related mechanisms into two very different mechanisms derives from the different interests of parties on conducting international cooperation in their preferred way. Based on guidance and robust accounting rules, the cooperative approaches will be less regulated than the SDM. The cooperative approaches allow parties to cooperate on bi- and multilateral arrangements without UNFCCC oversight. Therefore, in Article 6.2, transparency has been set as an additional requirement for this type of cooperation. In principal, more complex climate activities could be envisaged, including a sector or sub-sector dimension. The NACAG concept of combining



*The COP21 Climate Change Conference in Paris offered a final chance to effectively combat climate change*

巴黎第21届联合国气候变化大会为有效对抗气候变化提供了最后的机会

Source / 图片来源: sohu.com

的基础。《巴黎协定》第6条不是关于市场,而是国际减排成果转让。这一条不仅限于国际减排成果转让理念或者减排本身。第6条第1款指出适应合作。受限制的一个因素是国家自主贡献的实施采取自愿合作。但是第6条第1款并没有为国内目标的灵活性和节约成本开放机制。这已经是《京都议定书》灵活机制的一个作用。《巴黎协定》下的合作应该更加有雄心。

条约为不同形式的合作奠定了基础,包括市场和非市场相关的合作。总体而言,确定了三个自愿合作的主要领域。在市场方面,有第6条第2款和第3款的合作方法,第6条第4款、第5款和第6款的可持续发展机制。第三个是第6条第8款和第9款的非市场方法。

市场机制的进一步准备工作以及合作机制需要指导的决定,但对于可持续发展机制而言,规定、方式以及程序需要进一步发展。这些机制与市场紧密相关,并且使国际减排成果转让可行。

市场机制分解成两种不同机制,遵循缔约方不同的利益,以他们喜欢的方式开展国际合作。在指导和稳健的核算准则基础上,合作方法与可持续发展机制相比不需要那么多的管理。合作方法让缔约方在《联合国气候变化框架公约》的监督外进行双边或多边合作安排。因此,第6条第2款中的“透明”就是此类合作的附加条件。原则上,单个或跨领域更复杂的气候活动可想而知。在第6条第2款下,硝酸气候行动组将长期减排手段与国际转让的减排成果的理念相结合,可以作为今后行动的范例。

long-term mitigation solutions with initial transfers of mitigation outcomes could be a pattern for future action under Article 6.2.

The SDM – being the other major mechanism – will be the UNFCCC-governed mechanisms, substituting the Kyoto mechanisms when the Paris Agreement will enter into force. In this vein, binding rules and international oversight might become comparable to that of the CDM. However, the SDM, as it is has been clearly defined in the agreement, will go much further than the CDM. When mitigation activities are performed under the SDM with intent to transfer the mitigation outcomes internationally, they have to be additional mitigation efforts supplementing the host country's national determined contribution (NDC). This will result in an increased ambition of the host country. Whether this additional mitigation effort leads to a global rise of ambition depends on the buyer country using the received mitigation outcome for own compliance under the Paris Agreement or not. The reasons for doing so might differ. Possible reasons include mitigation activities counted against climate finance targets or voluntary targets. One example is the compensation of GHG emissions caused by business travels of the German Government.

Opposite to cooperative approaches and the SDM, non-market approaches do not allow for the ITMO. But what this regulation effectively excludes or not excludes has to be analyzed. Evidently, in the ITMO concept, the transfer for compliance and trading purposes is against this option. However, technical features of the market mechanisms, such as monitoring, reporting and verification (MRV), and the accounting function could be helpful. Good governance, best practice and, last but not at least, the assessment of climate activities depend on transparent and appropriate information. These are questions asked by Article 6.8. Further examination on what is meant by integrated, holistic and balanced non-market approaches is necessary. For a long time, one could notice a lack of understanding between representatives of market and non-market approaches. This should change in future, when NDCs are the cross-point for various policies, aiming to incorporate international support via carbon markets or climate finance. Taking all aspects of Article 6 into account, the inherent opportunities may become a good substitute for the flexible mechanisms of Kyoto Protocol. All parties are now challenged to keep the momentum from Paris in the upcoming negotiation rounds alive and ease the preparatory work on Article 6 of the Paris Agreement.

