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EURObiz

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LET'S GO GREEN

CHINA'S BLACK BUBBLE

Overcapacity in the coal power industry

THE ROAD FROM PARIS

What next after COP21?

A BREATH OF FRESH AIR

How indoor air quality is changing the face of business

WHAT DIFFERENCE DOES A YEAR MAKE?

China's Environmental Protection Law one year on

A CHEMICAL SOLUTION

The chemical industry can play a sustainable role in China's economy



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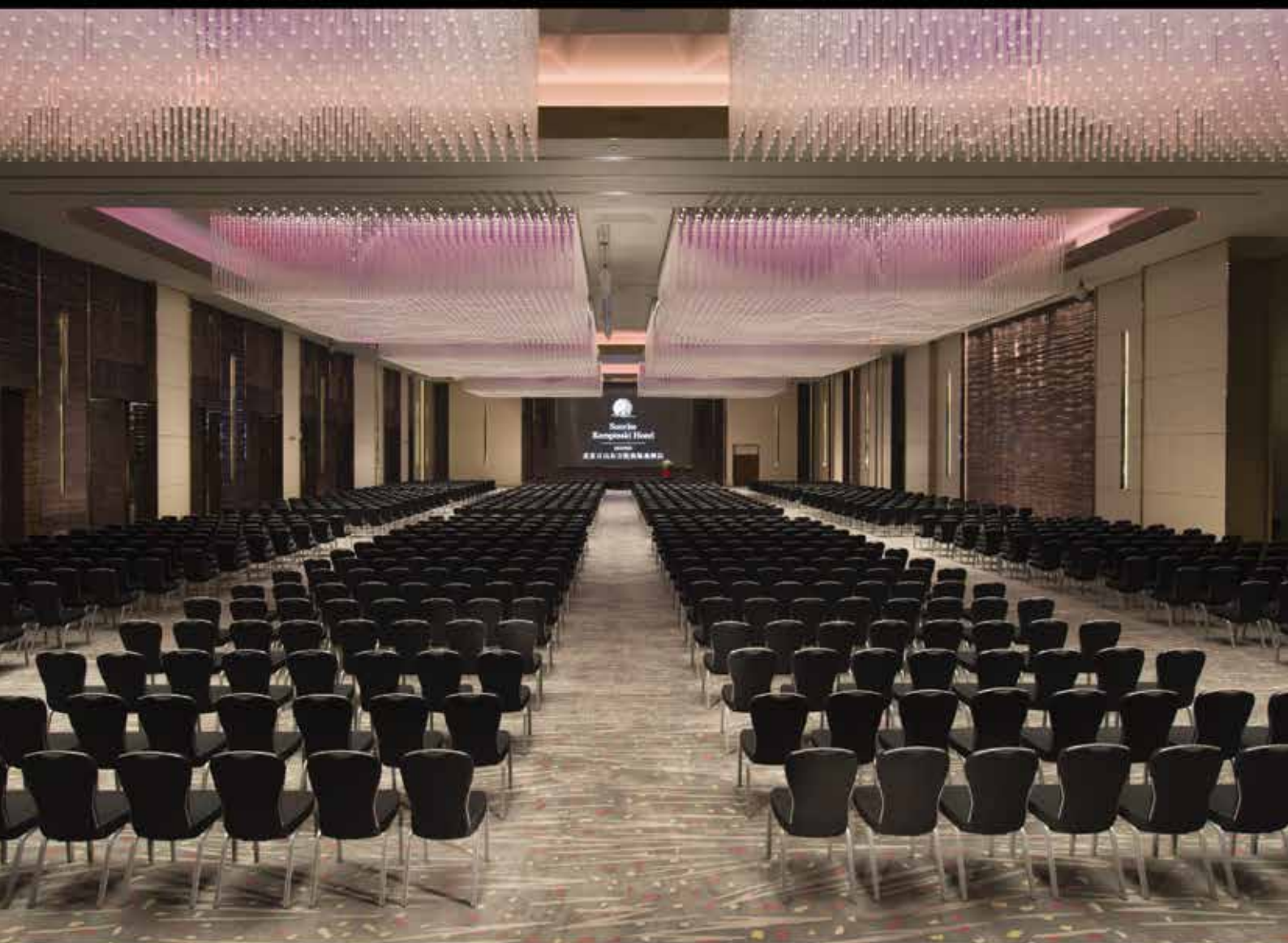




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COP21 COMMITMENTS AND COAL-FIRED CAPACITY



Jörg Wuttke
President of The European Union
Chamber of Commerce in China

A handwritten signature in blue ink, appearing to read 'J. Wuttke'.

The good news from last year's COP21 meetings in Paris was a breath of fresh air. It was darkly ironic, though, that while President Xi Jinping delivered his visionary speech about what needs to be done, Beijing choked under a cloud of pollution. In contrast to the 2009 COP talks in Copenhagen, when China defended its right to equal development opportunities—and the right to pollute that goes along with it—this time around really was different: China's delegates in Paris accepted real compromises. This constructive stance resulted from the country's evolving environmental and economic realities. In a welcome development, the Paris Agreement aligns with China's top-level reform agenda, and influential Chinese industry interests also see business opportunities. But Chinese leaders still have to overcome the inertia of local government and entrenched SOEs, which is no small task.

Thanks in part to a new development strategy in response to declining growth expectations, for the first time during the reform era environmental protection is a top policy priority. The new leadership has labelled this 'ecological civilisation'. And, with China now committed to peak carbon dioxide emissions by around 2030, it has not come a moment too soon. We are pleased to recognise this triumph for China's global institutional voice on a topic that was one of the policy themes outlined during the Fifth Plenum in October, 2015. As its recent bilateral agreements with the US and France also made crucial contributions to the final text adopted in Paris, we hope that this is just the beginning of good things to come.

Specifically, the European Chamber hopes that the Paris Agreement will provide added vigour to China's reform commitments, and affords reformers additional leverage with which to pressure SOEs and sub-national governments to fulfill China's climate targets. This necessitates a rapid reduction in heavy industry as well as ongoing improvements to rates of energy efficiency and clean energy capacity. But this can only happen if provinces and towns—where interest groups are strong—support the implementation of Beijing's agenda. Needless to say, China's commitments are already supported by EU businesses, which saw the Paris Agreement as a clear signal to scale up innovation and investment in climate solutions.

But success is by no means guaranteed. Renewable energy curtailment is widespread: emission reduction policies may prove insufficient for curbing the use of coal in electricity generation, especially if coal prices continue to fall; and leaders may turn back to energy-intensive stimulus measures in an attempt to shore up the economy in the short term. The key to effectively implementing Beijing's strong climate pledges therefore lies in transparency efforts. Monitoring, reporting and verification (MRV) of emissions and the implementation of climate policies requires both expertise and funding. Data quality and institutional arrangements for MRV also have to be upgraded. China's last submission of national inventories was in 2012, and only included emissions data from 2005. Chinese authorities now need to monitor and report on the country's emissions and policies more often and in more detail. Again, local implementation is vital.

By affording regional authorities the ability to approve power stations the Chinese Government has perhaps unwittingly inflated a coal-fired-power bubble. In fact, the China Electricity Council has stated that the current boom in the construction of coal-fired power plants led a 55 per cent year-on-year increase to their numbers during the first half of 2015. Greenpeace has endeavoured to explain how this happened, with some of their most important findings presented in *China's Black Bubble* on page six of this issue of *EURObiz*. Specifically, by analysing Environmental Impact Assessment (EIA) applications and approvals from the central and provincial Ministry of Environmental Protection (MEP) websites, Greenpeace found that during the first nine months of last year, 155 coal-fired power plants with a combined capacity of 123 GW, were approved. This is far beyond the number and scale of capacity that has been signed off in recent years. For example, during 2012, 2013, and 2014, only 33, 41, and 56 plants were approved respectively. Furthermore, this 123 GW of non-renewable energy capacity is on par with the *entire power capacity of Italy*, one of Europe's leading industrial heavyweights – all of this in just nine months!

The stark contrast between China's COP 21 commitments and its coal-fired capacity proves once again just how difficult it is to read China's political commitments as well as their global implications.

The Chamber will continue to monitor discrepancies and developments.



CHINA'S BLACK BUBBLE

OVERCAPACITY IN THE COAL POWER INDUSTRY

The announcement of Beijing's first ever pollution 'red alert' on 8th and 9th December, 2015, led many people, both in China and abroad, to assume that the air quality in China is deteriorating further. In fact, analysis of the first half of 2015 saw an overall improvement but media focus on the alert led to China's air quality taking yet another very public kicking, nonetheless. **Calvin Quek**, head of **Greenpeace's** Sustainable Finance Programme, looks at the reasons behind the improvement and how an increase in obsolete capacity in the coal power industry has resulted.

Breathing a little more easily

Analysis of data gathered from the first half of 2015, corroborated an observation that Greenpeace had previously made in one of our regular news updates: China's air quality generally improved during 2015. Although it is difficult to make out a discernible pattern by analysing Beijing's PM 2.5 levels since 2013, a comparison of the 30-day moving average appears to show that 2015's first-half PM 2.5 levels are in fact lower than those in previous years.



Source: Ministry of Environmental Protection

We went further and analysed first-half 2015 data gathered from 358 cities¹ across China and made some interesting findings:

- Average PM 2.5 levels across the 358 cities was 53.8 $\mu\text{g}/\text{m}^3$.
- For 189 cities, average PM 2.5 levels fell 16% year-on-year (YOY), from 68 $\mu\text{g}/\text{m}^3$ to 56.9 $\mu\text{g}/\text{m}^3$.
- Beijing PM 2.5 levels fell 15.5% YOY, from 92.1 $\mu\text{g}/\text{m}^3$ to 77.8 $\mu\text{g}/\text{m}^3$; Shanghai PM 2.5 levels increased 1.6% YOY, from 56.1 $\mu\text{g}/\text{m}^3$ to 57.0 $\mu\text{g}/\text{m}^3$.
- Biggest increases: Zhengzhou (Henan) rose 21%; Jiaozuo (Henan), rose 19%.
- Biggest decreases: Baoji (Shaanxi) fell 44.1%; Xi'an (Shaanxi) fell 40.7%.

It is worth noting that our analysis at Greenpeace, as reported by *Bloomberg Business Week* in August last year,² suggests that China's weather conditions have not been the main contributing factor to the increase of clearer skies. Instead, the most likely main causes are:

- more policies being released that are aimed at dealing with air pollution, coupled with increased pressure to comply with them;
- more importance being placed on the need for China to change its energy mix; and

¹ Currently, there is data for 358 cities across China. In 2014, only 189 cities' data was available. Hence comparisons between 2013/2014 could only be done for 189 cities

² Larson, Christina, *China Gets a Little More Fresh Air*, *Bloomberg Businessweek*, 7th August, 2015, viewed 10th December, 2015, <<http://www.bloomberg.com/news/articles/2015-08-06/pollution-china-gets-a-little-more-fresh-air>>

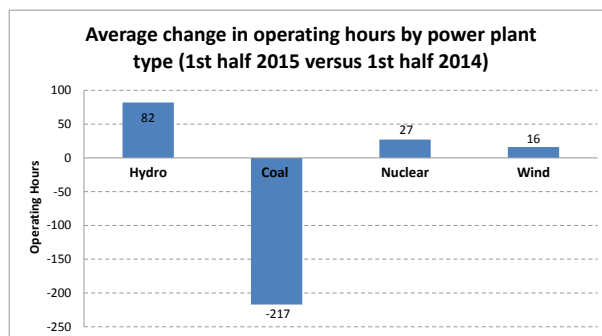
- secular and structural changes in China's consumption of energy.

While the first two recall China's *National Air Pollution Plan (2013–2017)* and its *National Energy Plan (2014–2020)*, the latter points to strong trends that are taking shape independently of these policies.

Energy statistics

So what were these secular trends? Below are some of the relevant data from China's first-half 2015 electricity statistics.³

- **Total electricity consumption rose 1.3% YOY**, the lowest growth in four years, compared to 2014 (grew 5.3%), 2013 (grew 5.5%), and 2012 (grew 5.1%).
- **By sector, industrial consumption of electricity (70% of consumption) fell 0.5% YOY**, in contrast to consumption of services (grew 8.1%), households (grew 4.8%), and agriculture (grew 0.9%).
- **Total electricity generation fell 0.6% YOY.**
- **By sector, thermal power generation (65% of generation) fell 3.2% YOY**, mainly displaced by hydro (grew 13.3%), nuclear (grew 34.8%), and wind (see below).



Source: <http://news.bjx.com.cn/html/20150723/645070-5.shtml>. Data compiled by Greenpeace and sourced from China Electricity Council.

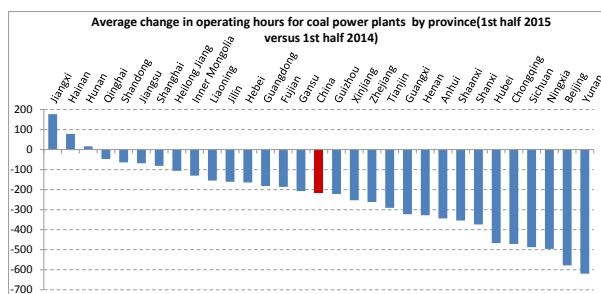
Taken together, China's changing electricity generation and consumption patterns provide further evidence that the economy is diversifying. However, although China's energy consumption growth is slowing and its economy is becoming more energy efficient, the thermal sector has not yet adjusted to this new reality and this is resulting in the formation of a 'coal power bubble'.

What's behind the bubble?

So what is this coal power bubble? Simply put, China's coal power base is expanding far faster than demand for

coal power generation. In 2014, thermal power capacity maintained its strong growth, up 6.4 per cent YOY, compared to 2013 (up 5.3 per cent), and 2012 (up 7.8 per cent). This trend continued in the first half of 2015, when capacity increased by 23.4 gigawatts (GW) (2.6 per cent YTD), the largest since 2012.

In 2014, thermal power generation decreased (down 1.6 per cent), and this continued in the first half of 2015. As a result, both thermal power operating hours and capacity utilisation rates have collapsed. This fall in utilisation was seen nationwide, with the exception of Jiangxi, Hainan and Hunan.



