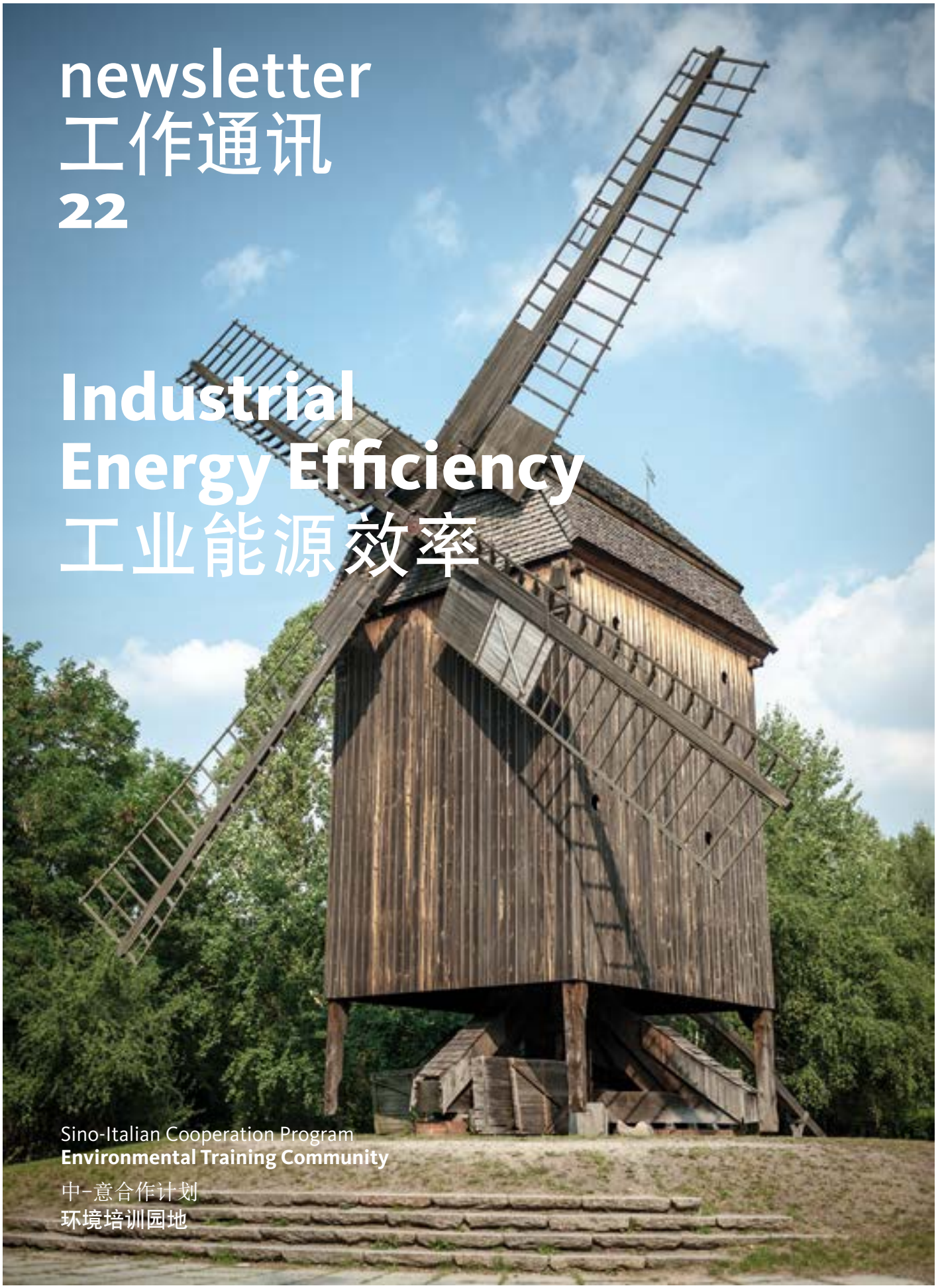
newsletter
工作通讯
22

Industrial Energy Efficiency
工业能源效率



Sino-Italian Cooperation Program
Environmental Training Community

中-意合作计划
环境培训园地

2014 Quadrimestrale Poste Italiane S.p.A. Spedizione in Abbonamento Postale – 70% DCB Venezia

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MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE

Venice International University

AGRINNOVA

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工作通讯电子版

Industrial energy efficiency cannot be left only to the market

There is a widespread agreement that fulfilling the increasing worldwide demand for economic growth by using the same growth model of the past 250 years in the now mature economies would lead to unsustainable outcomes. The need to combine economic growth with preserving a clean and safe environment has led to the concepts of "green economy" and "green growth". Green growth requires "decoupling" between the scale at which the economy expands and the rate at which the environment is used; with reference to energy, this requires not only that the energy intensity per unit of GDP declines over time, but that the rate at which it declines is higher than the rate of GDP growth. Green manufacturing is also crucial in improving "decoupling"; it differs from conventional manufacturing in that it is explicitly organized to reduce the amount of natural resources needed to produce finished goods through more energy-efficient and materials-efficient processes, and through more efficient transport and logistics, which account for a significant percentage of the total environmental impact of manufactured products. Manufacturing industries must pursue a life-cycle approach which requires: 1) re-design of products and productive systems towards closed-cycle manufacturing; 2) cleaner technologies that reduce emissions and integrate by-products into the production value chain.

Green manufacturing must be of a closed-cycle type, extending the life-span of manufactured goods, by making recycled goods available for re-use and reducing the need for raw materials. Energy efficiency is fundamental in achieving green manufacturing. It is a popular view among economists that energy efficiency can be improved through the market mechanism. The argument is that if people realize that the costs of energy efficiency improvements are lower than the present value of future benefits from energy saving, they should spontaneously spend in investment to increase energy efficiency.