另一个机制,可持续发展机制将是《联合国气候变化框架公约》下的约束机制,并且当《巴黎协定》生效时取代京都机制。具有法律约束力的条约和国际监管或许与清洁发展机制有可比之处,但是可持续发展机制如协定中明确定义的,比清洁发展机制还要深远。在可持续发展机制下的减排行动要实现国际转让,那就一定是东道缔约方自主贡献额外的部分。这样导致的结果是东道缔约方的决心将有所提升。这个附加的减排努力是否会转化成国际决心取决于购买国家是否使用获得的减排成果作为自己履行《巴黎协定》的部分。这样做的原因有很多,可能由于该项被计入气候融资的目标或者自愿目标。一个例子就是德国政府为商务旅行产生的温室气体排放进行补偿。



*CO<sub>2</sub> emissions are a leading cause for a warming planet*

二氧化碳排放是全球气候变暖的主要原因

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

与合作方法和可持续发展机制相反,非市场机制不允许减排成果的国际转让。但这项条约有效排除或者不排除的内容还要进行分析。很明显,减排成果国际转让的理念、履约和交易的转让与这一项相违背。但是,市场机制的典型技术特征如检测、报告、核实与核算功能是有帮助的。良好的管理、最佳实践以及气候活动的评估取决于透明和适时的信息。这是第6条第8款涉及到的问题。进一步的核查——到底什么是综合的、全面的、平衡的非市场手段是必要的。

很长一段时间,人们注意到了市场和非市场手段代表之间缺乏了解,这个在今后应该有所改变。未来国家自主贡献是各个政策的交叉点,旨在通过碳市场或气候融资吸收国际支持。第6条涉及各个方面,其本身带来的好机遇可以替代《京都议定书》的灵活机制。所有缔约方现在面临着挑战,将巴黎会议的势头在未来的谈判中保持下去,并为《巴黎协定》第6条的准备工作解除负担。



## Networking Meeting – Efficient Regulation Mechanisms for a Dynamic Chinese Carbon Market

### 交流研讨会 — 对于中国碳市场动力的有效调节机制

Starting in mid-2013, the Chinese government has begun implementing its plans for an emissions trading system (ETS) by launching Shenzhen as the first pilot project, with a total of seven pilot schemes today. China and other countries establishing an ETS need to avoid the build-up of a substantial surplus of emissions allowances, leading to low carbon prices and thus a weaker incentive to reduce emissions.

As a result, suitable design features for the trading systems as well as regulation measures need to be applied. In this context, German Industry & Commerce Greater China Beijing, on behalf of the German Federal Ministry for the Environment, on 6 November 2015 organized a Networking Meeting on the topic of efficient regulation mechanisms for a dynamic Chinese carbon market. At the meeting, experts informed the over 30 participants about experiences of the emissions trading pilots this year in China as well as potential regulation instruments, such as a carbon tax, and their effects on emissions trading.

At the beginning of the meeting, Chen Zhibin from SinoCarbon Innovation & Investment informed the participants about this year's experience of the seven pilots, with an emphasis on their unique development and China's plans to establish a national ETS by 2017. Due to lack of information on how to decide the best way for implementing low-carbon policies, a top-down command policy does not present an effective long-term solution. According to Chen, a market-based ETS, on the other hand, provides a more suitable means to put the right price on carbon through market mechanisms.

The seven ETS pilots have shown to develop quite heterogeneous. Whereas Beijing and Shenzhen include a large number of small emitters from diverse sectors, Hubei is characterized primarily by large industrial emitters, making up roughly half the trading volume of the Chinese carbon market. Shanghai is unique in that China's largest city has two standards for including enterprises: one designed for industrial enterprises, such as electricity and steel in addition to a non-industrial standard, including, for instance, shopping malls and commercial office buildings.