Source: Data compiled by Greenpeace and sourced from China Electricity Council

China's energy consumption continued to slow in October 2015. According to the latest industrial production statistics released on 11th November, 2015,⁴ thermal power generation (65 per cent of generation) in October fell 6.6 per cent YOY, which corresponded with weakness seen in China's energy-intensive heavy industrial sectors (coal, cement, glass and steel all down 9.4, 3.5, 9.6 and 0.2 per cent YOY, respectively). However, despite a drop in thermal power generation, thermal power assets continued to increase, as power companies expanded capacity.

According to a *Reuters* report on 6th November,⁵ the China Electricity Council said that there was a boom in coal power plant construction, which had increased 55 per cent YOY in the first half of 2015. Exactly how many projects have been approved this year, though? Where are they located, what are the underlying causes for this trend and what are the financial implications?

Diving deeper into the bubble

By analysing Environmental Impact Assessment (EIA) applications and approvals from the central and provincial Ministry of Environmental Protection (MEP) websites, Greenpeace found that from January–September 2015, 155 coal-fired power plants with a total capacity of 123 GW had been approved, far exceeding the number and

capacity approved in previous years.

	2012	2013	2014	2015
Number of coal plants approved	33	41	56	155
Capacity of coal plants approved (GW)	35.0	50.0	63.8	123.0

Source: Greenpeace analysis of MEP data, <http://www.greenpeace.org/eastasia/publications/reports/climate-energy/climate-energy-2015/doubling-down/>

Most of the projects are located in the key control areas, and in the central areas of the country. By province, Shanxi had both the most plants (24) and the largest capacity (21.3GW) approved in 2015. Xinjiang came second in terms of capacity approved.

There are several reasons that explain this large increase in coal power plant approvals in 2015.

First, the increase is linked to the State Council's 2013 'reduce government, delegate authority' (简政放权) initiative, which aimed to reduce red tape and bureaucracy by devolving central level project approval authority to the provinces. Between 2013 and 2015, the central National Energy Administration, the National Development and Reform Commission and the MEP began to allow their provincial counterparts to directly approve coal power projects. This was a contentious development: on the one hand, it was well received by the power sector, which wanted to expand capacity quickly; on the other, it was criticised by various environmental lawyers and officials, who believed that the sector would expand irrationally with reduced oversight.

Second, the number of coal power plants grew as Chinese mining companies, decimated by years of falling coal prices, started to diversify into the power generation business and either set up joint ventures with established power companies or went into the business by themselves. According to *Bloomberg* analysis, driven by huge margin differentials (mining: 11 per cent versus power: 42 per cent), mining companies boosted their power capacity to 140 GW, a 17 per cent gain over the past two years.

One example of this mining-to-power diversification trend is the company Shenhua, the world's largest coal company, which started to increase investment in the power business in 2011. In 2014, Shenhua's gross profits from its power business grew to 41 per cent from 23 per cent in 2012, while coal mining profits fell from 75 per cent to 56 per cent over the same period.

However, despite Shenhua's apparent success in diversifying its revenue streams, other companies may find the path is not as smooth. As indicated above, average coal power plant utilisation rates across the country fell steadily in 2015, and unless there is commensurate de-com-

⁴ Industrial Production Operation in October 2015, National Bureau of Statistics of China, 11th November, 2015, viewed 11th December, 2015, <http://www.stats.gov.cn/english/PressRelease/201511/t20151111_1271430.html>

⁵ *China should stop adding new coal-fired power plants – state researchers, Reuters*, 6th November, 2015, viewed, 11th December, 2015, <<http://uk.reuters.com/article/2015/11/06/china-coal-electricity-idUKL3N13110920151106>>



missioning of outdated capacity plant developers may be digging a bigger financial hole for themselves as electricity demand growth slows in China.

Investors should be wary: Greenpeace's study found that of the 123 projects approved in 2015, listed independent power producers (IPPs) accounted for 61 of the 123 approved projects and 49 per cent of approved capacity.

Ultimately though, the financial consequences of these underutilised coal plant assets may not completely fall on the companies, given that there is an implicit guarantee that provincial governments will bail out unprofitable state-owned company projects. At the same time, power plant utilisation rates is only one of several other factors (such as power tariffs, interest rates and input costs) that determine profits and shareholder value. Thus, even as utilisation rates have fallen precipitously, the share prices of China's IPPs were all generally flat in second half of 2015.

There is still an economic cost to be reckoned with over the long term, though: the lost potential of putting these

financial resources into more productive sectors of China's economy, and the structural costs of labour markets (workers not being retrained, new jobs not being created in alternative sectors) not reforming to meet evolving market needs.

In view of this, China's coal power bubble is perhaps the proverbial 'canary in the coal mine' – a warning of what might happen when corporate and planning developments are out of sync with broader trends. As China struggles with bad investments in other sectors as well, policy-makers might do well to avoid recreating other sector bubbles in their bid to maintain GDP growth. And for investors looking for where to park their money, all eyes should be on whether Chinese policy-makers offer prudent long-term policies (cue the 13th Five-Year Plan) to China's changing economic dynamics. **Eb**

Calvin Quek heads the Sustainable Finance Programme at **Greenpeace** in Beijing. This article was adapted from issues 21 and 22 of their regular report *Dark Clouds*.



Nations Unies

Conférence sur les Changements Climatiques 2015

COP21/CMP11

Paris, France



From L-R: Harlem Desir, French Secretary of State for European Affairs; Anne Hidalgo, Mayor of Paris; Segolene Royal, French Minister of Ecology, Sustainable Development and Energy; Matthias Fekl, French Secretary of State for Foreign Trade, Laurent Fabius, French Minister of Foreign Affairs and International Development and COP president; Ban Ki-moon, Secretary General of the UN; and Francois Hollande, President of France.

THE ROAD FROM PARIS

GLOBAL ACTION SHOULD START AFTER COP21 SUCCESS

More than a month has passed since the end of the twenty-first Conference of Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC). **Renato Roldao**, Lead Managing Consultant – Climate Change at **ICF International** and Vice Chair of the European Chamber's Carbon Market Working Group, attended this significant event as an official observer. Now that the dust has settled, Roldao says that it is important to move on and build on the political and historical momentum that was generated in Paris. This means global action.

The twenty-first Conference of Parties (COP) was almost unanimously considered a great success. It sent a strong signal to the world that not only is multilateralism as an approach to combatting climate change achievable but that the process has been revitalised, too.

This was not my first COP, but it was a very special one for what it represents in terms of giving the necessary medium- and long-term signals that were needed to trigger global convergence within this century towards a more sustainable and low carbon pathway.

The European Chamber was represented for the first time at a COP after obtaining observer status under the UNFCCC. In total, the Chamber sent a delegation of four member companies' representatives and I had the pleasure to formally lead in my capacity as the Vice Chair of the Carbon Market Working Group. As well as being a first for the Chamber, it was a first for me to act as an observer having previously participated in the COP13 in Bali as a negotiating party.

I was able to enjoy a totally different perspective of what was going on at *Le Bourget* (the conference centre) compared to those who were fully immersed in the negotiations, discussing specific, highly detailed and technical issues. This time I was able to feel the positive vibe in the corridors and see how the overall content and process was smoothly shaping up into a successful outcome under the wise leadership of COP president and French Minister of Foreign Affairs, Laurent Fabius.

So in terms of the content, what exactly are the main elements of the Paris Agreement and, more importantly, what they mean?


Since I was at COP21 representing business and the private sector I should first highlight that the Paris Agreement gives a boost to climate actions from companies that will be able to use science-based targets to reduce their emissions. Cities, sub-national government entities and individuals / civil society in general will also have more space to be part of the solution after Paris.

The final text tried to strike a better balance between developed and developing countries, and between the climate adaptation elements—which are a central pillar to help the world's most vulnerable regions—and mitigation ones. It manages to do this better than any of the previous documents approved under the convention. It sets a compromise of gradually

strengthening climate actions that will lead to further emissions reductions through global stocktaking and five-year review cycles. The national pledges or Nationally Determined Contributions (NDCs) enable a truly global and inclusive, bottom-up effort to achieve the convention's objectives.

There are other elements of the agreement that are also certainly worth mentioning:

- **Ambition:** the increase in global temperature is to be kept between 1.5°C and 2°C with global emissions to peak as soon as possible.
- **Financing:** a minimum floor for annual carbon financing post-2020 was set at USD 100 billion to poorer countries, although the role of public and private financing to make it happen still requires further discussions. Developing countries can provide climate financing voluntarily and this seems to be the approach that China had been following so far, to commit funds to south-south cooperation outside the Green Climate Fund (GCF). Countries will need to access climate financing for capacity building.
- **Monitoring and Review:** all countries should account for their emissions based on principles of environmental integrity, accuracy, completeness, comparability and consistency. There are commitments to enhanced transparency through the establishment of a robust framework under the convention that need to be further elaborated in forthcoming meetings in order to make sure that the commitments are met. There is also a long-term goal to achieve a balance of emissions and sinks (meaning carbon 'neutrality') by the second half of the century;
- **Carbon markets and market-based approaches:** there is a placeholder for future use of market-based approaches with a reference to cooperative approaches and international transferred mitigation outcomes (ITMOs). Transparent rules and details that do not risk environmental integrity are to be defined in future meetings. There is also a framework for non-market approaches.

The Paris Agreement was a breakthrough in international climate policy, but is not an end in itself and will not solve the problem of global climate change in the absence of concrete and implementable actions that should follow. It is, though, a fresh start that offers a route to the solution. 





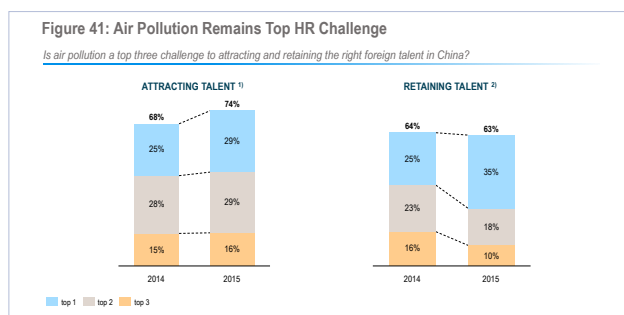
A BREATH OF FRESH AIR

HOW INDOOR AIR QUALITY IS CHANGING THE FACE OF BUSINESS

China's air quality issues have, once again, hogged the headlines in recent months. The focus has mostly been limited to outdoor air quality though. In the following article **Chris Drew**, General Manager of **PureLiving China** (Chengdu), shines the spotlight on indoor air quality (IAQ) and says that more and more companies are waking up to the fact that good air equals good business.

When you reflect on where you spend the majority of your time each day, it seems obvious that it is the quality of air indoors and not outdoors that should actually be the main focus of people's attention. The United States Environmental Protection Agency estimates that the average person spends 90 per cent of their time indoors. Whether at home, in the office or at school, it is only within buildings that individuals have control of the environment.

The European Chamber's *Business Confidence Survey 2015*, reported some significant findings related to air quality in China:



The figures speak for themselves – air pollution is a significant challenge for companies trying to hire and retain staff.

While clean office air is far from commonplace, many companies have recognised the importance of ensuring a breathable environment to differentiate themselves in a highly competitive hiring market. One way to look at this is that the cost of implementing an IAQ system can easily be recovered when considering the amount saved on employee sick days and on not having to retrain staff to compensate for staff turnover.

Good air quality brings other economic benefits, too. During the recent spate of bad air in Beijing the government declared a 'red alert', warning many schools, factories and businesses to close. Several schools decided not to, citing their clean air investments and demonstrating the level of their IAQ to justify staying open. One school administrator estimated their cost savings of not having to shut down for two days at over CNY 1 million.

There are also marketing and branding benefits. Posting screenshots of apps that monitor IAQ through corporate social media platforms is a good way to show you care about your employees; if employees can be encouraged to send their own posts these messages become potentially even more influential. This kind of communication can help to convince potential job candidates of the sincerity of a company, and even among those not considering employment it still helps to develop a positive brand

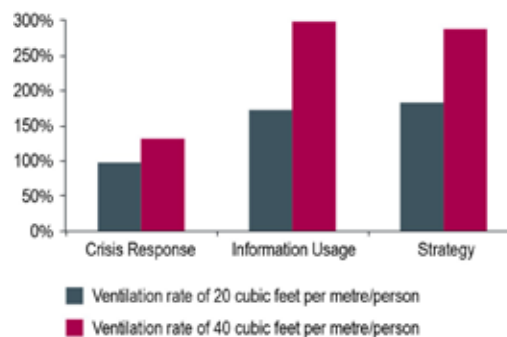
image. Being able to proactively care for staff while simultaneously presenting a positive public image of your business is a 1-2 punch that will make both HR and marketing departments exceedingly happy.



If the importance of good air quality seems so apparent, why haven't all companies implemented an IAQ plan? There are two main reasons: a lack of knowledge and the cost of implementation.

Of these, lack of knowledge is by far the bigger issue. Most people labour under the misapprehension that the building they are in automatically protects them from pollution. As air is invisible, its quality is not something that would necessarily be a concern: out of sight, out of mind. It is true that buildings can offer some level of protection but this varies with age and the degree to which the building is air tight. A typical audit will show that a building by itself provides limited protection from outdoor pollution – on average, only about a 30 per cent reduction.

More important is the level of filtration and fresh air provided by a building's centralised air conditioning and heating (HVAC) system. Most fresh air systems in Chinese buildings lack effective filtration and are essentially introducing dirty air to the inside environment. Clean air is a necessity in an office or school environment and can lead to much higher levels of productivity in analytical tasks as seen in the below Harvard study.

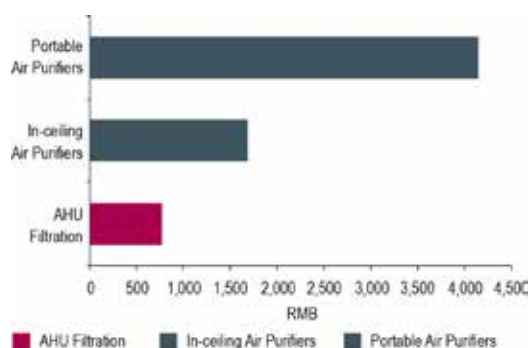




Another consideration is the human factor – if inhabitants constantly open windows this will introduce unfiltered air, deteriorating the IAQ even further. This is why education of all employees on the subject of IAQ is essential.

The costs associated with creating a clean air environment can be confusing, and in a market flooded with solutions—all claiming to produce near perfect air quality—it can be challenging to sift through the marketing and identify the reality. Is it better to install central filtration, portables, ionisation, electrostatic cleaners or other options?