Things however are not so simple when investments in energy efficiency are involved. Investments have to be made now, while energy consumption savings will come in the future. People are sure of the present investment costs, while they are uncertain about the time and the amount of future consumption savings. Moreover, people may have financial constraints to make fixed investments in energy efficiency. If the energy savings were perceived as providing true credible gains, energy saving companies (ESCOs) should emerge and develop to exploit them in providing energy saving services. But the success of ESCO turns out to be much less than expected, and policies are required to support energy saving investments. Even energy utilities have to deal with difficulties in implementing energy efficiency programs, because usually this implies rising energy bills, and promising future savings in terms of lower future bills, which is not always seen favorably by energy consumers. This is why it seems rather unrealistic to imagine that energy efficiency as a way to greening manufacture can be left to the market without an explicit direct government investment initiative. Higher prices for more energy consuming ways of producing, introduced through environmental taxes and/or auctioned tradable emission permits, can provide the right incentives towards improving energy efficiency investments; the result can be reinforced if the revenues from these instruments can be devoted to supporting tax reductions on investments devoted to the same objective.

Ignazio Musu
President, TEN Center, Venice International University

提高工业能源利用效率不能只靠市场机制

普当今社会已形成遍共识，即：在成熟经济背景下，利用过去250年发展经济的模式来满足现在不断增长的世界需求只能导致不可持续发展的后果。将经济增长与保护清洁与安全的环境相结合，则需要发展绿色经济和推动绿色增长。绿色增长需要"在经济增长规模与利用环境比例之间 "脱钩"；具体到能源领域，则不仅要求持续降低单位GDP能耗强度，而且要求其下降的速率高于GDP增长率。绿色工业也存在逐步"脱钩"的问题：与传统工业不同，绿色工业要求在生产过程中采取提高能效、降低物耗、提高交通运输与物流效率等措施，来降低所生产产品的自然资源消耗率，从而大幅降低对环境造成的影响。发展绿色工业必须依照生命周期的科学方法：1）重新设计产品和生产系统，以实现封闭式循环生产；2）采用清洁生产技术，减少污染物排放，并将副产品整合到生产价值链中。绿色工业必须是封闭式循环，包括延长产品寿命、利用可回收物资、减少原材料需求等。

提高能效是实现绿色工业的基础。经济学家们普遍认为通过市场机制可以实现提高能效。持这种观点的依据是，当人们意识到提高能效的成本低于节约能源所获得未来收益现值，那么人们自然会主动投资提高能源利用率。

但对提高能效投资并不是一件简单的事情，主要问题是现在就必须拿出投资，而节约能耗则只有到将来才可实现。换句话说，人们对现在的投资成本是很确定的，但对未来什么时间和节约多少能源却不太确定。而且，在提高能源利用率方面作出固定投资，往往还是有财务限制的。

如果所节约的能源可以在将来变成真实可靠的收益，则会出现一大批节能公司（ESCO）积极提供节能服务。但现实问题是节能公司状况远不如人们所预期，因此需要有相关政策来支持节能投资。

即使对于能源公司来说，实施提高能效计划也是一件困难的事情，因为这意味着增加能源方面的支出，而节能可带来的收益却具有不确定性。能源消费者一般来说是不欢迎这种情况的！

这就是为什么在没有清晰的、直接政府投入引导的情况下，把提高能效、实现绿色工业完全交给市场运作是不现实的。

通过征收环境税和/或拍卖排污许可证，可以促成高能耗高代价的局面，这样可以吸引更多资金投向提高能源利用率；如果将这些激励机制所带来的收益用于减免税收，则激励效果可以大大增强。

Ignazio Musu
威尼斯国际大学TEN中心主任

拟定新法律治理欧盟空气污染

空气污染每年造成欧盟40万人过早死亡和数百亿欧元的经费开支。
2013年12月18日，欧盟委员会提出了一项法律草案以进一步解决空气污染问题。
尽管与世界卫生组织的有关规定相比，欧盟的空气质量标准并不算严格，但很多欧盟国家在执行现有标准过程中还面临一些问题；不过人们普遍认为，应该采取更多的措施向空气污染宣战——因为它比交通事故所造成的死亡人数竟然还高。
拟定中的清洁空气政策将更新现有立法，以减少对人类健康和环境产生影响为目标，进一步控制工业、交通、能源和农业等领域的有害物质排放。
根据欧盟委员会测算，通过新标准的实施，到2030年由于空气污染造成死亡人数每年将减少58000；新标准的实施还将保护脆弱的生态系统，并促进清洁技术工业的长足发展。此外，仅新政策对健康所带来好处就每年节省开支400亿欧元，是污染治理成本的12倍。
预计到2030，治理污染的开支每年将达到340亿欧元。
新政策将包括以下几个方面：
《欧洲新清洁空气计划》将规定采取措施确保在短期内到达现有控制目标，并确保到2030实现新的空气质量目标。该政策还包括一系列支持性措施以帮助减少空气污染；核

New Draft Law to Tackle European Air Pollution

On December 18, 2013, the European Commission presented a draft law to tackle air pollution, which causes 400,000 premature deaths every year in Europe and costs tens of billions of euros. So far, many European states have had problems enforcing existing EU air quality standards, even though the rules are less rigorous than those set by the World Health Organization. However, it is widely felt that more can be done to fight a problem that causes more related deaths every year than road accidents.
The clean air policy package updates existing legislation and further reduces harmful emissions from industry, traffic, energy plants and agriculture, with a view to reducing their impact on human health and the environment.
The commission calculated that adopting its proposed measures would reduce the annual death toll from pollution-related disease by 58,000 by 2030, as well as protecting fragile ecosystems and boosting the clean-technology industry. Moreover, the proposal's health benefits alone will save society 40 billion euro per year - 12 times the cost of pollution abatement, which is expected to reach 3.4 billion euro per year in 2030.
The package adopted has a number of components. They include:
_ A new Clean Air Program for Europe, with measures to ensure that existing targets are met in the short term, and new air quality objectives for the period up to 2030. The package also includes support measures to help cut air pollution, with a focus on improving air quality in cities, supporting research and innovation, and promoting international cooperation;
_ A revised National Emission Ceilings Directive with stricter national emission

ceilings for the six main pollutants. To the four pollutants considered so far - SO_2, NO_x, NMVOC and NH_3 - fine particulate matter ($PM_{2.5}$) and methane (CH_4) have been added;
_ A proposal for a new directive to reduce pollution from medium-sized combustion installations between 1 and 50 MWth, such as energy plants for street blocks or large buildings, and small industry installations.
The proposal is based on a thorough policy review that began in early 2011 and was finalized in October 2013.
The package will now be submitted to the European Parliament and Council for debate, with a view to negotiating and agreeing on the different elements in the package.