自2013年中起，中国政府开始实行碳排放权交易系统，深圳成为首个启动碳交易的试点地区，现今共有七个试点地区。中国和其他国家建立碳排放权交易系统，需要避免大量过剩的排放许可，因为这会导致碳价过低，从而减弱减排激励。因此，需要根据碳交易系统的特征进行合适的设计，同时管理措施也是不可或缺的。为此德国工商大会北京代表处在德国联邦环境部支持下于2015年11月6日举办了以“对于中国碳市场动力的有效调节机制”为题的交流研讨会。在会上，专家们向30余位听众介绍了中国今年来碳排放权交易试点的经验，可能的管理工具如碳税，以及它们对碳排放交易的效果。



*Participants were informed about this year's experiences of the Chinese emissions trading pilots*

专家向听众介绍了中国今年来碳排放权交易试点的经验

首先，来自中创碳投的陈志斌向听众介绍了今年七个碳交易试点的经验，以及分析了它们各自的发展特点和中国将于2017年建立全国性的碳排放交易系统的计划。由于缺乏相关信息，来决定实施低碳政策的最佳方式，自上而下的行政命令并不能作为有效的长期方案。陈先生认为，基于市场的碳排放权交易系统提供了一种更为合适的手段，通过市场机制正确地调节碳价。

七个碳交易试点地区发展各不相同。北京和深圳碳交易系统包含了大量不同行业的小排放企业，湖北则是以大型工业排放企业为主，占到了中国碳市场交易量的将近一半。上海的独特之处在于，作为中国最大的城市，它对纳入碳交易系统的企业有两套标准：一套适用于工业企业如电力和钢铁，另一套适用于非工业企业如商场和办公楼。碳排放权的配额可以通过“祖父法”或“标杆法”进行分配，前者基于企业历史排

The allocation of emission allowances can be done either through “grandfathering”, where allocation is based on historical emissions of enterprises – meaning the enterprises that emit most could receive more allowances – or through benchmarking, where the government and industry experts sets a specific benchmark for emission output for industry-specific enterprises, for instance based on tons of carbon dioxide per product unit. Benchmarking thus offers the potential for a fairer system as it provides a consistent allocation methodology for both new and existing market participants and rewards early action as well as upgrades in technology. Nevertheless, due to insufficient availability of data, grandfathering is still the more widely used method for allocation across technologically divergent industries in China.

Besides a fair and efficient allocation method, compliance is central. After 2013 still left room for improvement, 2014 saw an across-the-board rise on compliance rates. The Beijing Municipal Commission of Development and Reform (BDRC), for example, has its own executive team that can impose and enforce fines for companies not reporting their emissions.

Besides the significance of an accurate and fair allocation method for allowances and the key role of local DRCs to implement a long-term system for monitoring, reporting and verification (MRV), experiences have shown that it is essential to maintain communication and keep the industry informed about developments regarding emissions trading and the accompanying MRV-system, to focus on a manageable number of emitters and to regularly revise market rules to adapt them to market realities, according to Chen.

Following as the second speaker, Dr. Jiang Kejun from the Energy Research Institute of the National Development and Reform Commission (NDRC) provided an overview on China’s low-carbon development and carbon pricing. With the aim to peak emissions by 2030, if not earlier, 2014 marked the high point for coal consumption so far and, consequently, coal-fired power production in China. Although investments into coal still remain at high levels, the government continues to replace coal-fired power plants with cleaner, low-carbon alternatives to reduce not only emissions but also the endemic air pollution in the country’s urban centers.