Perhaps the biggest myth is that portable air cleaners are the only, or best solution. In fact, they are appropriate for areas less than 20 square metres in size, or for temporary use, but are not suitable for larger areas. In a recent study that we conducted in partnership with Jones Lang Lasalle, we analysed the filtration systems of 100 companies in 50 commercial buildings. We found that the highest reductions in particulate matter (PM) were achieved by simply upgrading the filters in central air handling units that were moving high volumes of air. If landlords or building owners do not allow modification of the building systems, the next best solution is to install commercial in-ceiling, recirculating purifiers, which clean the air faster and more effectively than portables, and have the added benefit of being quieter.



Source: JLL-PureLiving Research, 2015

The first step in an air quality assessment is producing the IAQ plan, as it is necessary to gather all relevant information and identify all potential problems before deciding how best to proceed. This will avoid accruing unnecessary costs pursuing incorrect solutions. In many cases building owners do not know how their systems are performing and would actually like to provide solutions to keep their tenants happy. This brings us back to the point that education and knowledge are the most important aspects of providing good IAQ and ensuring that companies get maximum returns on their investment in IAQ solutions.

After installing filtration systems it is important to monitor their effectiveness, using technology not occupants to operate them. The point of automation is to provide the correct levels of filtration at all times while saving money on electricity and filter costs by shutting equipment off when it isn't necessary. Automation can even control filtration based on air quality readings. When PM 2.5 levels reach a certain level the equipment is activated and can switch to higher or lower settings as appropriate. These systems operate independently of a building's HVAC system and are a good way of providing clean air and air flow during hours when the building's own system is not on.

Indoor air quality has gone from being just an afterthought to becoming a tool to aid economic productivity, a marketing vehicle and an employee attraction and retention strategy. In China's increasingly competitive market, it is not surprising that those who are leading are also the ones with a clean and healthy workplace. **Eb**

PureLiving China (www.purelivingchina.com) is an indoor environmental services consulting company specialising in indoor air and water testing, remediation, filtration systems and professional air quality monitoring. With branches in Beijing, Shanghai, Suzhou and Chengdu, PureLiving has conducted over 4,000 indoor air quality projects and is the advisor to more than a third of the Fortune 100 companies in China.



WHAT DIFFERENCE DOES A YEAR MAKE?

THE ENVIRONMENTAL PROTECTION LAW ONE YEAR ON

A year after it came into effect **Li Huini**, Partner at **Adamas**, looks at the effect that China's revised Environmental Protection Law (EPL) has had. She notes a number of concrete improvements, particularly with regard to enforcement, but says that it will not be possible to measure the full impact of the law for a few years to come.

As the EPL's one year anniversary has just passed on 1st January, it is worth reflecting on the various endeavours of all stakeholders to implement the law and, more importantly, whether these efforts are helping to provide better protection for China's environment.

Law enforcement

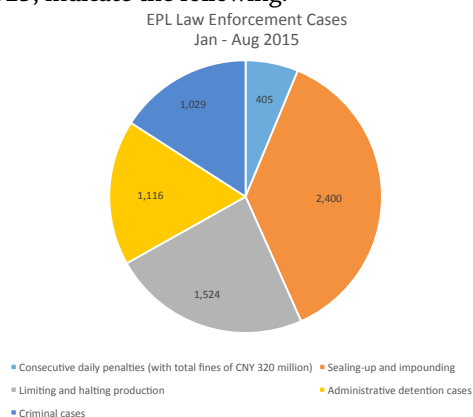
Enforcement of China's laws has always been a crucial challenge and every year the European Chamber's *Position Paper* raises this as a major concern of its member companies. The revised EPL granted public authorities more effective enforcement measures, with the Ministry of Environmental Protection (MEP) immediately promulgating a number of implementation decrees as soon as the law came into effect. These included:

- *Measures for the Implementation by Competent Environmental Protection Administrations of Consecutive Daily Penalties* (effective as of 1st January, 2015, MEP decree 28);
- *Measures for the Implementation of Sealing-up and Impounding by Competent Environmental Protection Administrations* (effective as of 1st January, 2015, MEP decree 29); and
- *Measures for the Implementation by Competent Environmental Protection Administrations of Limiting and Halting Production for Remediation* (effective as of 1st January, 2015, MEP decree 30)

Very shortly after, the Supreme People's Court promulgated the *Interpretation of the Supreme People's Court on Several Issues Concerning the Application of Law in the Conduct of Environmental Civil Public Interest Litigations*, which became effective as of 7th January, 2015.

It is certainly quite rare to have this intensity of legislative, jurisdictional and executive engagement in China, and these extremely detailed decrees provide genuine executable rules for the enforcement of the EPL.

Public announcements made by the MEP with regard to EPL enforcement achievements up until the end of August 2015, indicate the following:



Public participation

The public's right to be informed was an important concern that contributed a great deal towards the need to revise the EPL. After the law's release, the MEP promulgated:

- *Measures for the Disclosure of Environmental Information by Enterprises and Public Institutions* (effective as of 1st January, 2015, MEP decree 31); and
- *Measures for Public Participation in Environmental Protection* (effective as of 1st September, 2015, MEP decree 35).

These measures are intended to ensure public participation in environmental protection.

In addition to the requirement for public institutions and enterprises to make their pollution-related information publicly available, the MEP also started to publish complaints, actions and results of cases reported through the national environmental protection hotline, reachable by calling 12369. Social media platforms, such as Weibo and Wechat, have also become well utilised as communication tools related to environmental protection. The accessible nature of this kind of participation in environmental protection matters has managed to stimulate public enthusiasm and has led to more, and more effective, interaction between the public and relevant administrations. In some provinces cases involving public requests for information disclosure were initiated, and in Jiangsu and Zhejiang provinces, Non-governmental Organisations have become more deeply involved in the decision making processes of enforcement authorities.

Strengthening local governments' responsibilities

The EPL imposes extensive responsibilities upon China's public authorities, especially at all levels of local government. Upon the promulgation of the revised EPL, a number of local governments promulgated their own local regulations to ensure proper implementation of the law and introduced detailed local rules specifying local government responsibilities.

For example, Hebei Province promulgated the *Regulations of Hebei Province on Public Participation in Environmental Protection*; Guangdong Province promulgated the *Regulations of Guangdong Province on Environmental Protection*; and the People's Congress of Wuhan City of Hubei Province promulgated *Regulations of Wuhan on Motor Vehicle Emission Pollution Control*. These local regulations not only impose liabilities on enterprises but also increase the responsibilities at all levels of local government.

Influence on new legislation

As the basis for all other related laws and regulations, the EPL lays down the foundation and basic principles that are applicable across diverse fields of environmental protection.

On 29th August, 2015, the Law on the Prevention and Control of Atmospheric Pollution (LPCAP) was revised, eventually coming into effect on 1st January, 2016. The revised LPCAP expands its content from 66 to 129 provisions. Among other revisions, the LPCAP particularly follows the EPL with respect to:


- **The coordinating mechanism for joint prevention and control of environmental pollution in major administrative regions**, as set forth in the EPL. This mechanism is now integrated in the LPCAP as an independent chapter (chapter V) about the joint prevention of atmospheric pollution in major regions. Accordingly, the state has established a coordinating mechanism for the prevention and control of atmospheric pollution in major regions to plan and implement prevention and control work, and specify coordinated control targets in a consistent and unified way.
- **Strict legal liabilities**, especially consecutive daily penalties. The LPCAP goes a step further in adding other forms of fines and punishments. It also adds further concrete ways for sealing-up and/or impounding polluting equipment, and limiting and halting production in polluting facilities. In total, the LPCAP has established nearly 90 concrete forms of penalties.
- **Transparency and public participation**. It is specifically required in the LPCAP that public opinions shall be solicited and information shall be made publicly available with regard to: formulating all kinds of standards; communication between environmental protection administrations and local governments; lists of major polluting entities; environmental assessment documentation of new projects; key area atmospheric monitoring information and analytical results; contingency plans for heavy pollution; and major environmental emergency monitoring information.

Industrial structure optimisation

The new EPL plays an important role in the optimisation of industrial structures and, since its promulgation, environmental protection standards at national, local and industrial levels have continued to improve. The newly announced industrial standards are much stricter than before. Stricter liabilities and higher costs for illegality are forcing enterprises to increase their investments in environmental protection funds and facilities, and upgrade production equipment. Companies operating in industries that consume a lot of energy and are highly polluting, such as the ceramics, steel and textile industries, are now being forced to look for merger and reorganisation opportunities to improve their productivity and optimise their industrial structure.

In the meantime, due in part to the increase of the public's environmental awareness through the new EPL, the demand for green products is increasing. Enterprises,

machinery and technology specialised in natural resources development and protection, energy conservation and emissions reduction, resources recycling and environmental management services are entering a period of rapid development.

Over the past year, the EPL has undoubtedly brought significant improvements in terms of legislation and law enforcement in China. Its contribution to the improvement of social environmental consciousness and environmental protection is enormous as well. Despite the slowdown of the Chinese economy, which has seen the focus of local governments swing precariously between economic development and environmental protection, the legal constraints already established by the EPL have so far largely prevented local governments and enterprises from completely neglecting their environmental responsibilities. However, it will only be possible to observe over the long term just how the EPL will contribute to the healthy development of China's economy and the daily life of its citizens. 

*Founded in 1969, **ADAMAS** advises major European companies, institutions, public entities and governmental authorities on business and public law matters and assists them in litigation. In Mainland China, ADAMAS is the oldest existing foreign law firm licensed by the PRC Ministry of Justice to practice in the field of law. ADAMAS now has representative offices in Beijing and Shanghai, and partner offices in Chengdu, Guangzhou and Wuhan.*

With its professional practical experience and expertise developed over four decades, ADAMAS has now become one of the leading European law firms in this dynamic and largest economic entity of Asia. Especially in the fields of environment, energy, construction and infrastructure, ADAMAS has successfully integrated its European expertise into its China practice and shares the best know-how with its clients and partners.





GREEN BUILDINGS FOR BLUE SKIES

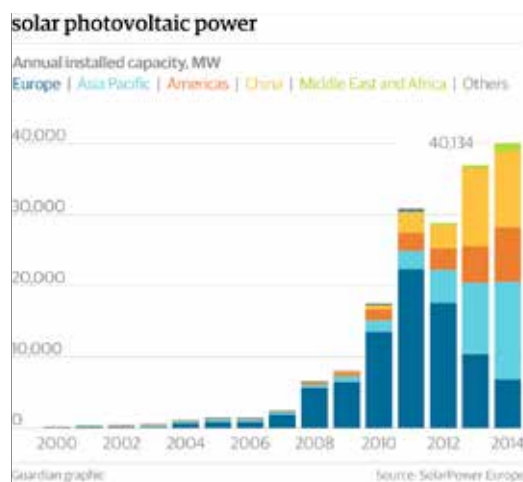
THE INCREASING IMPORTANCE OF GREEN BUILDING CERTIFICATION

While Beijing was issuing its very first pollution 'red alert' in early December 2015, around 190 world-leaders were sat around a negotiating table in Paris planning how to alleviate the planet's climate problems. During the COP21 summit, President Xi Jinping pledged to decrease China's carbon dioxide (CO₂) emissions and announced China's target of making non-fossil fuels a primary energy source. **Kent Zaitlik** and **Selena Mranata** of **Bisagni Environmental Enterprise (BEE)** says that China's aggressive sustainability policies and increase in renewable energy projects and green building practices suggests that these are not just empty promises.

Scaling the Great Wall towards improved air quality

China plans to fully implement its Emissions Trading Scheme (ETS) in the next two years for the power generation, iron and steel, chemicals, building materials, paper production and non-ferrous metals industries.

Within the power generation sector, China possessed the world's largest solar market in 2014, with a total grid-connected solar power capacity of 28.05 GW, a 60 per cent increase from 2013. In the same year, 10.6 GW of their photovoltaic (PV) power was connected to the grid.



Growth in PV power demand has led several companies to initiate unique platforms that facilitate PV employment. One such model that has proved to be successful is the purchasing power agreement (PPA) scheme, a financial agreement whereby a developer arranges the design, financing and installation of a solar energy system on a customer's property at little to no cost. The developer then sells the electricity to the host user (customer) at a fixed rate usually lower than the local utility's rate, saving the customer money while providing clean energy as well as receiving a healthy return on their investment.

China plans to spend at least CNY 2 trillion to improve its power grid infrastructure from 2015 to 2020. However, while generating renewable energy to replace industrial coal burning will certainly help improve China's air quality, introducing emission-reducing opportunities through the employment of sustainable building strategies may actually hold even greater potential.

Sustainable building and its role in China

A sustainable building is one that has been constructed using materials and processes that are environmentally responsible and resource-

efficient. It is crucial that China pursues this kind of construction, not only due to its grave pollution problems but also as it possesses the world's largest construction industry, in which further extensive growth is anticipated.

In 2006, China established their own green building standard, the Green Building Evaluation Label (GBEL), to drive sustainable building practices. This and the Leadership in Energy and Environmental Design (LEED), established by the US Green Building Council (USGBC), now serve as the two most prevalent green standards in China. So far, China has been awarded 3,165 green building certifications and has gained the title of the second largest international LEED-user nation. There are even three economic zones, located in Tianjin and Beijing, which focus on forming policies and providing subsidies for LEED projects. In addition, China has mandated that 30 per cent of its newly-constructed projects are to be green-building certified by 2020.

Green building certification: moving towards results, health and wellness

The increase in global green-building practices has led to the establishment of several novel sustainability standards, the most prevalent of these being Regenerative Ecological, Social and Economic Targets (RESET), WELL and LEEDv4. These innovative certification systems illustrate the change that is beginning to take place within the green building industry, shifting from a platform of instructive implementation to one centred on data-backed results and human health.

Focused on both the health of its occupants and result-based measures, RESET was designed to ensure that the material composition of a building's interior space meets low volatile organic compound (VOC) requirements while establishing high indoor air quality (IAQ) standards within five parameters – particulate matter (PM) 2.5, total carbon emissions (TVOC), CO₂, temperature and humidity. While spaces that are RESET-certified are beginning to take shape across the globe, they are particularly prevalent in cities across China, such as Beijing, Shanghai, Suzhou and Chengdu, and are being adopted by some of the world's largest corporations.

The WELL Building Standard focuses on implementing prescriptive and technological measures across seven categories that directly impact people's physical and mental health. Although it was only established in November 2014, WELL has already certified a total of 300 projects worldwide. Again, China is among the chief adopters and is currently in the process of certifying seven projects.