A New Course of Economic Reforms Unveiled in China

The Third Plenary Session of the 18th Communist Party of China (CPC) Central Committee was held from November 9-12,2013 in Beijing. The meeting came as China faced major economic and social challenges and shall, to some extent, determine the direction of reform of the new leadership.
The decision on "major issues concerning comprehensively deepening reforms" came at the closing of the four-day meeting. The general objective of the approved reforms was to improve and develop socialism with Chinese characteristics and push on with modernization of the country's governing system and capabilities.
China must build on the fact that it is still in the primary stage of socialism and will continue to be in the long-term, while pursuing comprehensive, deeper reforms. Economic reform is key, and the core solution is the proper relationship

心是改善城市空气质量、支持开展研究和创新、并积极推进国际合作；
修订《国家排放上限指令》，对6种污染物制定更严格的国家排放上限。在对二氧化硫、氮氧化物、氨、非甲烷挥发性有机物等污染物进行控制的基础上，增加了对细颗粒物（PM2.5）和甲烷（CH4）的控制；对1－50兆瓦中小型燃烧装置，例如街区居民住宅、大型建筑物以及小

between the government and the market, leaving the market to play the decisive role in the allocation of resources.
According to the decision, China will accelerate the establishment of ecological civilization system, improving the system for property rights and use of natural resource assets, delineating the ecological red lines, implementing the ecological compensation system, and reforming the eco-environmental protection management system.
These actions are of high significance for promoting the harmonious development of both man and nature and creating a new pattern for modernization.
(Source: CCTV)

Sustainable Agriculture: an Agreement Between Barilla and Coprob

A new agreement to achieve a more sustainable agriculture was signed in January 2014 between Barilla (one of the most important Italian pasta producers) and Coprob (the Italian consortium of sugar beet growers and the main Italian sugar producer).
The agreement is the natural continuation of a project carried out by Barilla since 2011, the so-called Progetto Filiere Integrate (Integrated Production Chains), which fosters the horizontal cooperation within the Italian agricultural and food sector. The aim of the agreement with Coprob is to achieve maximum integration between the durum wheat and sugar beet production chains in several Northern Italian farms, allowing farmers to perform efficient crop rotation, reducing resource waste and soil impoverishment.
The crop rotation principle, which sees the alternation in the fields of cereals, legumes and oilseeds, is part of traditional agricultural practices worldwide, but Barilla has developed it with modern methods, taking into account meteorological variables and local soil properties. This has allowed Barilla to produce high quality durum wheat whilst reducing the use of fertilizers and improving soil conditions. The crop yield increased by 20% whilst greenhouse emissions dropped by 30%, along with production costs, which were also reduced by 30%.
Thanks to the new agreement, the

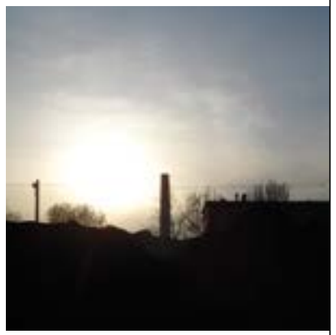
型工厂的动力装置等，新法令提出削减污染物排放的要求。
该法律草案是基于自2011年初启动的全面政策评估结果，评估工作已于2013年10月完成。目前草案已提交欧盟议会和委员会进行审议，并就具体内容进行磋商和谈判。

中国拉开新一轮经济改革大幕

中国共产党第十八届中央委员会第三次全体会议，于2013年11月9日至12日在北京举行。这次会议是在中国面临经济、社会诸多挑战背景下召开的，会议将决定新一届领导集体下一步改革的方向。
会议历时4天，对“将进行全面深化改革的主要问题”作出重要决定。会议确定改革的总目标是完善和发展中国特色社会主义制度，推进国家治理体系和治理能力现代化。
中国正处于社会主义建设的初级阶段，必须坚定不移地继续高举中国特色社会主义的伟大旗帜，必须致力于全面推动深化改革。经济改革是关键，必须正确处理好政府与市场的关系，充分发挥市场在配置资源方面的作用。
会议决定，必须建立系统完整的生态文明制度体系，健全自然资源资产产权制度和用途管制制度，划定生态保护红线，实行生态补偿制度，改革生态环境保护管理体制。
这些行动对于构建人与自然和谐发展、开辟现代化建设新途径等将具有重要意义。(信息来源: 中国中央电视台)

可持续农业：Barilla（意大利面生产企业）和 Coprob（意大利甜菜种植与糖生产联盟）达成协议

2014年1月Barilla（意大利面生产企业）和Coprob（意大利甜菜种植与糖生产联盟）达成一项协议，以期



进一步推动可持续农业发展。
2011年Barilla实施了“一体化生产链”（Progetto Filiere Integrate）项目，旨在推动意大利农业和食品加工企业间的横向合作。本次新签订的协议是该项目的自然延续，通过与Coprob的合作，将把意大利北部种植硬粒小麦的主要农场与甜菜生产企业链进行最大程度整合，从而允许农民进行有效作物轮作，减少资源浪费和土壤日趋贫瘠化。
轮流种植谷物、豆类和油菜籽，是世界公认的传统农业种植方法。Barilla在此基础上采用现代方法对轮作技术进行发扬光大，并充分考虑了当地气象条件和土壤状况。为此，Barilla不仅种植出高质量的硬粒小麦，而且还减少了化肥施用、改善了土壤条件；农作物产量增加了20%，而温室气体排放量下降了30%，同时生产成本也降低了30%。
根据所签订协议，将硬粒小麦纳入轮作种植系统中Coprob企业可以更优厚的条件将产品卖给专业生产链企业；而且还免费获得至少三年的最先进农技培训，以进一步提高其种植竞争力和效率。

国家能源局发布页岩气产业政策

国家能源局日前发布《页岩气产业政策》（以下简称《政策》），提出把页岩气开发纳入国家战略性新兴产业，加大对页岩气勘探开发等的财政扶持力度。
根据《政策》，国家将鼓励建立页岩气示范区。加快示范区用地审批，支持示范区其他相关配套设施建设。鼓励页岩气勘探开发技术自主化，加快页岩气关键装备研制。
《政策》规定，为促进页岩气资源有序开发，国家能源主管部门负责制定页岩气勘探开发技术的行业标准和规范。鼓励各种投资主体进入页岩气

Coprob producers, who will integrate durum wheat into their crop rotation system, will be able to sell both products to dedicated supply chains with advantageous conditions. Moreover, they will be offered at least three years of training on the most advanced agricultural techniques, in order to improve their competitiveness and efficiency.