The coal industry thus stands before a crossroads: if the operators of coal-fired power plants want to maintain current output levels, buying emission certifi-



*Chen Zhibin from SinoCarbon Innovation & Investment shared his insights on the development and future perspectives of China's ETS pilot projects*

中创碳投的陈志斌分享了他关于中国碳排放权交易系统试点项目的发展和展望的见解

放量分配配额,也就是说根据历史记录排放得多的企业可以分配到更多的配额,后者是政府与各个行业协会设定的标杆,例如基于每产品单位产生的二氧化碳。因此标杆法为一个更加公平的系统提供了可能性,它为新加入市场的企业和之前已存在的企业提供了一种一致的分配方法,同时奖励了前期的节能行动和技术升级。然而由于数据可用性不足,祖父法仍然更为广泛地运用在中国技术上不同行业的配额分配中。

除了公平有效的分配方法,执行性也是一个核心问题。2013年仍有改进空间,2014年的执行率全面上升了。例如说北京市发改委有自己的执行团队,可以强制向不汇报排放的企业征收罚款。陈先生说,地方发改委除了要准确公平地分分配额外,还有一个重要角色,即实行长期的监控、报告和核查系统(MRV),经验表明,和行业保持沟通,让他们随时了解碳排放交易和相应的MRV系统的发展情况,是十分必要的,还要重点关注可控数量的排放者,定期修订市场规则,以适应市场的实际情况。

接下来的第二位演讲者,来自国家发改委能源研究所的姜克隽博士提供了关于中国低碳发展和碳定价的综述。中国计划2030年左右碳排放达到峰值并争取尽早达峰,2014年是迄今为止的中国煤炭消费即燃煤发电的最高点。虽然煤炭投资仍保持在高位,政府持续用清洁低碳的方案代替燃煤发电站,这样不仅可以减少排放量,也可以减轻市中心当地的空气污染。

因此煤炭工业站在了十字路口:如果燃煤发电站的运营者要保持现有的产出水平,就不可避免地要购买排放许可;否则的话就必须减少产出。因此煤价是低碳发展道路的决定性因素,煤价高企就导致利润减少和工厂关闭。在这种情况下,分析表明能源或碳税对国内生产总值造成的潜在负面影响与减少能源需求带来的潜在正面影响相比,经济性比较高。

icates becomes unavoidable; otherwise a reduction in output becomes necessary. The price of coal is thus a decisive factor for a low-carbon path of development, with high coal prices translating to lower profit margins and more closed-down plants. In this vein, analyses have shown that the potential negative effects of an energy or carbon tax on GDP are economically feasible compared to the potential positive impacts of reducing energy demand in China.

Whereas an energy tax, while reducing GDP by 0.4 percent annually, could decrease energy consumption by over 16 percent until 2030, a carbon tax could potentially reduce consumption even further, by up to 23 percent in the same timeframe with almost similar effects on GDP. According to Dr. Jiang, especially a carbon tax could thus be a useful instrument in the government's toolbox for putting the right price on carbon and to lead China into a more sustainable, low-carbon future.

With only negligible effects on GDP, a move towards more clean and renewable energy options would also help to promote investments as well as research and development into new, more efficient technologies. With rapidly rising investments into new and renewable energies and an overachievement of past and present policy targets, abolishing future target requirements in this field altogether might be the most reasonable solution to encourage further investment.

In the following discussion, participants drew an overall positive picture of recent developments in China's pilot projects. Of particular interests were the structure of a national ETS and the role the already established pilot projects could play in such a system. It was highlighted that there has not yet been a final decision by the central agency responsible, the NDRC, of how to effectively administer the seven pilots when the national ETS will be established by 2017. The implementation of a carbon tax was another central question during the meeting.

Both speakers agreed that a strong carbon policy is needed as a prerequisite for the tax to work effectively. Additionally, there was broad consensus that in order for an ETS or carbon tax to work as intended, allowances should not be free as this – depending on the scale – could significantly distort the underlying market mechanisms and hinder the progression of a national carbon market. Looking at the future development of the Chinese carbon market, the national ETS and its structure remains a key area of interest.