As the most widely used green building certification,

LEED is being upgraded from v2009 to v4, which will be mandatory by 16th October, 2016. Currently, there are 10 projects in China that have been certified LEEDv4, with many more registering for the designation. The main differences between these two LEED versions are within the materials and building management sectors. An increase in selectivity of green building materials has led to the emergence of informative material-management software that caters to various project types. One such cloud-based software that is beginning to take shape in China is MATTER, which optimises material searches and material documentation to offer a seamlessly integrated solution for material management, allowing firms and organisations to communicate design and corporate visioning while setting measurable material specification and project budget goals for evaluation and benchmarking. Building on this platform, MATTER is beginning to combine IAQ data and real-time, on-site monitoring to allow firms to easily specify and track low-emitting materials and demonstrate healthy IAQ levels, which may result in RESET Certification.

Much innovation is also happening in furthering the efficiency of buildings' operations. The USGBC has developed the LEED Dynamic Plaque, a tool that constantly monitors key parameters, including energy, water, waste, transportation and human experience, to determine the level of operational impact of a particular building. This tool will be a central part of a project's operations and became a requirement for achieving LEED certification on 1st January, 2016.

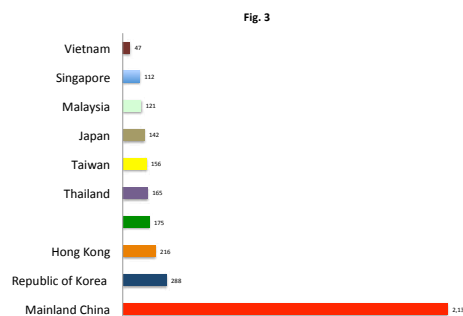
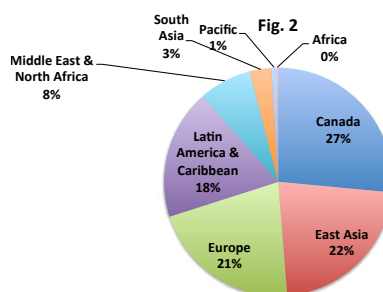
Green building users

The Chinese stakeholders who are most interested in sustainable buildings are real estate developers. They are investing significantly in projects with commercial, residential, retail and mixed-used purposes. Dalian Wanda Group, CBRE, SOHO China, Jiaming Investment and Hang Lung Properties are a few of the major players. The Wanda group in particular has already attained 322 green certifications with 2.5 million square metres of LEED-certified space. They plan to pursue LEED certifications for their ongoing 14 projects and upcoming malls.

The USGBC recently announced their collaboration with Beijing-based Shougang, one of China's largest steel companies and a Fortune 500 firm. This partnership entails the incorporation of LEED, WELL and several other green certifications to transform an old factory site, which spans over 863 hectares, into a mixed-use development. Shougang has 20 other similar projects ongoing in China.

Passing the threshold

Beyond merely employing design and technological methods to reduce energy consumption, the green building market is moving along two apparent trajectories – one that prioritises individuals' physical and mental health and another that focuses on the operation of the building through monitoring systems such as the LEED Dynamic Plaque and RESET's air monitoring platform. News about certification and project updates reflect an increase in green building projects in various parts of the world, with East Asia being at the forefront of this development (Fig.2) and China leading the pack with 2,136 LEED certified projects (Fig. 3).



That being said, Beijing's recent red alert reflects the substantial amount of action that is still needed if a noticeable impact on improving China's air quality is to be realised. With increased education on sustainability and the related lowering of costs, China should establish enough renewable energy operations and green buildings to surpass the threshold that will go towards producing a positive environmental impact. Construction of buildings that are mindful of environmental degradation and the world's finite resources is one clear measure that is able to counter the detrimental effects of China's rapid urbanisation. **Eb**

Bisagni Environmental Enterprise (BEE) is an engineering consultancy and material specialist focusing on sustainability for the built environment. BEE excels in MEP engineering and simulations primarily focusing on energy, lighting, thermodynamics, acoustical models and occupants' health and well-being, as well as certifying projects with LEED, HK BEAM, GBEL, RESET, and WELL certifications. We currently have projects in 23 countries and are proud to be furthering sustainability strategies worldwide.



CONSTRUCTING A BETTER FUTURE

Promoting low-energy buildings in China

The construction industry can act as one of the keys to successfully combatting climate change. Around 30 to 40 per cent of primary energy is consumed by buildings for heating, cooling, ventilation, lighting, cooking and other activities. The resultant CO₂ emissions account for more than one third of the global total. **Xiaotong Gao** of **Saint-Gobain Research Shanghai** explains that although the construction of low-energy buildings can help to address this problem, promoting them in China is a challenge.

Up to 70 per cent of China's energy is supplied by coal-fired power stations. Consequently, catastrophic amounts of air pollutants, such as carbon dioxide (CO₂), carbon monoxide (CO), suspended particulate matter (PM), nitrogen oxides (NO_x), sulphur oxides (SO_x), polycyclic aromatic hydrocarbons (PAHs) and heavy metals, are released into the atmosphere. This causes multiple environmental problems like smog and acid rain and contributes to health issues including chronic respiratory diseases.

A recent example of extreme pollution was witnessed in Shenyang, Liaoning Province, on 8th November 2015, when the recorded peak concentration of PM_{2.5} exceeded 1,400µm/m³. This astonishing deterioration in air quality was widely acknowledged as being caused by the city's coal-powered heating systems being fired up for the winter. Clearly, reducing buildings' energy consumption will be critical for China's sustainable development.

To reduce energy consumption in buildings there are three key technical aspects that must be addressed: ensuring buildings are properly insulated, adopting clean energy sources and employing efficient downstream technology, such as heating and cooling equipment. None of these can solve the problem on its own, so advanced solutions for all the three are needed.

Proper insulation plays a fundamental role in reducing a building's energy consumption. A poorly insulated building can be compared to a car with a leaking fuel tank: to conserve fuel, the first thing to do is to stop the leakage. Similarly, to reduce a building's energy consumption, thermal leakage through walls, windows, the ground and roof needs to be prevented, thermal bridges at various building elements need to be avoided or protected, and the airtightness of the building envelop needs to be sound. A well-insulated building can save up to 90 per cent of energy expended on heating and cooling, significantly reducing the overall amount of energy used and subsequent CO₂ emissions and air pollution, not to mention the reduction in operational costs.

Products and solutions for low-energy buildings are already available and have been for years, yet low-energy buildings are still not as popular in China as anticipated. This is not primarily due to cost, as the cost of insulation materials is only a fraction of the cost of the whole building. Therefore, in order to successfully promote low-energy buildings several other factors must also be considered.

First, nowadays, developers and contractors will engage several suppliers and evaluate a huge number of products before selecting materials for insulation, moisture control, mortar, glazing and roofing. This involves high

costs related to communication and coordination and it raises legitimate concerns over quality control due to a lack of alignment between the various products from the different suppliers that are ultimately selected. Manufacturers that can offer a wide range of products and one-stop solutions are therefore more desirable: it is more likely that the quality and performance of the building envelop can be assured because the integration of different products and materials takes place during the product design and manufacture stage.

Second, solutions must be designed with due consideration given to a building's function, the local climate and attributes of the building's occupants. A low-energy building designed for Shenyang cannot be adopted in Guangzhou because of the differences in temperature, relative humidity, solar angle and strength of solar radiation. Similarly, solutions that are suitable for schools will be different from those for hospitals, apartments and shopping malls, because the activities and needs of the occupants are completely different. Thus, a deeper understanding of building sciences and occupant preferences is required in order for the building industry to be able to provide localised and specialised products and solutions that satisfy the needs of different customers.

Third, the demand for low-energy buildings has to be stimulated among potential end-users. The general public needs to be educated on the importance of low-energy buildings for maintaining a desirable living environment, the available products and solutions that can reduce energy consumption in their homes, offices and classrooms, and how their choices and actions can ultimately help to save our planet.

This is not an action that should be undertaken solely by government and educational institutions, all stakeholders of the building industry should participate. For example, demonstration buildings are a useful tool of communication, however, most of them are accessible only to professionals. Making demonstration buildings accessible to the general public will allow them to see, touch, feel and understand low-energy buildings, which, in turn, will increase their interest in and desire for low-energy buildings. It is ultimately increased demand from end-users that will raise the low-energy building market to a higher level.

Last, but by no means least, a low-energy building must be liveable, meaning it should provide a high quality indoor environment. Optimum thermal comfort, adequate daylight, proper room acoustics and clean fresh air are all conditions that are better for the health, productivity and psychological well-being of a building's occupants.



Traditionally, Chinese customers tend to sacrifice comfort to save on energy bills. An example of this can be witnessed in Shanghai during the winter, when the indoor temperature of a typical apartment can drop to as low as 5°C, which is far below the suggested comfort temperature of 18°C to 24°C in building codes and literature. In these instances, well insulated walls and windows can make a significant difference by preventing heat loss.

Research by Carnegie Mellon University's Centre for Building Performance and Diagnostics also shows that productivity in offices can be improved up to three per cent with good thermal comfort; up to 11 per cent with good air quality; up to 15 per cent with good natural light; and up to 20 per cent with good acoustics. Ensuring a high level of comfort will therefore clearly make low-energy buildings more attractive to building owners and end-users alike.

According the Ministry of Housing and Urban Rural Development's 2013 annual report, China then had a building stock of 37 billion square metres, which had increased at a speed of 10 billion square metres per year since 2009. This high rate of growth poses a significant challenge to the overall aim of reducing energy consumption and improving building quality. At the same time, it presents an enormous opportunity

to the building industry to introduce new technologies, products and services.

In addition to energy efficiency, one-stop solutions and customised design, an end-user orientated strategy and a high level of occupant comfort are the keys to promoting low-energy buildings in China, which will eventually play a major role in reducing energy consumption and CO₂ emissions, and improving air quality. **Eb**

Mr Xiaotong Gao obtained his Ph.D. in Materials Science and Engineering from Drexel University, Philadelphia. He joined **Saint-Gobain Research Shanghai** (SGRS) in 2011, where he is the leader of the Building Physics Platform. The Platform covers research projects of building energy efficiency, thermal comfort, daylighting, room acoustics and indoor air quality, and supports the group strategy of Sustainable Habitat in APAC.

Saint-Gobain, the world leader in the habitat and construction market, designs, manufactures and distributes high-performance and building materials providing innovative solutions to the challenges of growth, energy efficiency and environmental protection. The company takes a long-term stance for its actions in order to produce for its customers the products and services that will facilitate sustainable construction and day-to-day living.



WHY WASTE IT?

Improving source separation in waste management creates energy, saves water and reduces waste.

One of the many challenging aspects of China's rapid urbanisation process is how to deal with the ever increasing amounts of solid waste that are produced. **Maximilian Rech**, Programme Director and Assistant Professor for International Affairs at **ESSCA School of Management**, provides some details on good practices in waste management and identifies areas for EU-China cooperation.



Municipal solid waste (MSW) is an important aspect of urban planning and sustainable city management. Sharing best practices of MSW management can help to clean the air and reduce green house gas (GHG) emissions. Therefore, technical and economic cooperation on urban waste management seems like a logical building block for EU-China cooperation.

According to the World Bank, MSW “comprises refuse from households, non-hazardous solid waste from industrial, commercial and institutional establishments, market waste, yard waste and street sweepings.”¹ Developing an integrated strategy for MSW management not only helps reduce waste volumes and offset resource demands, but also promises economic returns to municipalities that address sustainable urban waste management.

Waste generation and composition

When analysing MSW generation, it is important to differentiate between construction waste, industrial waste and household waste. Construction and industrial waste can represent as much as 40 per cent of MSW and the composition of industrial waste differs from one region to another depending on the dominant sector and the local industrial structure. It is therefore useful to focus on household and general waste in municipalities, which share similar patterns of waste composition across regions. This allows identifying trends and recommending policy actions to improve municipal waste management.

Per capita generation of waste varies from one country to another. Regional differences can be explained by cultural as well as economic factors.² While China’s waste generation has increased rapidly over the past decade, per capita waste generation is still relatively low. Based on World Bank figures, it has been argued that “[n]o other country has ever experienced as large and as fast an increase in solid waste quantities” as China.³ According to the Organisation for Economic Cooperation and Development (OECD), per capita generation of MSW in China is at 0.98 kg/day, comparable to the level of Mexico and slightly above the average for East Asia.⁴

Many European countries feature in the medium range of per capita waste generation with Germany generating 1.64 kg/day. Larger per capita ratios can be found in the United States, Denmark or Switzerland. While this in-

dicates a correlation between affluence and generation of MSW, this link is not undisputed due to flaws in data collection. While per capita generation increases, household waste might decrease due to increasing time spent elsewhere and decreasing amounts of meals consumed at home. Hence, the general positive correlation between increasing affluence and increasing MSW generation holds true, but more accurate data is needed.⁵



Figure 1: Generation of Municipal Solid Waste in kg/per capita

In terms of household waste composition, China features a very high degree of biodegradable waste and moisture. Scientific research suggests that China’s high proportion of organic waste is due to cultural specificity of a diet characterised by fresh vegetables and fruit. A comparison of Beijing and Berlin confirms that increasing affluence will not necessarily lead to a decrease in the amount of organic MSW generated. In both cities, the percentage share of biodegradable MSW is as high as 40 per cent. Given this high proportion of organic waste, there is considerable potential for improved source separation and subsequent composting.⁶

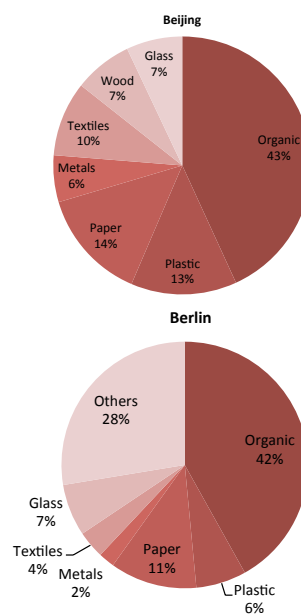


Figure 2: MSW composition in Beijing and Berlin is relatively similar.

¹ Schübeler, P., Christen, J., Wehrle, K. (1996), *Conceptual framework for municipal solid waste management in low-income countries*, SKAT (Swiss Center for Development Cooperation), p. 18.