National Energy Administration of China Unveils Shale Gas Policy

The National Energy Administration (NEA) of China recently issued the Shale Gas Policy, pledging to increase financial support for shale gas exploration and production and putting shale gas under the category of National Strategic Emerging Industries.
Under this policy, the state will encourage the establishment of shale gas demonstration zones.
Local governments will accelerate the approval of land use for demonstration zones and support the construction of supporting facilities, stimulate the

technological advancement in shale gas exploration and development, and expedite the development of key shale gas equipment.
According to the policy, in order to promote the deployment of shale gas resources, the competent authorities have the responsibility to formulate standards and regulations for shale gas exploration and development technologies. Meanwhile, the government has encouraged a variety of investors in the shale gas trading market, facilitating the coexistence of shale gas exploration, marketing enterprises and urban gas ventures in the market.
In addition, the policy explicitly calls for the local governments to provide subsidies to shale gas producers, reductions or exemptions for mineral resource compensations, mineral rights royalties, and to introduce a resource tax, value-added tax and income tax. (Source: Xinhuanet)

MEP: EIA Agencies Transformation to Independent Corporations Before 2015

Environmental Impact Assessment (EIA) agencies under the system of environmental protection should be decoupled from their administrative function before 2015, according to the notice recently issued by the Ministry of Environmental Protection (MEP).
All of the public EIA agencies are required to make the transformation.
According to the *Notice on Promoting the Reform of the EIA System among Public Institutions* released by MEP on December 2, 2013, MEP from now on will not accept applications from public institutions for EIA qualifications, and from January 1, 2016 onwards will not accept applications for qualification promotion, assessment range adjustment, and qualification renewal.
Meanwhile, transportation, water, marine institutions affiliated to the existing EIA agencies, as well as universities and other institutions should also accelerate the EIA system reform in accordance with the market requirements.
MEP clarified that the existing EIA institutions should transform into independent corporations.
Environmental protection authorities and administrative authorities at all

销售市场，逐步形成以页岩气开采企业、销售企业及城镇燃气经营企业等多种主体并存的市场格局。
《政策》明确鼓励地方财政根据情况对页岩气生产企业进行补贴，补贴额度由地方财政自行确定。对页岩气开采企业减免矿产资源补偿费、矿权使用费，研究出台资源税、增值税、所得税等税收激励政策。（信息来源：新华网）

环保部：环评机构在 2015 年前将全部转企

按照环保部发布的有关通知要求，隶属于环保系统的环评机构应在2015年前脱钩。环保部要求，现有事业单位性质的环评机构都要转企。
2013年12月2日环保部公开发布《关于推进事业单位环境影响评价体制改革工作的通知》（以下简称通知）。通知表示，从现在开始，环保部不再受理尚未取得建设项目环评资质的事业单位资质申请；从2016年1月1日起，环保部不再受理事业单位资质晋级、评价范围调整和环保部门所属事业单位资质延续申请。
同时，隶属于现有环评机构中的交通、水利、海洋等有关部门所属事业单位和大专院校等其他事业单位也应按照市场化要求，加快推进环评体制改革。
环保部称，现有事业单位性质的环

levels, public institutions under the Civil Servants Law or serving administrative functions, and agencies for the technical assessment of environmental impact of construction projects are not allowed to hold shares in the after-reform EIA agencies, while the serving officers of these organizations and government officials shall not serve as legal representatives concurrently.
"Qualification transfer and trading via transaction and auction shall be prohibited in the transformation, and the EIA qualifications shall not be sold in a binding manner in the process of state-owned assets restructuring and disposal."
(Source: www.gov.cn)

评机构要通过体制改革，形成独立企业法人性质的环评机构。
各级环保行政主管部门或其他行政机关、参照《公务员法》管理、承担行政职能的事业单位以及从事建设项目环境影响技术评估的单位，不得在改革后的环评机构参股。而且，政府部门公务人员和上述单位在职人员不得兼任改革后环评机构的法定代表人。
改革中不得以出卖、拍卖等方式转让、买卖资质，不得在国有资产重组和处置过程中搭售环评资质。
(信息来源: www.gov.cn)