*Dr. Jiang Kejun from the Energy Research Institute of NDRC informed the participants about the latest low carbon developments in China*  
国家发改委能源研究所的姜克隽博士向听众介绍了最近中国低碳发展情况

而到2030年,能源税在每年减少国内生产总值0.4个百分点的同时,也会共降低超过16%的能源消费,碳税可能会进一步地降低能源消费,在同样的时间段会降低多至23%,也会类似地影响国内生产总值。姜博士认为,碳税可能成为政府工具箱中一个尤为有用的工具,为碳设定正确的价格,将中国带向可持续和低碳的未来。它对国内生产总值只有微不足道的影响,向更清洁和可再生能源转变的努力也有助于促进投资,以及研究发展更加创新高效的技术。随着对新能源和可再生能源投资的快速增长,以及超额完成过去和现在的政策目标,取消未来的目标要求在这一领域完全可能是进一步鼓励未来投资的最佳方案。



*Subsequent networking, where participants used the opportunity to discuss the future development of China's carbon market*  
在随后的讨论中,参会者借此良机热烈讨论中国碳市场未来的发展

在随后的讨论中,参会者对中国试点项目的近期发展总体持乐观态度。尤为受关注的是全国碳排放权交易系统的结构和已建立的试点项目在此系统中扮演的角色。重点是发改委作为中央责任机关还没有最终决定,到2017年全国碳排放权交易系统建立起来时怎样有效地管理七个试点地区。推行碳税是会议的另一个核心问题。两位演讲者都认同,强有力的碳排放政策是碳税得以有效运行不可或缺的先决条件。此外还有一个广泛共识,为保证碳排放权交易系统或碳税达到预期效果,就不应分配免费配额,因为免费配额根据其范围大小,会显著地扭曲基本的市场机制并阻碍全国碳市场的进程。纵观中国碳市场的未来发展,全国碳排放权交易系统和它的结构仍然是核心关注领域。



## China in 2015 – Between a Rock and a Hard Place

A contribution by Doris Fischer, University of Würzburg

### 2015年的中国 — 进退两难

来自维尔茨堡大学Doris Fischer的客邀文章

Good news about China was hard to come by in 2015. While the news may have exaggerated the situation up- or downwards for headline purposes, at least three issues have been troubling the country throughout this year. These three issues are interrelated and will influence the perspectives for environment policies and economics in the coming years.

The first issue is the substantial slowing of China's industrial growth, increasingly troubling investors. The Chinese economy has experienced lower growth rates for some years now. However, until 2014, these lower growth rates, unusual as they were, did not trigger too much of concern neither within nor outside China. Arguably, investors and observers had stayed relatively calm because the earlier double digit growth rates had been too high to be healthy for both the economy and the enterprises. In addition, the earlier high growth rates had partly been triggered by the government's stimulus package of 2009 and thus had to a large degree relied on state-backed investment. Therefore, since 2012, discussions had proliferated that this investment spree actually did more harm than help. The decrease in growth rates since 2012 could thus for a while be interpreted as a healthy correction of earlier problems. At the same time, it was expected that the new Party leadership would initiate substantial reforms in the wake of the 3rd Plenary Session in November 2013, which had published a reform agenda for the years until 2020. Business leaders as well as economists, though not necessarily happy with the situation in 2014, granted the government some time to translate this agenda into policy measures. In 2015, the situation has changed as the growth decline has become more severe. Over the year, published accounts of excessive production capacities in the heavy industry have been accompanied

2015年很难见到中国的好消息。虽然这些消息可能为了夺人眼球或多或少夸张了局势,但纵观今年,至少有三个问题一直困扰着中国。这三个问题相互关联,并且还会在未来几年影响中国环境和经济政策的前景。

第一个问题是中国工业增长的大幅放缓越来越多地困扰着投资者。中国经历了几年较低的经济增长率。截止到2014年,较低增长率并没有在中国国内或国外引起太多关注。可以说,投资者和观察者都相对比较冷静,因为早期两位数的增长率过高,超出了经济和企业健康发展水平。此外,之前的高增长率部分源于2009年政府的经济刺激方案,投资过于依赖政府。