² Zhang, D. Q., Tan, S. K., Gersberg, R. M. (2010), *Municipal solid waste management in China: Status, problems and challenges*, *Journal of Environmental Management*, 91(8), p. 1624.

³ Friends of Europe (2012), *Greening China's cities of tomorrow*. Understanding China policy briefing by Shen Wei and Peter Taylor, edited by Shada Islam and Maximilian Rech; Zhang; Tan; Gersberg, op. cit.

⁴ Hoornweg, Daniel; Bhada-Tata, Perinaz (2012), *What a Waste: A Global Review of Solid Waste Management*, World Bank, Washington, DC. World Bank, <<https://www.wdonline.worldbank.org/handle/10986/17388>> License: CC BY 3.0 IGO; Ling Qiu (2012), *Analysis of the Economics of Waste to Energy Plants in China and MSW Sorting Models in China and Potential for Improvement*, Department of Earth and Environmental Engineering, Columbia University.

⁵ Zhang; Tan; Gersberg, op. cit., p. 1625; YANG Kai, YE Mao, XU Qi-xin (2003), *Environmental Kuznets Characteristics of Municipal Solid Waste Growth in Shanghai City*, Department of Environmental Sciences, Urban & Environmental Open Laboratory, Ministry of Education, East China Normal University.

⁶ Zhang; Tan; Gersberg, op. cit., p. 1625; Chen, X., Geng, Y., Fujita, T. (2010), *An overview of municipal solid waste management in China*, in *Waste Management*, 30(4), p. 718; World Bank (2005), *Waste Management in China: Issues and Recommendations*, Urban Development Working Papers, East Asia Infrastructure Department World Bank, Working Paper No. 9.

Source separation

Source separation of household waste in Beijing and other Chinese cities can still be improved. Waste collection in Berlin, for example, is organised partly by public, partly by private entities. Residents and businesses separate their waste individually and then dispose of waste in coloured bags and bins in the courtyard. The respective bins are then collected regularly, either by a public or private MSW collection scheme.⁷ At the same time, households also participate in a deposit refund system returning bottles and cans to their local retailer.

Through source separation and the deposit refund scheme for households and businesses, Berlin realises a nine-fold source separation of MSW. This leads to more homogenous waste and has advantages for recycling and reuse of waste, but also allows for much greater recovery of energy from waste. Hence, it is not only in the interests of the environment to conduct integrated MSW management – it actually promises economic returns to any municipality willing to take these steps.

Policy recommendations and conclusion

When introducing a strategy for sustainable MSW management, it is important to involve all relevant stakeholders from civil society, business and all levels of government to ensure efficient implementation of sustainable and more efficient MSW management. While China and Germany have already introduced relatively sophisticated MSW management schemes, large-scale, nationwide standards and their implementation are still lacking.⁸

Each of the relevant stakeholders can play a conducive role: governments provide legislation and ensure implementation, civil society and businesses can increase source separation and at times offer innovative solutions to improve MSW management. What is more, mayors and local bureaucracies can play a pivotal role, especially in the implementation of waste management technologies. A closer framework for EU-China cooperation could facilitate exchange of technology and best practices – the EU-China Partnership on Sustainable Urbanisation could be a useful vehicle to structure such cooperation.

The largest potential can be discovered by introducing more biogas power plants that can divert organic waste from regular disposal to biological composting. In China, where business and household waste is made up to ap-

proximately 40 per cent of organic waste, the potential for biological fermentation and biogas production is very promising. By separating regular disposal of waste from biological waste, the moisture of the regular MSW will even decrease, leading to an increase in the caloric value of regularly disposed waste and increasing the efficiency of incineration. This, in turn, eases the demand for coal or liquefied natural gas for co-firing purposes and decreases the amount of residues from incineration. Hence, the air will get cleaner and highly toxic leftovers from incineration will be reduced. From a geopolitical point of view, this also ensures energy security by fostering further diversification of supply.

Municipal policy-makers should address six key priorities to improve integrated MSW management for sustainable urban planning in both Europe and China:

1. Improve source separation, relying on businesses and households.
2. Realise the potential of composting – energy from waste and reduced GHG emissions.
3. Enhance efficiency of incineration – energy from waste and reduced GHG emissions.
4. Reduce direct landfill disposal – reduced GHG emissions and reduced wastewater leakage.
5. Use financial incentives to prevent packaging waste – a ‘pay as you throw’ system.
6. Formalise scavenging activities – involve scavengers in municipal solid waste management.

Hence, EU-China cooperation on MSW management should focus on sharing best practices and particular focus should be paid to making more use of the large amounts of organic waste from households and businesses. To that end, all businesses and consumers need to be engaged to drive effective change. **Eb**

ESSCA School of Management is a leading European business school equipping students and managers for a successful and sustainable career while taking fully into account the human and social dimensions of a globalised world. This is achieved through high level academic and professional management programmes, developed by research-active faculty, a strong student mentoring system and respect for the traditional humanist values on which the school was founded. Established in 1909, ESSCA School of Management has ten campuses worldwide and has received the internationally renowned AACSB and EPAS accreditation.

⁷ BSR – Berliner Stadtreinigung, BSR – Berliner Stadtreinigung (2012), “Die Berliner Stadtreinigung im Überblick 2011,” Provision by e-Mail from BSR corporate communications department p. 64; Berlin Senate – Berlin Senate Department for Urban Development and the Environment (2013), “Abfallwirtschaftskonzept.”

⁸ Pires, A., Martinho, G., Chang, N.-B. (2011), “Solid waste management in European countries: A review of systems analysis techniques”, in, *Journal of Environmental Management*, 92(4), p. 1044.



A CHEMICAL SOLUTION

HOW THE CHEMICAL INDUSTRY CAN PLAY A SUSTAINABLE ROLE IN CHINA'S ECONOMY

The chemical industry has the potential to be a solution provider to many of the challenges faced by China, especially in the environmental realm. **Steffan Huber, Senior Covestro Representative**, Greater China, believes that by engaging in energy conservation, environmentally-friendly technologies and the manufacture of sustainable products, chemical companies can contribute to the advancement of China's society and can help develop technological innovation in the long term.

China's 13th Five-Year Plan (FYP) is expected to provide the framework that will allow the country to shift from an energy-guzzling economy towards a more sustainable model. The blueprint of China's roadmap for the next five years—adopted during the Fifth Plenary Session of the 18th Communist Party of China Central Committee at the end of October 2015—indicates a thorough rethinking has taken place, ranging from energy to environment. Measures are expected to include ramping up the exploration of clean, safe energy resources to replace coal and other fossil fuels as well as more stringent enforcement of environmental standards in industrial production. To this end, the government has called for the establishment of novel distribution systems for the rights to use energy and resources that will enable businesses to better pursue their interests in benefiting the people, making a profit but not harming the planet. On the environmental front, Beijing is geared to widen the range of pollutants to be controlled and sharpen enforcement.

This will have huge implications on the environment and the local energy market. China is set to enter a crucial period where it will look to redress imbalances of past decades—with an emphasis on environmental degradation—and it will provide the opportunity to explore other government agendas such as encouraging innovation and improving the quality of life.

Challenges and opportunities

Chemical companies face increasing challenges as they are perceived as the causes of many of China's safety and environmental problems. New investments in chemical facilities are more likely to encounter headwinds from the local population. After the Tianjin blasts in August 2015, a 'not in my backyard' mentality has become more prevalent, a challenge that is exacerbated by China's rapid urbanisation, which may force the relocation of chemical plants to make way for expanding residential settlements.

But that is only one side of the story. What is frequently forgotten is that the chemical industry in China has over the past two decades also produced technological advancements that have addressed many of China's challenges. Within the framework of the 13th FYP the chemical industry now has the chance to prove once again that it can be a solution provider, achieving better environmental protection and higher levels of sustainability. However, the entire industry must stringently act as one to overcome the current challenges—many of which are self-inflicted—to create a shared future and win public trust. To this end, all players have to start putting long-term viability ahead

of short-term commercial gains, and unanimously adhere to standards and existing regulations. Stricter implementation of environmental protection laws and regulations serves the interests of China and ultimately benefits the chemical industry in the long term.

Multinational companies are often better placed to weather such adjustments and leverage sustainability due to their broader and longer-term experience. Increasingly, chemical companies recognise that sustainability has to play a key role in their global strategy, including in China. With the anticipated implications of the 13th FYP regarding safer and more environmentally friendly production, upgrading of product quality and increasing sustainability, chemical companies will be expected more than ever before to adopt clean and safe production and to join hands with players across the value cycle to produce energy-efficient and emission-reducing solutions. Companies should strive to reduce the negative impact in all areas of the supply chain, production and logistics, and urge partners, suppliers and customers to adopt equally stringent measures.

A concerted effort

Over the past four decades or so, the chemical industry has been integral to the development of China's economy. Chemical companies were some of the earliest investors in China. Today, state-owned enterprises, local players and multinational companies share the chemical industry landscape as their roles are converging. Multinational companies are increasingly becoming locally rooted while more local companies are branching out internationally.

Multinational chemical corporations, with their decades-long 'clean-up' experience, can help China's overall industry raise standards through best practice sharing and dialogue. Their know-how in different aspects of chemical production, from efficient energy use and water utilisation in production, to safety standards and waste disposal, can be shared with or licensed to other chemical companies operating in China. Improvements of plants and the use of advanced energy-reducing or resource-saving technologies will help to improve production performance while at the same time reduce resource consumption and avoid waste generation and emissions.

Many chemical companies in China have started to recognise the importance of cleaner production as a business proposition. During the China Petroleum and Chemical International Conference (CPCIC) held in September 2015, some 430 Chinese chemical companies signed the Global Responsible Care Charter, formalising their commitment to responsible care, which represented a milestone in China's journey towards sound chemicals production and management.



Chemicals as an enabler for sustainability

Sustainability as stipulated in the 13th FYP does not stop at improved production processes. It calls for higher quality products and consumer solutions. Here, chemicals and materials from sustainable production can play an even bigger role in enabling applications that improve energy saving or environmental protection. Below are some examples where materials are making a difference:

- Natural resources are being depleted, yet at the same time global energy demand shows no signs of waning. Technologies for renewable energy are an answer to this trend, for example wind energy. In China wind energy is already the third largest contributor of electrical power. To ensure maximum efficiency, modern windmills need ever larger rotor blades. They have to withstand the stresses felt in the atmosphere but at the same time need lightweight materials to reduce the mass of each blade. Materials such as polyurethanes can make a difference. Mixed with carbon fibre, these wind blades can reach up to a length of nearly 60 metres.
- China has already overtaken the United States as the world's largest automotive market and millions more vehicles will hit the roads in the years to come. Vehicle discharge is one of the main culprits of the choking smog that frequently covers China's cities and the government is looking at stricter emissions standards to curb pollution. By making vehicles as light as possible, less fuel is used and less exhaust is emitted for every kilometre spent on the road. Heavy metal parts are increasingly replaced by lighter parts for chassis, interiors or windows made from high-tech plastics such as polycarbonate. Such parts are also easier to produce than metal ones and they open up new design options, especially for electric vehicles.

- As the Chinese economy matures and moves towards a service-orientated model, structured urbanisation planning becomes more critical. The Chinese Government envisions resettlement of the population in cities in a safe and sustainable manner with an overall improvement in quality of life. This will include higher energy-efficiency targets for new buildings. One of the most important aspects for ensuring a building's energy efficiency is good insulation: using superior spray foam polymers for parts of a building's overall insulation system is a highly effective way of reducing energy consumption.

The chemical industry can undoubtedly play a significant role in the new Chinese economy, not only as the provider of sustainable solutions but also as the promoter and enabler of innovative approaches and R&D efforts. In the 13th FYP, China vows to embrace a sustainable development model by implementing a more exacting environmental protection system to actively control and reduce carbon emissions. By stringently focusing on addressing its challenges, China's chemical industry has a chance to prove that it remains relevant to the country's development through the creation of value for both the economy and society at large. **Eb**

*With 2014 sales of EUR 11.8 billion, **Covestro** is among the world's largest polymer companies. Business activities are focused on the manufacture of high-tech polymer materials and the development of innovative solutions for products used in many areas of daily life. The main segments served are the automotive, electrical and electronics, construction and sports and leisure industries. Covestro, formerly Bayer MaterialScience, has 30 production sites worldwide and employs approximately 15,700 people (calculated as full-time equivalents) as of the end of September 2015.*





TAKE A DEEP BREATH AND COUNT TO 100

WHAT TO LOOK FOR WHEN CHOOSING AN INDOOR AIR PURIFIER

Some of the clear beneficiaries of China's now infamous bad air are manufacturers of air purifiers. Predictably, the decrease in China's air quality has seen an inversely proportional increase in the number of these products hitting the market. So how can you decide which one to choose? **David Noble**, International PR Manager for **Blueair** explains how to separate the wheat from the chaff.

Although the air quality in China may not have actually worsened over the past year, the frenzied media attention that the subject has drawn makes it seem like it has: it has also significantly raised awareness on this issue among the general public. Understandably, the main media focus has been on the health consequences of living with air that is heavily polluted by dust, chemicals and other particles. This has led to an increased interest in creating safer indoor environments, at home and

in the workplace. One of the options available to concerned citizens is the use of indoor air purifiers.

Yet, anyone worried about their indoor air quality will find themselves faced with a staggering choice of air purifiers from all over the world, with new brands appearing almost weekly. And, of course, all of them claim to do the job of removing airborne contaminants that can spark allergies, worsen respiratory diseases, cause headaches and leave odors.

But not all air cleaners live up to the claims of their manufacturers. Some electric air purifiers even create ozone, which can lower lung function and cause health problems such as chest pain, shortness of breath and throat irritation.

Purifying technology

Anyone looking to purchase an air purifier should prioritise performance above all else. The key factors affecting the performance of such devices are efficiency and airflow, and the way they work together to remove pollutants bombarding our indoor air.

Most air purifiers will remove particles and a few will remove gases. Some will remove both using either 'mechanical' filtration technology or 'electronic' cleaning technologies. Mechanical air cleaners involve drawing air into a unit and passing it through a fibre or other filter with different sized pores to trap particles. An electric air cleaner will use either ozone generators, electrostatic precipitators (ESPs) or ionizers. Some manufacturers have developed technology that combines electrostatic and mechanical filtration. This can produce a capture rate of up to 99.97 per cent of airborne particles down to 0.1 micron in size.