Energy Efficiency in European Industries
欧盟工业能源效率

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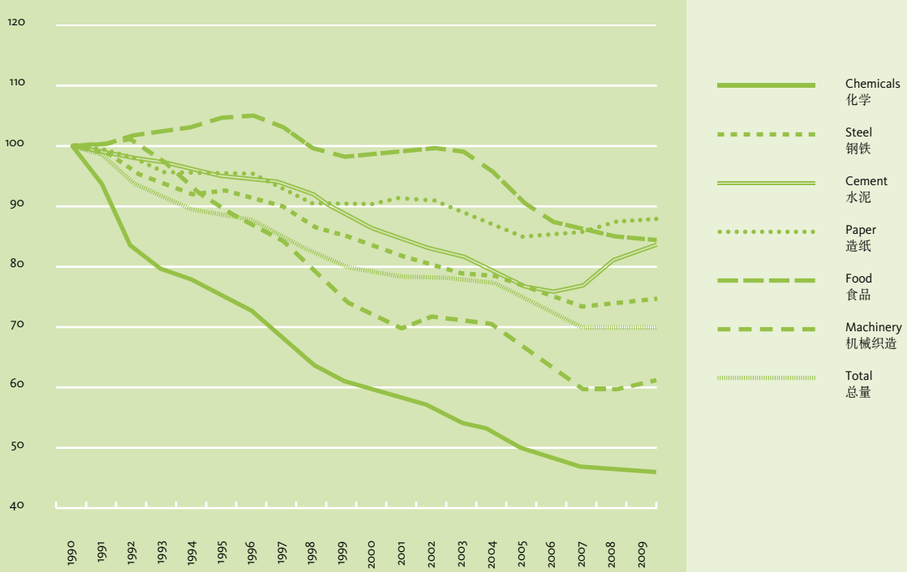
Energy efficiency has been the kernel of European energy policies since the seventies, when the oil shocks increased disproportionately the price of energy and new technical solutions became necessary to power the world economies. Even if the attention towards efficiency has never been lost, during the eighties the low price of oil led to investments based on efficiency, until the end of the century, when the evidence of climate change made energy savings a priority of environmental policy.
Back in 2006, the European Parliament adopted the Energy Services Directive (2006/32/EC) requiring all EU member states to reduce their annual energy consumption by 9% until 2016. The directive not only set a target, but also created a path, with specific commitments for all EU member states. The strategy designed in 2006 was based on 10 actions:
_ Appliance and equipment labelling and adoption of minimum energy performance standards;
_ Building performance requirements and construction of very low energy buildings (“passive houses”);
_ Making power generation and distribution more efficient;
_ Achieving fuel efficiency of cars;
_ Facilitating appropriate financing of energy efficiency investments for small and medium enterprises and Energy Service Companies;
_ Spurring energy efficiency in the new European Member States;
_ Supporting a coherent use of taxation of energy products;
_ Raising energy efficiency awareness;
_ Promoting energy efficiency in built-up areas;
_ Fostering energy efficiency worldwide, to support the European industry competitiveness.
The basic documents in which the member states have to set their targets and outline their actions are the so-called National Energy Efficiency Action Plans (NEEAP), to be released every two years. A new important step was Directive 2012/27/UE in 2012, which set new commitments for a better use of energy.
In brief, Directive 2012/27 poses the following targets:
_ A reduction of 20% for final energy consumption in 2020 compared to 2005. In energy terms, it means a target of 1.078 Mtoe for final consumption in 2020 for the whole of Europe;

自70年代以来，当石油冲击造成能源价格不成比例地增高，新技术成为了支撑世界经济继续发展的动力，能源效率也因此成为欧洲能源政策的核心。尽管人们从未忽略能源效率问题，但80年代的石油低价导致投资活动更多地考虑效率问题；直到上世纪末，当人们发现了全球气候变化的证据后，才终于将节约能源纳入环境政策最优先考虑的范畴。
追溯到2006年，欧盟议会通过了能源服务指令(2006/32/EC)，要求所有欧盟成员国到2016年将能耗水平平均每年削减9%。指令不仅确定了削减目标，而且还指出了各成员国实现削减目标的路径和具体的减排承诺。2006年出台的战略基于以下10项行动:
_ 家电和设备采用并张贴最低能效标准;
_ 对建材性能提出要求，建造最低能耗建筑（“被动房”）;
_ 提高发电和配电效率;
_ 提高汽车燃油效率;
_ 为中小企业和能源服务公司能效项目提供便捷融资支持;
_ 在欧盟成员国大力推进提高能源利用率;
_ 对节能产品实施更有力的税收政策;
_ 提高能源效率意识;
_ 在已经建成的地区推动提高能源利用效率;
_ 在世界范围内推动提高能效，以支持欧洲企业的竞争力。
各成员国每两年都必须发布两个基本文件，即：各国的能耗目标和行动纲领（NEEAP）。
一个最新进展是2012年欧盟发布了另一项指令，即：2012 / 27 / EU指令，要求各成员国在如何更好地利用能源方面作出承诺。简要来说，2012/27指令确定了以下目标:
与2005年相比能源消耗降低20%。用能源行业的

术语来说，这意味着到2020年欧洲能源消耗总量将控制在107.8万吨石油当量；
各成员国将设定自己的消减目标，由欧洲委员会监督，对于那些“偏离减排轨迹”或存在不能实现减排目标风险的国家，欧盟可以执行有约束力性的措施；
要求各国都制定能效规划，并且每两年更新一次；
到2015年所有大型企业必须进行能源审计，此后每四年审计一次；
成员国还必须执行能源和环境管理体系，这套体系是由独立机构或者按照国际规则进行认证的；
采取行动制定地方和国家级“积极能源规划”。
为了实现投资高回报，应采取以下积极措施推动提高能效：
支持国内企业引领技术潮流；
激励新产品和服务的创新与发展；
获得环境正效益（任何能源都不如不生产更洁净！）；
降低众多行业运营成本；
提高能源安全，增加能源多样化；
创造新的专业方向。
实现这些目标如果不增加成本，那么这些措施可以被称作为“无遗憾”的措施。在工业化国家，当向所有潜在消费者提供能源时，很自然会将能源供应的重点从数量转移到质量，并将所有可用能源作为盈余储备起来。提高能效不是一件自然而然的事情，许多企业热衷于销售更多的能源，因此这项行动并不能得到各界的一致支持。
在意大利、法国和英国，追求提高能源效率也创造了新的市场机会，形成了可交易的能源效率证书（白色证书），为进一步提高节能潜力而引入了市场机制，并催生了能源服务公司（ESCO）的就业机会。首先由能源公司提供提高能效的服务，然后客户用节约下来的能源经费支付能源公司所提供的服务。这种情况主要集中在工业部门的创新技术。由于利用结余下来的能源来支持投资而没有增加消费者的债务，并且将投资风险分配到有承担能力的当事人，即：技术供应商负责解决技术问题，金融机构负责相关融资风险，客户只需操心能源需求即可，因此这种能源服务公司在欧洲日渐盛行起来。有趣的是在能源公司的合同上各利益相关方都寻求到了最大收益。
创新型和根本性改进生产工艺是在工业上下游生