所以,自2012年起,关于投资热潮是否弊大于利的讨论激增。因此2012年以来增长率的下降部分被视为对早期问题的健康调整。同时,2013年11月召开的十八届三中全会上新一届的领导层公布了期待已久的全面深化改革方案,此改革议程将延续到2020年。

商界领袖以及经济学家虽然对2014年的形势不一定感到满意,但还是给予了政府一定的时间把议程转化成政策措施。到了2015年,随着增长率进一步下滑,



China's slowing industrial growth has been causing concern among investors  
中国实体经济增长放缓引起投资者关注  
Source / 图片来源: globalconversation.org

by – less published, but much debated – stories of many export-oriented private enterprises struggling with sales declines and idle production capacities. In parallel, foreign-invested companies increasingly saw their annual sales and profit targets endangered by the economic decline. While the situation may have been less troubling in the service sector, as is regularly stressed by Chinese state media, the overall impact on the 2015 business climate has been negative.

The second issue comes as an internal struggle about economic policies, which hampers policy direction and implementation. Political struggles about economic policies in times of crisis would be expected for any country. For China, however, we often presume that the Party and government leadership acts in consensus and follows one common strategy. This expectation has been proven to be repeatedly wrong in the past; and the year 2015 will likely be remembered as a year in which such struggles within the leadership became more visible. One indicator for these struggles has been the contradictory policies with regard to financial market liberalization. On the one hand, the government supported stock market reforms since the end of 2014. On the other hand, the government did not enlighten private investors that stock market liberalization comes with additional investment risks. Instead, it first supported fast expansion of the market, only to intervene even more severely in market developments after the crash of the stock markets in the summer of 2015. Whether the perceived inconsistencies in financial market policies reflect conflicts about economic policies or rather a learning process on the side of the new leadership is difficult to assess. In any case, the financial market development over the summer was not helpful in creating trust in the government's capacity to steer reforms in critical times. Another indicator is the debate regarding the need for another stimulus push by the government. Openly, the current leadership states that large government investment to (re-)stimulate is not intended. At the same time, however, the new Silk Road program, the plans for expansion of the high-speed railway system, investments in further urbanization – to name just a few indicators – hint to the fact that government investment programs are indeed used to combat the economic slowdown. A further indicator of the struggles are repeated exhortations of the Party leadership to Party members to support the reform agenda, the anti-corruption campaign and – more generally – Party discipline. These exhortations hint to a considerable level of resistance to the new policies.

情况发生了变化。一整年，重工业产能过剩，伴随着并未公布但已备受争议的出口型民营企业销售下滑和产能闲置的状况被不断提及。

与此同时，外商投资企业越来越多地看到他们的年销售额和利润目标受到经济衰退的影响。尽管服务业不太疲软，正如官方媒体常常强调的那样，但2015年商业气候的整体影响是消极的。

第二个问题是对经济政策的内部分歧，阻碍了政策方向和实施。危机时刻任何国家都会产生对经济政策的分歧。不过在中国，党和政府的领导层通常会达成共识，并遵循一个共同的策略。过去的日子里实际情况与这种期望有所出入，2015年领导层的分歧变得更加明显。

金融市场的自由化就是这种分歧的一个表现。一方面，自2014年底，政府支持证券市场改革；而另一方面，政府却没有提醒私人投资者证券市场自由化会伴随额外的投资风险。相反，政府首先支持市场的迅速发展，直到2015年夏股市暴跌时才采取了更为严厉的干预措施。

所观察到的金融市场政策的不一致性到底反映了经济政策的分歧还是新一代领导层的学习过程，这一点不得而知。不管怎样，今夏金融市场的发展对政府在关键时期推动改革方面树立信任帮助不大。



*China's government intervened severely in market developments during the 2015 stock market crisis*

2015年中国股市危机时政府大幅干预市场发展

Source / 图片来源: [financialexpress.com](http://financialexpress.com)