Locking in particles at different stages ensures they are never released back into a home or office environment, even when filters are heavily loaded. The early layers capture larger particles like pollen and dust, while later filter layers capture smaller bacteria and exhaust particles.

Separating the good from the bad

Scientific evidence is still being gathered about the health impact of polluted indoor air. But with such an overwhelming amount of information, how can anyone make an informed choice?

One of the more credible standards for comparing the performance of air purifiers is the one developed by the one-hundred-year young Association of Home Appliance Manufacturers (AHAM), which seeks to provide consumers a level playing field to make informed decisions about the appliances they are evaluating prior to a purchase. The AHAM has developed a system for measuring the efficiency of air purifiers called the Clean Air Delivery Rate or CADR.

The CADR indicates the volume of filtered air delivered by an indoor air cleaner. Anyone looking to potentially purchase an air purifier should find and read the AHAM label on its packaging, which lists three CADR numbers – one for tobacco smoke, one for pollen and one for dust. The higher the tobacco smoke, pollen and dust count, the faster the unit filters the air. Devices with similar CADR numbers will have a similar level of efficiency.

The AHAM recommendations state that anyone in the market for an air cleaner should first ensure that the room size on the label matches the intended room size in which the device is to be used. It is then advisable to compare the CADR number of various models.

Indoor air cleaners produced by manufacturers that participate in the AHAM programme are certified and verified by an independent laboratory, which should provide some assurance that the product will perform according to the manufacturer's product claims.

But, do they work?

A first-of-its-kind study was undertaken by Fudan University, Shanghai, in late 2015. Tests carried out on a group of young, healthy adults found that the use of efficient indoor air purification systems had clear health benefits for both heart and lung function. The Fudan study comprised a randomised, double-blind crossover trial among healthy college students divided into two groups that alternated the use of genuine and fake air purifiers for a period of 48 hours.

According to the study—recently published in the *Journal of the American College of Cardiology*—the test “demonstrated clear cardiopulmonary benefits of indoor air purification among young, healthy adults in a Chinese city with severe ambient particulate air pollution”. The authors added that one could expect even larger heart and lung benefits of air purification among particularly vulnerable people such as the young or elderly.

The study also rejected the notion that people could escape indoors to avoid outdoor pollution. Researchers found that while closing doors and windows barely reduced the concentration of PM 2.5, the use of an air purifier “efficiently reduced” the amount of fine particles in the indoor air resulting in improved heart and lung function.

Energy efficiency matters, too

For maximum performance an air purifier should run twenty-four hours a day. Research has shown that traditional room air purifiers can use approximately 550 kWh a year when running continuously, which is more energy than some modern refrigerators. This will naturally have an impact on the environment, so this is something that must be taken into consideration. When purchasing an air purifying device, it is therefore worthwhile ensuring that it is energy certified by a credible standards agency. Given that one of the main causes of air pollution in China is coal-powered electricity generation, purchasing an air purifier that is not energy efficient would be something of a self-defeating measure. **Ed**

Blueair is a Swedish air purifying company formed in 1996 that today sells in over 60 countries worldwide.

LEAN AND GREEN MANUFACTURING

HOW TO SAVE MONEY WHILE BEING ENVIRONMENTALLY RESPONSIBLE

The promulgation of China's revised Environmental Protection Law (EPL) on 1st January, 2015, led to the imposition of more stringent standards on industry. This has resulted in stronger pressure for manufacturers to reduce their overall waste. **David Collins**, Chief Operations Officer at **China Manufacturing Consultants**, looks at a number of different ways this can be achieved while simultaneously saving costs.



One goal of any factory should be to ensure that it sends no waste to landfill. Realising this concept takes a good deal of thought and coordination, but it has been achieved successfully in many places in the world. If you have a sound recycling strategy for copper, steel and other metals, you can actually sell this material and reinvest the cash made from the sale back into environmental improvement incentives for the business.

Recycling cardboard and similar materials is another great way to save or even make money for your company, and with 400 million tons of paper and cardboard being manufactured worldwide every year, any reduction in the amount sent to landfill will clearly have a significant impact on the environment. One of the best ways of achieving this is by switching to reusable containers from your suppliers. Instead of having your materials delivered in cardboard boxes, use a container that can be sent back to the supplier which they can fill again. This idea has been successfully implemented by many companies.

The automobile industry is a big user of this type of packaging. A Chinese company based in Guangdong that recently introduced reusable containers was able to pay back their investment in less than six months: a double whammy of helping the environment by reducing waste materials while saving the factory money.

When powder coating parts, many companies do not seal their powder coating area, which in itself is a hazard. If

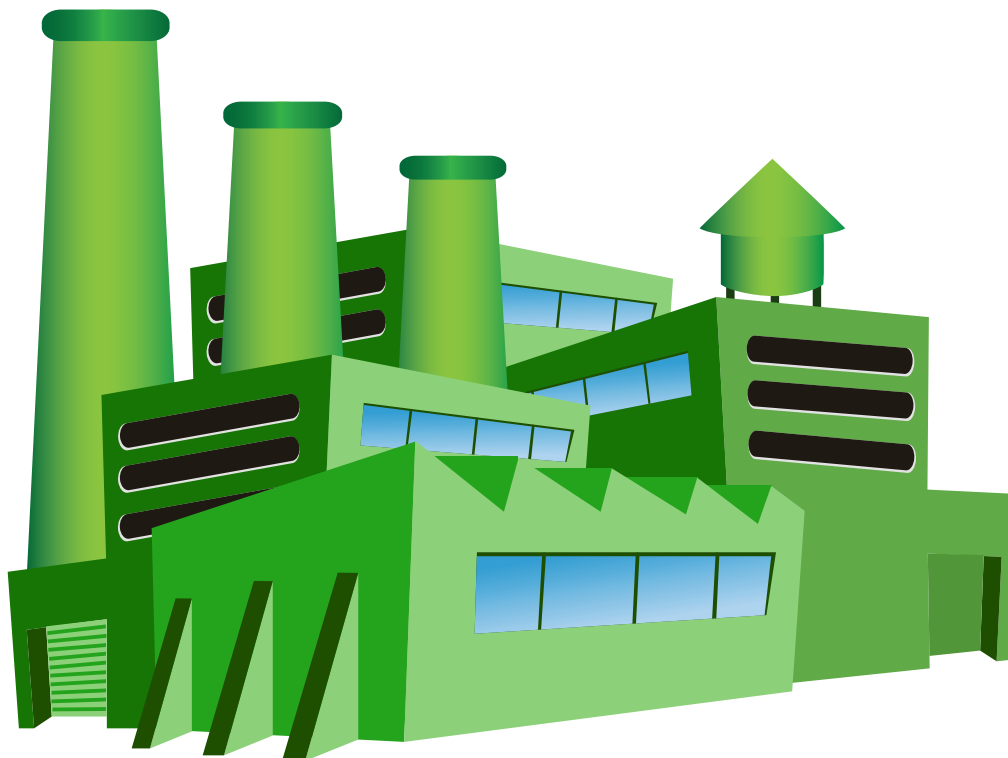
you consider that the transfer efficiency (i.e. the amount of paint that is released and deposited on the intended part) is only about 50 per cent, half the paint is being wasted. By using efficient application equipment and recovery methods a powder utilisation rate of 95 to 98 per cent can be realised.

When it comes to application of liquid paints, the paint that is left over in a spray booth can be dried and sold as fuel or, alternatively, sold to companies that produce pitch for roofing.

Working with electrostatic equipment or air-assisted airless, instead of traditional spray equipment, can save you as much as 50 to 70 per cent of your paint costs. Most conventional spray guns have somewhere between a 25 to 35 per cent transfer efficiency; good equipment and technique can get your factory in the 75 to 95 per cent range, saving a tremendous amount of money in paint as well as preventing unnecessary environmental damage.

This approach can also be applied in the dyeing industry which has traditionally been a big polluter. Instead of letting the dye wash into the river, polluting the environment, it can be captured in a water treatment facility and sold just like paint waste can be.

Excess heat produced from ovens or other factory processes can be used to heat offices or even be recycled back into the heating process itself. The amount of energy wasted from these processes is often very high: some factories can save as much of 20 per cent of their energy bill



by simply recycling or reprocessing excess heat.

Due to poor facility engineering and planning, many machines are oversized, consequently using too much energy, which costs your factory money. By fitting your machinery with variable frequency drives (VFDs) you can save as much as 15 per cent of the energy expended on a machine by only providing the machine with the amount of energy it needs to do the work.

Running a compressed air system is another very expensive process. Most factories have compressed air leaks springing out all over the factory – just listen and you can hear the hissing. By fixing these leaks the air compressor works less, saving energy and of course money. The fact is, these leaks usually cost nothing to fix, just tightening the fittings will get rid of most of them.

Factories can even generate their own energy by using wind power, solar energy or even geothermal energy. Granted it may not cover all the needs of the facility, but it can go a long way to contributing to the energy requirements of the factory.

The last and most cost effective way to help the environment and save money in the factory is by managing quality. Rework and poor quality has a number of knock on effects: it uses additional energy, causes the factory to buy more parts, requires more manpower and any scrap generated often has to be put into landfill. Good process control, well-developed standard operating procedures and a well-trained workforce will save you much money and help the environment a great deal.

It is also important to note that there are many marketing advantages to this environmentally-friendly approach to production. As social responsibility becomes more and more important to your customers, your ability to say “we send nothing to land fill” or “we recycle all our chemical waste” will become a competitive advantage. It will also give the local government a favourable impression of your company. When taking all these factors into account, not only will you be saving money, you should also be able to attract new customers and operate in a more productive manner.

To sum up, keeping your factory environmentally friendly does not have to be thought of as just adding costs. You can implement many cost-saving measures that will help the environment. And while it is true that some clean air and clean water systems are expensive to implement, they do add to quality of life. This in itself creates a demand for goods and services that will help businesses to thrive. **Eb**

David Collins is Chief Operations Officer at **China Manufacturing Consultants (CMC)**. David has more than 30 years of manufacturing experience in the automotive, computer, aerospace, chemical and furniture industries. He was a senior manager of several General Motors and Chrysler car plants, as well a general manager and site director for Foxconn. He helped set up five factories from scratch in three different countries. David is a firm believer that good manufacturing practices improve performance on cost, quality, safety and environmental impact simultaneously. He may be contacted at david.collins@cmc-consultants.com.



CHINA'S GREEN ENERGY MARKET

BUSINESS OPPORTUNITIES FOR EU SMEs

China's ongoing transition of its energy structure towards a greener, safer and more efficient model means that investment continues to flow into this sector, from both Chinese and foreign enterprises. The **EU SME** Centre say the companies that can offer high-tech solutions and know-how combined with enhanced performance and competitive pricing will be the ones to prevail.

China's Energy Development Strategy Action Plan (2014–2020)

China uses more energy and emits more greenhouse gases than any other country in the world today. The country's huge industrial sector, together with rapid urbanisation and development, has created a hunger for energy that is unsurpassed anywhere else. Faced with the task of balancing the need for perpetual economic growth with ever-dwindling reserves of fossil fuels, the Chinese Government is pushing hard for a gradual transition towards producing cleaner energy and more efficient energy consumption.

	Total	Coal power	Hydropower	Wind power	Nuclear power	Other (incl. biomass)	Solar power
2010	955.2	702	200	42	10	0.6	0.6
2014	1,360	909	301	96	20	12	22
2020 (estimated)	1,883	1,160	390	180	90	43	20

Source: EU SME Centre report *The green tech market in China* and Webinar on *Energy and the Environment in China*

In November 2015, the State Council released the *Energy Development Strategy Action Plan (2014–2020)*, which aims to promote more efficient, self-sufficient, green and innovative energy production and consumption in China.

The targets include a cap on annual primary energy consumption set at 4.8 billion tonnes of the standard coal equivalent until 2020, with a need to limit the annual growth rate of primary energy consumption to 3.5 per cent for the next six years.

The share of non-fossil fuels in the total primary energy mix will rise to 15 per cent by 2020, from 9.8 per cent in 2013, according to the plan. Meanwhile, the share of natural gas will be raised to above 10 per cent and that of coal will be reduced to less than 62 per cent.

Business opportunities for European SMEs

Progress on the ground has been impressive so far, but much more remains to be done if China wants to meet its ambitious targets.

For European SMEs, the main market opportunities will be found in areas where large SOEs or multinationals have not yet invested and where they can leverage their know-how and technologies such as water, renewable energy, waste management and industrial pollution control. Below is a list of business opportunities in these areas:

Water Sector

Water saving technologies

- Special sealing products, dynamic and static seals
- Water extraction
- Well-drilling and high pressure pumps
- Water distribution
- Network leakage detection and repair technologies
- High efficiency pumps

- Advanced water measurement technologies
- Integrated monitoring systems

Water treatment

Biological denitrification and phosphorus removal technologies

- Membrane manufacturing technologies
- Sludge treatment technologies
- Disposal equipment and automatic control equipment
- Immobilised microbe technologies

Renewable Energy

Wind sector

- Wind-to-heat technologies
- Inverter/converter technology, generators and gearboxes
- Cooling and filtration systems
- Pitch control systems

Solar sector

- Effective solutions for the management of distributed generation networks
- High quality solar rooftop solutions
- Concentrated solar power
- Thin film technology

Bio-energy sector

- Steam turbines for biomass combustion
- Auxiliary equipment such as generators, condenser systems, monitoring and control systems
- Process control technologies such as totally integrated automation, totally integrated power solutions, modular distributed control system (DCS), supervisory control and data acquisition (SCADA) and manufacturing execution system (MES) solutions
- Solutions to ensure effective plant management and operations

Waste Management

Municipal solid waste management and collection

- Equipment for sorting and washing mineral substances, and magnetic pulleys
- Combustion process technologies where the waste is not sorted, or refuse-derived fuel (RDF) combustion
- Boiler and gasifiers
- Co-firing pulverised coal boilers and fluidised bed boilers

- Circulating fluidised bed boilers and vertical boilers
- Biomass boiler systems, biomass boiler parts and services

Gasification processes

- Anaerobic digestion
- Syngas solution
- Pyrolysis
- Solid waste disposal equipment manufacturing
- Landfill leakage-proof geo-membrane
- Hazardous waste treatment equipment
- Landfill gas power equipment and large-scale livestock farm waste

Industrial pollution control

The Chinese industrial market is looking for technologies that directly minimise emissions or indirectly reduce them. Such sectors include the iron and steel manufacturing, foundry operations, metals finishing, cement manufacturing, paper and pulp, glass manufacturing, food processing, tanning and chemical industries. These industries are looking for methods to control pollution better, such as:

- Treatment techniques and disposal methods for hazardous waste;
- Direct steelmaking processes that reduce pollution;
- Modified glass making furnaces;
- Non-chlorine pulp bleaching sequences to control toxic substances such as dioxins;
- Environmental equipment – oil skimmers;
- Soil investigation and remediation technologies;
- Volatile organic compounds (VOC) control technologies;
- Catalytic materials and catalytic combustion; and
- Industrial organic exhaust gas purification.