_ Every member state will set its own target, to be monitored by the European Commission, which can impose binding measures to states that are off track and risk missing the target;
_ All the states will have to write an energy efficiency plan, to be updated every two years;
_ All large companies are obligated to undergo an energy audit by 2015 and every four years from then on;
_ They also have to implement an energy and environmental management system certified by an independent body according to international rules;
_ Actions at the local and national level to make active energy planning are also foreseen.
The aim of this choice in favour of efficiency measures is to achieve the multiple dividends of these investments:
_ Support the technological leadership of domestic companies;
_ Give incentive to innovation and development of new products and services;
_ Gain positive effects on the environment (no energy is as clean as that which is not produced!);
_ Reduce the operational costs in many sectors;
_ Increase of security and diversification of energy sources;
_ Creation of new professional profiles.
It is important that achieving these targets comes with no costs to pay and the actions can surely be identified as “no regret” measures. In industrialised economies, when energy is made available to all prospective consumers, it is natural to shift the focus of energy supply from quantity to quality, harvesting the largest energy source available as savings. Achieving efficiency is not natural and many actors have interests in selling more and more energy, so that this action does not find unequivocal support.
The quest for energy efficiency has also created new markets in Italy, France and the UK for tradable energy efficiency certificates (White Certificates), where market mechanisms have been introduced for the exploitation of savings potential, creating new jobs under the activity of Energy Service Companies (ESCO). ESCOs supply energy efficiency as the first option and are paid with the savings achieved by consumers, mainly in the industrial sector with innovative technologies. They are becoming more and more popular in Europe, as they can finance investments in energy savings without charging the debt to consumers and can allocate the risk of investments to the parties able to bear it, the technology supplier for the technical problems, the financing institution for the risk related to financing, and the customer for the energy demand. Interestingly, ESCO’s contracts are such that all the parties have the same target and are associated in the search for the highest savings.
Novel and radically improved production processes are key to increasing the energy, resource and CO_2 efficiency in industrial value chains. Addressing these challenges requires the appropriate technologies, processes and products, with intelligent product design as well as smart processes over the value chain to:

Fig. 1: Energy efficiency index in the manufacturing industry (Source: Odyssee)
图1: 加工制造业的能效指数 (来源: Odyssee)



1. Use energy and resources more efficiently within the existing installed base of industrial processes;
2. Re-use waste streams and energy within and between different sectors, including recovery, recycling and re-use of post-consumer waste;
3. Replace current feedstock by integrating novel and renewable feedstock (such as bio-based) to reduce fossil feedstock and mineral raw material dependency, while reducing the CO_2 footprint of processes or increase the efficiency of primary feed stock. Replace current inefficient processes for more energy and resource efficient processes when sustainability analysis confirms the benefits;
4. Reinvent materials and products to have a significantly increased impact on resource and energy efficiency over the value chain as a result of, for example, integration of recycled materials, easy recyclability and re-usability, as well as improved material properties such as lighter weight (for lower fuel consumption vehicles) and improved insulation (for energy efficient buildings) through close collaborations with other European programs.

产链上提高能源、资源和CO2效率的关键。应对这些挑战需要适当的技术、工艺和产品、以及智能产品设计，并在生产链 上以智能化过程开展以下工作:
1、在已安装的生产设备上更有效地使用能源和资源;
2、在不同部门之间再利用废水和能量，包括回收，循环利用和再使用消费者使用后的产品;
3、通过集成新的和可再生原料（如生物质燃料）来取代目前的化石和矿物燃料，以减少对矿物原料的依赖，提高一次性能源的使用效率，同时减少二氧化碳足迹。
4、发明新材料和产品，以大幅度提高其资源节约和环境友好性。例如，通过实施相关欧盟计划，可更多使用可再生或易于再生的原材料，改进材料特性，减轻产品重量（低油耗汽车）和提高隔绝性（节能建筑）等等;

In this change from a focus on energy supply to one on energy demand, electric power can play a crucial role substituting fossil fuels in many thermal uses.
The share of electricity has increased from 23% of all European energy demand in 1990 to 32% in 2009.
The process of aiming for a better use of energy started many years ago, as is shown by the trend in energy intensity in EU industries in figure 1, where the ODEX index shows the lowering of energy demand per unit of product in many sectors. Nevertheless, in a time of low economic growth it is essential to become more efficient and this trend has to be accelerated.
In Europe, economic growth is getting decoupled from energy consumption, with many countries having a reduction in energy demand during years of GDP growth. This is in part due to the shift from energy intensive industries to lighter activities, mainly in the services sector, but increasingly in the adoption of more efficient production processes as well. The use of Information and Communication Technologies (ICT) to control all energy absorbing processes is driving down energy consumption, sometimes in a dramatic way.
The paradigm of smart energy solutions is really changing the pattern of energy demand, not only in quantity, but also in the way it is used. The choice to auto-produce energy demand is also becoming popular thanks to many low cost technologies, primarily photovoltaic energy, but it is also due to cogeneration plants, micro turbines, biomass combustion units and a change in the organization of the energy market and the substitution of large power plants with many small units in industrial premises.
The present policy gives a central role to energy audits in all industrial sectors, to raise awareness of energy use and to give information about the level of efficiency of all factories and manufacturing activities. Audits must be carried out according to principles clearly identified in the European guidelines, to help identify proper solutions for specific energy needs. Certification is also encouraged, with the new ISO 50001 that looks at the procedures of energy management in companies and public administration, to keep energy consumption under control. Finally, an important role is given to technical standards regulating the energy consumption of most devices, to help technology suppliers to drive down energy consumption and to set new targets for the coming years. Electrical motors, buildings and light bulbs are examples of areas of consumption where technologies with higher energy demand have been progressively put out of the market, with benefits for the environment, the competitiveness of companies and the operating costs of consumers.