第二个表现是关于政府推动另一个刺激计划必要性的讨论。现任领导层公开表明没有计划推动大型政府



The third issue is the incremental erosion of confidence, adding to a rather pessimistic perception of the overall situation. The erosion of confidence – or trust – is related to a number of issues. Among these, the recurrent discussion about the reliability of China's economic data may be the one most acknowledged in the media. However, the issue goes far beyond the question whether GDP quarterly data is accurate. Throughout 2015, this presumably dead discussion saw a revival because the rather stable GDP data did neither mirror the economic situation as reflected in enterprise order books nor the mood of entrepreneurs or the stock market crash in the summer. In addition, reports that some provinces in the North East have cooked their books over many years contribute to concerns about reliability of statistical data in general. Beyond the question of statistic data quality and reliability, however, the increase of propaganda and censorship – of traditional and social media – as well as the pressure put upon lawyers, NGOs, etc. do not help in creating trust. Such control and pressure signal distrust from the government in its constituencies and results in mistrust on the part of the latter as well as foreign investors and observers. Last but not least, the anti-corruption campaign, which has been shaking the country since 2012, also erodes trust and initiative. This should by no means imply that the government should turn a blind eye to corruption issues. Still, the broad definition of corruption used in China, the importance of corruption (in the past) as compensation for the (arguably) low pay of officials, and the fact that corruption is first of all prosecuted via Party organs rather than judicial institutions together result in a low level of policy initiative at local levels. Local cadres can well argue that it is not worth showing initiative for new policies if they are thrown back to their normal salaries, and cannot only not profit from initiative, but instead even risk to be prosecuted if they stick out.

At a first glance, these issues may not seem to be related to environmental protection, green development or related business. At a

投资以(再)刺激经济发展。然而,“新丝绸之路”的建设、高铁网络的扩建计划以及推动城镇化的投资等迹象表明,政府确实以投资项目来抵御经济增速的放缓。

另一个表现是中国共产党领导层号召党员支持改革、加强反腐以及严肃党内纪律。这些号召某种程度上也暗示了对于新政的分歧。

第三个问题是信心逐渐受挫,增加了对整体情况悲观情绪。信心或者信任受挫与很多问题相关。其中,媒体上不时对中国经济数据可靠性的讨论或许是公认的一个。然而,问题不局限于季度GDP数据是否准确。整个2015年,这个看似已经沉寂的讨论又活跃起来,因为稳定的GDP数据既没有反映出如企业订单一样的经济状况也没有反映出企业家的心情和夏天股市的波动。

此外,对于东北一些省份多年经济虚高的报道增加了对一般统计数据可靠性的质疑。除了数据的质量问题,对于传统和新媒体的过多限制无益于提升信任。政府的不信任导致了国外投资者以及观察者对政府的信心降低。

最后但同样重要的一点是,自2012年席卷中国的反腐运动也在逐渐削弱信任和主动性。鉴于以往的形势,低收入的官员在地方层面对于改革的执行力有所降低。

乍一看,这些问题似乎没有涉及到环境保护、绿色发展或相关问题。但是仔细看来,他们确实相关。新的



China has been underreporting coal consumption by up to 17 percent  
中国少报高达17%的煤炭消费  
Source / 图片来源: bwbx.io



second glance, though, they do. The new Party and government leadership has stressed its intention to increase the use of market forces in the economy. This idea also reverberated in the reform agenda of 2013 with regard to environmental policies and has since been reflected in the expanded experiments with local emission trading systems, new policies for “green finance” and other initiatives. However, the more China’s economy struggles, the less likely it is that the market will create enough incentives for an “ecological turn” and economic recovery in the short run. On the contrary, the government – especially at the local level – may be more inclined to return to industrial policies similar to those applied throughout the global financial crisis and supported by the 2009 stimulus program. While these policies did not only support traditional strategic “brown” sectors but also led to huge investments in “green” industries, they did not necessarily contribute to the efficient use of sustainable technologies and better environmental protection. Similar, the unclear picture with regard to economic policies – presented during the summer of 2015 – raises questions for investors interested in green projects. Insecurity with regard to policies and low transparency are bad advisors for investment in general, but especially so for long-term oriented investment in environment protection or green technologies. Against this background, the lack of trust in publicly available environmental data is just an additional problem discouraging investors.