Market challenges

The vast size of the Chinese green tech market does not necessarily translate directly into opportunities for European SMEs, though. Missing or insufficient regulations and investment incentives, the importance of strong relationships with local governments and SOEs, and increasing competition from Chinese companies are among the main factors inhibiting more extensive involvement by non-Chinese companies. Other factors such as intellectual property rights and technology localisation also strongly come into play.

Advice for SMEs

Analyse your business within the Chinese environment

- Understand if the local market is ready for your solution.
- Be flexible to local market needs.
- Prepare the necessary documentation.
- Brochures and technology descriptions need to be adapted to and customised for the Chinese market.
- Select the right people for your business.
- Learn how to build an effective local team and work with Chinese business partners.
- Develop an effective budget control.
- Be open to cooperate with other European SMEs.
- Develop detailed market and customer research.
- Define with who and how to develop your business.
- Prepare a specific negotiation strategy.
- Become familiar with how Chinese companies negotiate and adapt your strategies accordingly.

To learn more about the recent trends and business opportunities in China's green energy market, check out our webinar *Energy & the Environment in China: Development, Trends & Opportunities for SMEs* and sector report *The Green Tech Market in China*. [Eb](#)

The EU SME Centre in Beijing provides a comprehensive range of hands-on support services to European small and medium-sized enterprises (SMEs), getting them ready to do business in China.

Our team of experts provides advice and support in four areas – business development, law, standards and conformity and human resources. Collaborating with external experts worldwide, the Centre converts valuable knowledge and experience into practical business tools and services easily accessible online. From first-line advice to in-depth technical solutions, we offer services through Knowledge Centre, Advice Centre, Training Centre, SME Advocacy Platform and Hot-Desks.

The Centre is funded by the European Union and implemented by a consortium of six partners – the China-Britain Business Council, the Benelux Chamber of Commerce, the China-Italy Chamber of Commerce, the French Chamber of Commerce in China, the EUROCHAMBRES, and the European Union Chamber of Commerce in China.

To learn more about the Centre, visit website www.eusmecentre.org.cn



EUROPEAN CHAMBER LOBBYING HIGHLIGHTS

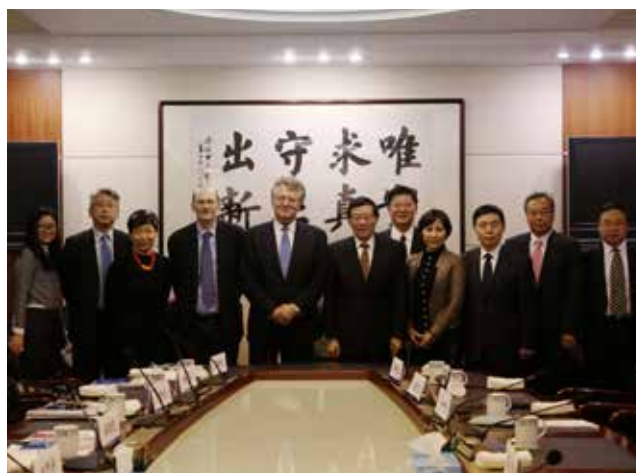


An Exchange of Views with AIIB President Designate Jin Liqun

Before the Chamber's Annual Conference commenced on 1st December, President Wuttke and Executive Council (ExCo) members met with Mr Jin Liqun, AIIB President designate. The two sides exchanged views on the latest developments of China's economy and the implementation of reforms. Mr Jin outlined the new bank's plans, policies and expectations. In response, President Wuttke and ExCo members expressed their support for the AIIB's future projects and hopes for strong involvement by European businesses in their development.

Constructive Dialogue with the President of the SCDRC

Chamber President Jörg Wuttke provided a briefing to President Li Wei of the State Council's Development Research Council (SCDRC), on 26th November at SCDRC headquarters. The briefing covered the key recommendations from the Chamber's *Position Paper* as well as feedback from Foreign Invested Enterprises (FIEs) on the current state of China's reform progress. In response, President Li outlined some of the challenges China is now facing as well as the difficulties involved in implementing reforms at the local level. They also exchanged views on overcapacity in various Chinese industries and opportunities for further cooperation at the working level between the Chamber and the SCDRC.



Shanghai Vice Mayor Zhou Bo Provides an Update on the FTZ

On 2nd December, Shanghai Vice Mayor Zhou Bo gave President Wuttke an overview of recent developments

in the China (Shanghai) Pilot Free Trade Zone and plans for future financial reforms. President Wuttke

presented Vice Mayor Zhou with a copy of the Chamber's Position Paper, and introduced some of the key recommendations of relevance to Shanghai. The two agreed that the Chamber and Shanghai

government should maintain regular dialogue and Vice Mayor Zhou acknowledged the Chamber's important contribution to China, and Shanghai in particular.

“I Always Looked to the Chamber for Information on China”: Lord Mandelson Meets Advisory Council Members

Lord Peter Mandelson, former European Trade Commissioner and former British Deputy Prime Minister, expressed his appreciation for the Chamber during a meeting with members of its Advisory Council on 18th November in Beijing. He also stated that as EU Trade Commissioner he always looked to it for information on China. In conversation with Chamber Vice President Bertrand de la Noue, former Chamber President Davide Cucino, Secretary General Adam Dunnnett and other Advisory Council members, Lord Mandelson discussed the role that the AIIB will play on the global stage and the opportunities it will create for business. Vice President de la Noue outlined the effect of China's current business environment on European businesses and the question of whether the fourth plenum's focus on the rule of law has led to any improvements. Secretary General Dunnnett also briefed Lord Mandelson and Advisory Council members on recent developments in security-related issues of relevance to European businesses in China.



Lithuanian Businesses' Interest in China

The Chamber recently had an opportunity to learn more about the interests of Lithuanian businesses in China. This took place on 29th October when Secretary General Adam Dunnnett met with the new Lithuanian Ambassador to China, Ina Marčiulionytė. The Ambassador stated that Lithuania has been pleased with the services offered by the EU SME Helpdesk and IPR SME Helpdesk that the Chamber co-implements. She also revealed the country's interest in expanding access to China's food and beverage market. As Lithuania had just reached an agreement with China to ensure access to the latter's market for dairy products, this was highly topical. Secretary General Dunnnett provided the Ambassador with a briefing on recent developments in security-related issues and the two sides agreed to assist each other in developing their respective media operations in Lithuania and China.





IN THE DRIVING SEAT

Serafino Bartolozzi has worked in the automotive industry for 32 years, covering various responsibilities from assembly and welding production units, to quality; from operating technical help desks to aftersales. Serafino, who is Director and General Manager Asia-Pacific of the aftermarket for **MAHLE**, became Chair of the Chamber's Auto Components Working Group in March 2015. He has been in China for over seven years.

Have you found the role of Chair fulfilling so far?

It is a challenge as much as it is rewarding. As a businessman the way I conduct business is more technical and less political, perhaps more straightforward. When representing the Chamber we have to deal with different companies that all have varied policies, cultures and mind-sets, so it's very important to understand, mediate and compromise. The challenge is switching between different modes of thinking. The reward is to accomplish a better business environment for all auto components suppliers.

What do you feel are the main differences in China's auto components industry/market now, compared to when you first came to China?

When I first arrived in China the market was extremely small. Companies were just betting and hoping for returns and future growth. In some cases, especially among European companies,

the growth is now there but not always with satisfactory returns.

The Chinese authorities have started to address the issue of the strong presence in the aftermarket of the OEMs (original equipment manufacturers) – they have pared down their unrivalled market position, but this situation still needs further improvement.

Are you positive about future market development?

Yes, I am definitely positive. The Chinese authorities are taking some very important steps in regulating the market and there are some similarities to the situation in Europe as it was more than 20 years ago that led to the introduction of specific laws. Observing the dominant position held by OEMs, the EU introduced the Motor Vehicle Block Exemption Regulation stipulating that OEMs must publish all the information related to how to diagnose and repair their vehicles. This knowledge was previously held by the OEMs and only

distributed throughout their authorised network. Other provisions state that OEMs cannot prevent auto components suppliers from participating in the independent aftermarket. The implementation of this law opened up the possibility for this market to develop.

However, the situation in China is complicated by the fact that its market is so much bigger and the vehicles are totally different – there are so many different brands and models that didn't exist back then. In China there are all the foreign brands, plus around 50 Chinese vehicle manufacturers. The problem is amplified by the complexity of the vehicles – they have now become computers on wheels. Nowadays, in order to understand the condition of a car you have to plug it into a computer, so the situation is quite different in this respect.

What are the main market access issues that European auto components companies face in China?

Challenges include the fact that Chinese entrepreneurs are moving fast and are catching up with technology and business practices, so the lead that European companies have is becoming narrower. This could be on the one hand a threat if we do not restructure ourselves to be able to compete. But this could also be a stimulus for further improvement and force companies to understand Chinese culture better and the dynamics that are regulating the market in China – they are totally different to those in other large markets in the world.

Counterfeiting is for sure the biggest problem. It is a plague in our industry and we estimate that for every genuine product we sell there are between five and eight counterfeits that are sold. That isn't just limited within China because we see exports of counterfeit parts around the world. Counterfeits are also found in Europe, too, but this problem is more prevalent in areas where there is less attention paid to IP issues, such as in certain parts of Southeast Asia and Africa. The counterfeits that turn up in other markets mostly originate from China.

With China's economy slowing, how is the auto components industry adjusting?

We see that passenger car sales are almost the same as last year, but in commercial vehicles we


see a tremendous drop – our sales in this segment are more than 30 per cent down. This could be an indicator of the economic slowdown. The point is that all players in the industry—both the auto components suppliers and the OEMs—have an increasingly high production capacity, meaning that fixed costs are significant. If the output of these factories dips below 80 per cent of their nominal capacity, which is normally the break-even point, then there will be a very uncomfortable situation: OEMs will have to reduce vehicle prices and apply more discounts, and specifications may be reduced in a bid to keep the factories working as much as possible. Of course the margins will be much lower and this will need to be compensated by asking the parts suppliers to lower their prices. So there could be a squeeze at all levels.

If fewer vehicles are sold then the average age of cars will be older and that of course means they would require more maintenance and repairs, which could be good for the aftermarket. However, the market is also about sentiment, so if people think that the situation is not going to be good maybe they will use their car less and will perhaps be more inclined to buy cheaper or even counterfeit parts.

Do you think some companies may move their manufacturing bases out of China?

No, I don't think so. I don't see much demand coming from other Asian markets except for perhaps India, although even there the scale is much, much smaller. So there isn't really anywhere else that could generate the same demand as China. Most of the players in the auto components industry have made large investments in China that now oblige them to stand firm, particularly in light of the fact that things may look a lot better in a few years' time, so you cannot just walk away. Furthermore, China has developed an impressive infrastructure that no other emerging country in Asia can match.

What would you consider to be the major lobbying successes of the working group?

The AML, and more recently the draft recommendations that have been published on repair and maintenance information having to be distributed by OEMs to any operator in the aftermarket – these are two of the biggest achievements. 

A hand holding a large white padlock against a background of floating currency symbols and binary code.

CAN YOU KEEP A SECRET?

BEST PRACTICES FOR THE ENFORCEMENT OF TRADE SECRETS

Having trusted IPR enforcement mechanisms in place is crucial for China as it looks to increase the role that innovation plays in its economy. Following exchanges in Beijing and Guangzhou between European and Chinese IP experts in 2014-2015, areas for improving China's system for protecting trade secrets were identified. In the following report, **Daide Follador**, Technical Expert at **IP Key**, summarises the output of the discussions that took place and some of the recommendations drafted by the external experts that emerged as a result, in the interests of improving China's trade secrets' enforcement system for the benefit of both domestic and foreign companies in China.

Enforcement and coordination between administrative and criminal authorities

China's current administrative enforcement system for trade secrets struggles when it comes to the application of criminal thresholds. Assessment of such a value is challenging due to the fact that establishing the 'profits and losses' related to a trade secret's misappropriation in the early stages of an enforcement action is difficult, when the right holder and authorities often lack reliable information on the extent of the infringement. This results in a low rate of criminal enforcement initiated by right holders.

However, further consistency and coordination in the application of the criteria for calculating criminal thresholds could be achieved, for example, by encouraging permanent coordination committees formed by the State Administration of Industry and Commerce (SAIC), Public Security Bureau (PSB) representatives and judges.

Criminal enforcement: is a value threshold even needed?

It is noteworthy that financial thresholds are not applied by the vast majority of European countries. It is widely agreed in the European Union (EU) that there is no rationale for such a requirement. Since a theft is punished irrespective of the value of the stolen object, there is likewise in principle no reason to preclude application of criminal law according to the extent of the loss suffered by the defendant, while the judge should modulate the severity of the charges and punishment on a case-by-case basis. Although in China the application of criminal penalties should also take into consideration the existence of administrative punishments.

Constitutive elements and legal definition of trade secrets

In most European countries, an infringer can be sued or prosecuted once he/she obtains a secret without the owner's consent, even if the secret is not used to produce similar products. Courts in the EU usually make a distinction between trivial knowledge available within a corporation and sensitive commercial or technical information.

They then consider the various steps that have been taken by the owner of the trade secret(s) to preserve confidentiality, such as whether a file is specified as 'private' or 'confidential', access restrictions are in place, confidentiality agreements have been entered into with employees or third parties, or data encryption has been applied. Consequently, proof of whether or not the defendant actually knew that the information was secret is not required if it he/she objectively *should* have known. This requires a balanced assessment, and it is up to judges to decide on a case-by-case basis whether a product benefits to a *significant degree* from a violated trade secret.

Looking at the Chinese legal framework, it would be worthwhile confirming that both direct and indirect un-

authorised use of a trade secret is prohibited.

Evidence collection and burden of proof

Evidence collection in China is problematic due to several factors, such as the absence of a discovery procedure and the fact that preference is given to documentary evidence over witness testimony.