造现有的低效率生产工艺，并用高效节能的生产工艺予以替代;
4、发明新材料和产品，以大幅度提高其资源节约和环境友好性。例如，通过实施相关欧盟计划，可更多使用可再生或易于再生的原材料，改进材料特性，减轻产品重量（低油耗汽车）和提高隔绝性（节能建筑）等等;
这种变化的显著特征是关注点由能源供应端改为能源需求端，因此在很多供热领域可以用电能替代化石燃料。电力在欧盟能源总需求中的占比由1990年的23%增高到2009年的32%。
许多年前人们就已经开始为更好地利用能源而奋斗，图1展示了欧盟工业领域的能源强度。ODEX指数代表了许多行业单位产品能耗下降的趋势。然而，在经济低迷阶段，能否提高效率至关重要，因此这个阶段能耗下降的趋势也相对比较陡。
欧洲经济增长已经与能源消耗脱钩，许多国家在过去几年里GDP实现了持续增长，而能源需求却在不断下降。这种结果部分归功于这些国家的经济已经成功转型，从能源密集型转向低能耗型产业，主要是转向服务行业；同时还得益于采用了更加高效的生产技术和工艺。利用通讯与信息化技术很好地控制了所有吸收能量的生产过程，大大降低了这些过程的能耗。智慧能源技术改变了能源需求模式，不仅从数量上、而且从质量上改变了能源供应。受益于许多低成本的技术，不仅包括光伏能源，再加上热电联产、微型涡轮机、生物质燃烧装置、能源市场新的组织形式、一些工业设备的大型动力厂替换为小型装置等，这一切都使得人们越来越多地选择“自动生产”的能源需求。
在推动所有工业企业进行能源审计方面，当前政策发挥了核心作用，提高了企业对能源利用的意识，也帮助企业了解其整体能效水平和各生产环节的能效水平。能源审计必须根据欧洲指南中确定的原则来进行，以有效帮助企业制定出解决具体问题的方案。鼓励开展ISO 50001认证，关注企业和公共部门的能源管理各个环节，从而使能源消耗处于控制范围之内。最后，在规范设备能耗、帮助技术供应商降低能源消耗和对未来几年设置新的目标方面，技术标准发挥了很重要的作用。电机、建筑物和灯泡是能源消费领域很有说服力的例子，取而代之的是对环境、企业竞争力和消费运营成本有益的技术。

Improving Industrial Energy Efficiency: Accelerating Industrial Transformation and Upgrading

Experiences from the Sino-Italian Industrial Energy Efficiency Seminar

提升工业能效水平 加快推进工业转型升级

–学习意大利工业能效交流经验

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China is in the middle of an industrialization process featuring rapid industrial growth, economic take-off, crucial transformations and an upgrading stage. At present, industrialization in China is facing the dual challenge of accelerating development and transformation and upgrading. On the one hand, a certain speed must be maintained for accelerating development, yet on the other hand it is necessary to accelerate the speed of transformation and upgrading in the industrial sector as problems like the increased pressure of energy-saving emission reduction, the conspicuous contradiction of industrial structure and rising business costs are becoming increasingly prominent and the traditional development model turns out to be unsustainable. Therefore, improving energy efficiency will be an important way to promote transformation and upgrading in the industrial sector, as well as serve as the basic strategy for the long-term development of Chinese society and it's economy.

Industrial energy efficiency is not only a technical issue but also an economic one. Its index can reflect deep-seated economic problems regarding the operation and development of a country or region. China's industrial energy consumption level is still below the average of developed countries, while great potential and space in energy saving awaits discovery. Therefore, successful experiences and practices with regard to improving energy efficiency, and measures to ease the energy crisis and reduce greenhouse gas emissions should be learned from Italy and other countries, to improve industrial energy efficiency and to promote industrial transformation and upgrading.

1. Give full play to the role of market mechanism. In addition to the traditional mandatory and control oriented measures, Italy places more emphasis on developing energy-saving policy tools based on the market, such as mechanisms of Tradable Certificate for Energy Saving and Energy Management Contracting in order to enhance industrial energy efficiency. The new Chinese government proposes "to make the market play a decisive role in the allocation of resources". The power of market mechanism will be highly valued in the industrial energy-saving sector. In view of this, we could set up pilot energy savings transactions in some regions and a white certificate

中国正处于工业化中期的发展阶段。国际经验表明，工业化中期阶段通常是工业快速增长阶段、经济起飞阶段，也是转型升级的关键阶段。当前，中国工业化进程面临着加快发展和转型升级的双重挑战。一方面，加快发展必须保持一定的速度，另一方面节能减排压力增大、产业结构性矛盾突出、企业成本刚性上升等问题日益凸显，传统发展模式难以为继，必须加快推进工业转型升级。提高能源利用效率是推进工业转型升级的重要途径，也是中国经济和社会长期发展的基本战略。

工业能效问题不仅是一个技术问题，更是一个经济问题。工业能源利用效率指标能够反映出了一个国家或地区经济运行和发展中深层次问题。中国的工业能耗水平仍低于发达国家平均水平，具有较大的节能潜力和空间，需要学习借鉴意大利等国在提高能源利用效率、缓解能源危机和减少温室气体排放方面的成功经验，提升工业能效水平，促进工业转型升级。

一、充分发挥市场机制作用。为提升工业能效水平，意大利除了采用传统的命令-控制性政策外，更加注重发展基于市场的节能政策，如可交易的节能证书机制、合同能源管理机制等。新一届中国政府提出"使市场在资源配置中起决定性作用"，工业节能领域也将更加注重市场机制的力量。借鉴意大利白色证书机制，并结合中国节能政策特点、能源价格形成机制和各省份发展现状差异，可以选择大型能源消费工业企业作为责任主体，在部分地区或开展节能量交易试点，建立白色证书市场交易体系。

二、提高企业的自觉节能意识。企业是工业节能的主体。意大利众多中小企业的自觉节能意识给我们留下深刻印象。企业不仅仅考虑节能即期投入和收益，更多地考虑长期的投资回报率。相比而言，中国企业降低能源强度的自觉意识尚有一定差距。

需要通过政策激励引导、拓宽节能融资渠道、典型案例宣传等多种方式，充分激发企业的自觉节能意识，更加有针对性地提高企业能效水平。

三、加快完善工业节能管理体系。完善的工业节能管理体系是提升工业能效的重要保障。意大利政府、中介机构、企业和个人共同构建了完善的节能管理体系。在政策方面，有企业能源管理经理制度、高效电机自愿性协议、绿色照明工程等；在中介机构方面，意大利合理利用能源协会（FIRE）等在提升工业能效方面发挥了重要作用；在节能主体方面，企业内部能源管理体系比较健全，企业员工积极参与各类节能活动。这些，都值得我们学习和借鉴。要加强重点企业

market transaction mechanism with large energy consumption industrial enterprises as the main actors through learning from the Italian White Certificates mechanism, combining it with the characteristics of Chinese energy-saving policy, an energy price forming mechanism and development differences in local provinces.