It is possible, of course, to read the current situation more positively. In this reading, the economic problems of this year were anticipated by the new Chinese leadership, who already propagated the concept of the “new normal” situation of China’s economy in late 2014, a situation which is associated with lower growth rates and better “quality” of growth. Arguing from this point of view, the problems of 2015 are mere ripples on the water and stricter governmental controls would only mirror the perceived need for stronger supervision during a transition period towards a more market- and sustainability-oriented system; a system in which market mechanisms contribute to more sustainable use of resources and patterns of consumption. The Chinese dream, so to speak.



*China increasingly pursues a green development path to further economic growth*  
中国加强追求绿色发展道路进一步推动经济增长  
Source / 图片来源: [jjl.cn](http://jjl.cn)

党和政府领导人强调利用市场力量带动经济发展。这个想法在2013年与环境政策相关的改革中也有体现,并且自2013年起,在地方排放交易体系的扩展实验中,绿色金融的新政策中还有别的新举措中都有所反映。不过,中国的经济越是处于挣扎,市场就越不大可能产生足够的动力进行生态转型以短期内实现经济复苏。

相反,政府,尤其是地方政府,更倾向于返回先前在应对全球经济危机中使用的工业政策,并辅以2009年的经济刺激计划。这些政策不仅支持传统“棕色”产业战略,也可能引导大规模的绿色产业投资,但它们并不一定真的有助于高效利用可持续发展技术以更好地保护环境。类似地,像2015年夏天所体现的那样,经济政策的不明朗让热衷于绿色项目的投资者心存疑虑。

通常而言,政策的不稳定和不透明不是好的投资建议,尤其对于像环保和绿色科技这样的长效性投资。在这种背景下,对环保公布数据准确性的质疑只是额外阻碍投资者的一个问题。

当然可以以更加积极的态度看待当下形势。在这篇文章中提到的今年的经济问题被新的领导层在2014年底解读为中国经济的“新常态”,即一种低增长率和高质量的经济增长状态。

从这个角度来看,2015年的问题不过是水中泛起的涟漪,政府更加严厉的控制只是反映了在向市场和可持续发展转型过渡期中需要更严格的监管。在该体系中,市场机制在资源可持续利用和消费方式都发挥着重要作用,也就是所谓的“中国梦”。

## Fairs & Events 展会与活动

Clean Energy Expo China 2016  
Beijing, China · 29.03.2016 - 31.03.2016  
中国国际清洁能源博览会  
北京, 中国·2016年3月29日 - 3月31日  
cleanenergyexpochina.com

Ecobuild China 2016  
Shanghai, China · 29.03.2016 - 01.04.2016  
2016上海酒店工程与设计展览会  
上海, 中国·2016年3月29日 - 4月1日  
www.hdeexpo.com

12th International Conference on Green and Energy-Efficient  
Building New Technologies and Products Expo  
Beijing, China · 30.03.2016 - 31.03.2016  
第十二届国际绿色建筑与建筑节能大会暨新技术与产品博览会  
北京, 中国·2016年3月30日 - 3月31日  
chinagb.net

IE Expo 2016  
Shanghai, China · 05.05.2016 - 07.05.2016  
中国环博会  
上海, 中国·2016年5月5日 - 5月7日  
ie-expo.com

10th SNEC PV Power Expo 2016  
Shanghai, China · 23.05.2016 - 25.05.2016  
SNEC第十届国际太阳能产业及光伏工程(上海)展览会暨论坛  
上海, 中国·2016年5月23日 - 5月25日  
sneec.org.cn

Aquatech China 2016  
Shanghai, China · 15.06.2016 - 17.06.2016  
第九届上海国际水展  
上海, 中国·2016年6月15日 - 6月17日  
aquatechtrade.com

## IMPRINT

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#### 参考网站:

www.china.ahk.de

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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  
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