Also, as the infringer has absolutely no interest in cooperating with the claimant, it is extremely difficult to collect and submit evidence of misappropriation or violation of trade secrets. In addition, the evidence collection system remains largely dependent on the investigative powers of the administration/court, which can issue orders to the infringer to exhibit documentation and evidence. However, in practice, evidence collection remains largely ineffective due to the relatively low fees applicable in cases of non-voluntary compliance.

As to the burden of proof, it may be very useful to implement the practice of pre-trial evidence preservation procedures in the Chinese court system as well as to support *ex parte* investigations. To date, this has been limited, particularly in comparison with other IPR.

Proving trade secret misappropriation in China is generally more difficult than in Europe, since Chinese courts place a heavy burden on the plaintiff to provide direct evidence of a trade secret's misappropriation. Plaintiffs usually don't have the means of proof, apart from initial/circumstantial evidence or reasonable assumptions.

It is also significant that Chinese courts usually only apportion a relatively low evidentiary value to court experts' opinions, when in fact they could be crucial in proving that a defendant's products incorporate a trade secret and that it was acquired illegitimately. This is in contrast to many EU courts where much greater evidentiary value is placed on circumstantial evidence and experts' opinions.

Preliminary injunctions

Preliminary injunctions play a key role in limiting the adverse consequences of a trade secret's misappropriation. Ordered in due time, they represent the only way to limit the prejudice suffered by the claimant. However, in contrast to the Chinese Patent Law, Trademark Law or Copyright Law, the use of preliminary injunctions in trade secret cases has been rather limited in China.¹

Provisions in force in many EU Member States ensure that the competent judicial authorities may, at the request of the trade secret holder, order interim measures against the alleged infringer to impose the cessation of the use/disclosure of the trade secret on an interim basis,

¹ The first time a preliminary (pre-trial) injunction was used was in the *Eli Lilly vs Huang* case on 2nd August, 2013, when the Shanghai no.1 Intermediate Court issued an order prohibiting the defendant from further disclosing, using or allowing others to use the alleged misappropriated trade secret.



as well as bans on producing, offering, placing on the market or using infringing goods, inclusive of seizure and prohibition of importing/exporting or storing infringing goods for such purposes.

These measures are aimed at providing right holders with effective tools to contain the adverse consequences of an alleged infringement in urgent cases and according to the experts these should therefore be further promoted in the Chinese Court enforcement system.

Confidentiality in enforcement proceedings

Maintaining confidentiality in enforcement proceedings is essential to prevent further violations, but this must be balanced with parties' rights to access hearings or evidence.

Experts recommend:

- implementing a consistent practice in court and administrative proceedings allowing a party to black out certain confidential elements (such as the names of the clients on a customer file or sensitive technical information) when they play a secondary role and do not impact assessment of evidence;
- restricting access to hearings to the parties and their legal/technical counsels, to preserve a trade secret's

confidentiality; and

- ensuring the confidentiality of technical experts, through the signing of non-disclosure agreements (NDAs).

Assessment and awards of damages

In some EU jurisdictions, like Italy, damages in trade secret violations cases are assessed according to the same criteria as those applied to other IPR infringement cases. A trade secret right holder may be awarded a sum which corresponds to either the infringer's profits or the rights holder's losses, whichever the greater.

In order to calculate losses, the first aspect to be taken into account is *how much more* the right holder would have earned compared to the actual revenues in the years of reference if it had been marketing its goods or services without benefiting from the availability of the (stolen) trade secret(s). The sum the right holder would have spent to market the products or services incorporating the trade secret is then deducted from this amount.

Assessing the greater profits made by the infringer requires consideration of the greater revenue earned, by deducting from such revenues (only) the expenses that would not have been borne if these goods or services had never been marketed.

Other elements to consider in the assessment of damages should include, image/reputational damage, prejudice to goodwill, advertising investments made over relevant years and legal fees, among others.

Exchanges held in Beijing and Guangzhou showed that Chinese courts apply the same general principles for calculating damages as in the EU, although in the practice there is a lack of consistency among different provinces and a number of difficulties in the assessment of damages still remain. This situation is definitely expected to improve in the future practices of China's newly established IP Courts.

In the judicial practice of many EU Member States, competent judicial authorities may order that information on the origin and distribution networks of the goods or services which infringe IPR be provided by the infringer and/or any other person involved in the distribution of infringing goods.

Since infringers' account books are seldom available, or reliable, in China it is challenging to accurately assess profits/losses incurred. Statutory damages are therefore the last resort for trade secret holders.

A trade secret owner may seek damages according to Article 20 of the Anti-unfair Competition Law but a large majority of trade secret holders consider the amount of damages awarded by Chinese courts to be still insufficient.

Both EU and Chinese experts agree that the damages from trade secrets' violations do not only originate from direct losses/profits, and that the 'competitive advantage' of holding and exploiting a trade secret should be also taken into consideration. It was noted that while the administrative authorities are currently unable to award damages, if this power was granted to the SAIC/AIC it could act as an additional deterrent to potential infringers.

Employment relations and violation of trade secrets

In China, while theft of trade secrets by former employees is a pattern in most trade secret infringement cases right holders face several difficulties in enforcement actions, mainly due to the high burden of proof.

The Chinese Labour Law currently provides that the parties involved in an employment contract may reach an agreement on matters concerning the commercial secrets of the employing unit. Employees who are in violation of the conditions specified in the law or violate terms on confidentiality agreed upon in employment contracts—and thus have caused economic losses to the employing unit—shall be liable for compensation in accordance with the law.

One of the proposals suggested by experts at the Beijing workshop was to introduce a presumption that, in force of an employment contract, an employee is bound to keep


confidential any information obtained during the employment period. The obligation to not disclose confidential information should continue after the employment relation terminates.

In the Italian Civil Code, for example, any breach of a NDA leads to contractual liability together with extra-contractual liability since trade secrets are considered IPR to the full extent. In China, protection of trade secrets is limited to competitors: under the Anti-unfair Competition Law, only action against competitors is allowed, not against non-competitors/individuals.

During the workshops it was suggested that the future reform of the Anti-unfair Competition Law includes a provision that trade secrets can also be enforced against non-competitors, in particular against former employees/shareholders.

Current workings of revision to the trade secrets' law

The State Council Legislative Affairs Office included the reform of the Anti-unfair Competition Law among priorities for preparatory work and submission to the National People's Congress during the balance of 2015. An amendment to the Anti-Unfair Competition Law was included in the legislative agenda of the Standing Committee of the 12th National People's Congress, and the State Administration of Industry and Commerce (SAIC) completed a draft revision of the Anti-unfair Competition Law at the end of May 2015.

Ever since its adoption and implementation in 1993, China's Anti-Unfair Competition Law has not been amended. Over the recent years, many new issues and challenges have emerged in anti-unfair competition, including those related to trade secrets' protection. As China is making efforts to build an innovative nation, it is necessary to amend the Anti-Unfair Competition Law, for the purposes of actually addressing the issues of IPR protection in this area, encouraging fair competition, and preventing unfair competition behaviour, as well as protecting lawful rights and interests of businesses and consumers. 

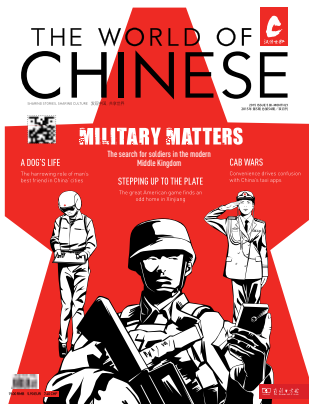
*The **IP Key** project is the European Commission's financial vehicle for the EU-China New Intellectual Property Cooperation, an agreement between the EU and China. Concluding in 2016, this three-year project is building on the long and productive history of EU-China cooperation on IP issues. IP Key focuses on facilitating the development of an IPR framework in China that is increasingly effective, fair, transparent and otherwise based upon international best practices. It is a platform for cooperation and acts as bridge between EU and Chinese agencies in order to create an IP landscape that benefits both Chinese and EU Industry operating in China.*

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Every year both Chamber staff and management take a moment to recognise the outstanding work of their fellow colleagues. The Peer Awards are given to colleagues nominated by their peers, and chosen by the Chamber's Management Committee. The Secretary General Award is based on nominations by the Chamber's Management Committee and chosen by the Secretary General. Winners of both awards receive a plaque and a gift from the Chamber.

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Ziting Zhang and Loretta Luo – Beijing Chapter

Awarded for their lobbying success on the Food Safety Law, Article 81.

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Awarded for always being the first to lend a hand when needed, and also her dedication to her job.

Volker Mueller – Beijing Chapter

Awarded for his commitment to the job, especially his role as coordinator for the *Position Paper 2015/2016*.

EUROPEAN CHAMBER EVENTS GALLERY

BEIJING CHAPTER



1



2



3



4



5



6

M&A Conference 2015 (1)

On 17th November, the Chamber hosted our M&A Conference providing an overview of the latest trends, the legal framework affecting M&A transactions and other practical advice. The event was sponsored by FTI Consulting.

Exclusive Dialogue on the New Food Safety Law with DG Lin Wei, AQSIQ (2)

On 18th November, the European Chamber and AmCham China hosted an exclusive dialogue with Director General Lin Wei of the Bureau of Import and Export Food Safety, AQSIQ, who gave a briefing on China's new Food Safety Law.

2015 Year-end Review: Would China's One Belt, One Road (OBOR) Initiative Really Work? (3)

On 26th November, the Chamber organised a seminar on exploring OBOR from a risk assessment perspective.

European Chamber Annual Conference 2015: The Changing Landscape (4,5 & 6)

On 1st December, the European Chamber's Annual Conference attracted more than 200 people, with high-level speakers engaging in in-depth discussions on China's changing landscape. We thank our sponsors Nokia, Roland Berger, SGS and Wyeth, and lucky draw sponsor Emirates.

NANJING CHAPTER



Winter badminton tournament (1)

On 6th December 2015, the Nanjing Chapter organised a winter badminton tournament with seven teams participating, including members and non-members.



Meeting the Jiangsu Government (2)

The *Jiangsu Government Dialogue 2016* was held to strengthen ties between our members and the local government. A total number of 26 government officials from 14 Jiangsu Provincial Government departments and over 100 members from 42 European companies attended. Jiangsu Television Station (JSTV) reported the event.

SHANGHAI CHAPTER



CSR (1)

On 25th November, 2015, the European Chamber celebrated the 10th Anniversary of the Corporate Social Responsibility Forum with a conference at CEIBS campus. The conference was attended by 150 guests and speakers from multinational corporations, non-governmental organisations and local media. Corporate sponsors for this event were Mary Kay, Merck, Michelin, Storaenso, Unilever, United Technologies, A&Z Law Firm, Bayer, Arkema, Lego and Lanxess.



China Economic Outlook 2016 (2)

On 2nd December, 2015, the European Chamber was delighted to host a discussion between Alfred Schipke, IMF Senior Resident Representative in China, Gary Liu, Executive Deputy Director for CEIBS Lujiuzi Institute of International Finance, Simon Rabinovitch, Asia economics Editor at the *Economist* and Jörg Wuttke, President of the European Chamber, on the most pressing economic, political and social issues in China for 2016.

SOUTHWEST CHINA CHAPTER



European Chamber Southwest Chapter 10 Year Anniversary (1)

On 27th November, 2015, more than 240 members and friends, including representatives from local government bureaus, consulates and media, came together to celebrate the European Chamber Southwest Chapter's 10-year anniversary.



InterChamber Christmas Charity Party (2)

The European, American and British Chambers held a joint InterChamber Charity Christmas Party on 5th December, 2015, to raise money for the Hopeful Hearts Charity, which is helping disadvantaged children who need heart surgery.

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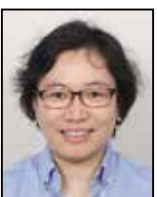


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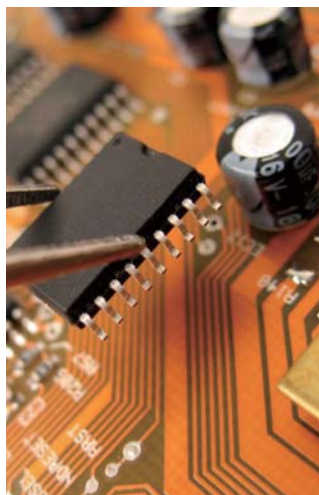
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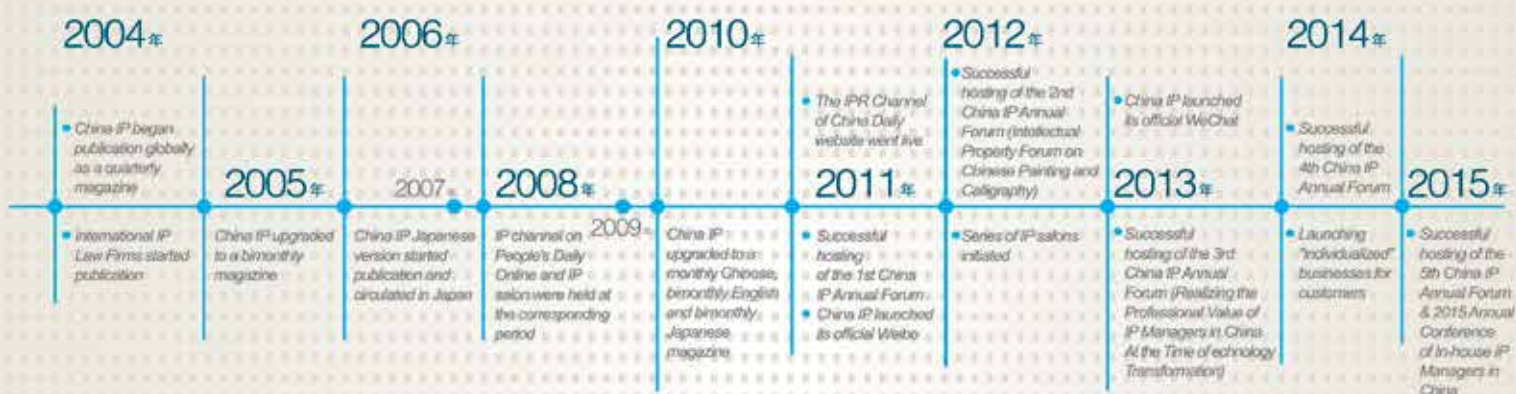
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