2. Improve enterprises' awareness and participation in energy saving. Enterprises are the main players of industrial energy saving, and they should not only take current energy-saving efforts and paybacks into consideration, but also take a long-term prospective on investment returns. Several small and medium sized enterprises' efforts in industrial energy saving in Italy have impressed us deeply. In contrast, there is still a certain gap between Italian and Chinese enterprises' awareness of reducing energy intensity, therefore, it is a necessity to stimulate enterprises' awareness and participation through policy incentives and guidance, broadening financing channels for energy saving, disseminating typical cases so as to improve the enterprises' level of energy efficiency.

3. Accelerate the improvement of the industrial energy management system, which guarantees the success of industrial energy efficiency enhancement. In Italy, governments, intermediary organizations, enterprises and individuals work closely together and comprise a comprehensive energy management system. In terms of policies, the Enterprise Energy Manager Mechanism, High-efficiency Motor Voluntary Agreement, and Green Lighting Project are all in place. Meanwhile, intermediary organizations like FIRE in Italy make great contributions to industrial energy efficiency enhancement.

In terms of energy-saving actors, there are relatively sound energy management systems within enterprises and employees actively participate in all kinds of energy-saving activities. These are all worth learning from and referencing. Therefore, we need to strengthen the construction of the energy-saving management team in key enterprises and to explore the establishment of an energy management head system. Besides this, we need to further improve and standardize the energy audit management system and to guide the key energy intensive enterprises to actively participate in an energy-saving audit. We also need to encourage energy-saving technological innovation and actively promote the application of advanced, mature new energy-saving technologies, processes and equipment. It is essential to improve the function of industry associations, energy centers and other third-party organizations.

4. Adjust industrial layout reasonably. Reasonable industrial layout in parks is an important means to enhance energy efficiency. Implications from the planning and construction of eco-industrial areas in the Mediterranean and Western Balkan region are important. We need to strengthen domestic and international communication and cooperation regarding

industrial parks, learning about successful cases of circular economy industrial park construction from developed European countries, absorbing good ideas to optimize the planning and building of industrial areas. It is a current trend to implement rational planning and construction in all kinds of industrial parks following the requirements of a circular economy. Energy cooperation and service transactions between enterprises in parks are encouraged and will form a resource-efficient recycling industry chain, creating a win-win situation.

5. Make the energy service industry bigger and stronger. The Energy Service Company（ESCO） plays a significant role in promoting industrial energy efficiency. In Italy, it advocates integrated energy saving and upgrading, stimulating the development of energy services companies, which provide comprehensive energy solutions and many success stories in this field. In recent years, China has placed a high value on the development of the energy-saving service industry, as well as the energy service company based on EMC witness rapid development. In view of the huge market potential of energy saving in China, the energy-saving service industry still has great potential and room for future growth.

But we must realize that financing for energy saving is still the biggest bottleneck that constrains the development of the energy service industry. Therefore, we have to learn from Italy's success stories, to encourage and support industry development by perfecting related policies, innovating operation models and broadening financing channels.

In short, we should give full play to the role of market mechanisms in promoting industrial energy efficiency, strengthen enterprises' awareness of and participation in energy-saving, build and perfect energy-saving policies and management systems, and stimulate the development of professional intermediary service institutions to enhance the overall level of industrial energy efficiency, accelerate transformation and upgrades in the industrial sector and finally, to strive to establish an upgraded version of the Chinese industrial economy.

节能管理队伍建设，探索建立能源管理负责人制度；要进一步完善和规范能源审计管理制度，引导重点用能企业积极参与节能审计；要鼓励节能技术创新，积极推广应用先进、成熟的节能新技术、新工艺、新设备；要更好地发挥各级行业协会、节能中心等第三方机构的作用。

四、合理调整产业布局。合理的园区产业布局是提升能效水平的重要手段。地中海沿岸国家生态工业园区建设经验给我们的启示十分重要。要积极开展工业园区国内外交流合作，学习欧洲发达国家循环经济工业园区建设方面的成功案例，积极采纳合理化建议，优化工业园区产业布局。要按照循环经济要求对各类工业园区进行合理规划和建设，促进园区企业间的能源合作交易，形成资源高效循环利用的产业链，实现多方共赢的良好局面。

五、做大做强节能服务产业。节能服务公司（ESCO）在提升工业能效方面发挥了重要作用。意大利倡导整体节能改造，鼓励发展提供全方位能源解决方案的节能服务公司，成功案例很多。近年来，中国高度重视节能服务产业发展，基于合同能源管理模式的节能服务公司得到快速发展。相比中国巨大的节能市场，节能服务产业发展空间和潜力仍然很大。但我们应清醒地看到，融资问题等仍是制约节能服务产业发展的最大瓶颈。要学习借鉴意大利的成功经验，从完善配套政策、创新运营模式、拓宽节能融资渠道等方面鼓励和支持节能服务产业发展。

总之，我们要充分发挥市场机制在提升工业能效水平中的重要作用，增强企业自觉节能意识，建立和完善节能政策和管理体系，大力发展专业中介服务机构，提升工业能效整体水平，推动工业转型升级，努力打造中国工业经济升级版。

Some Like it Smart
“智慧” 的魅力

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The Smart Grid represents a completely novel electric grid paradigm that drastically breaks with the basis of traditional power grids.

The power grid paradigm has changed dramatically during the last 3-5 years. The new challenges we will have to deal with concern the increase in intermittent and distributed sources of electricity, the objective of reducing greenhouse gas emissions and a growing energy demand. A new and revolutionary electric grid, the so-called Smart Grid, is emerging in response to these issues, basing its development on the key concepts of energy efficiency and distributed renewable generation. The aim of Smart Grids is to maximize the system reliability, resilience and stability and minimize costs and environmental impact by coordinating the needs and resources of consumers, *prosumers*, grid and market operators.

In most countries, increasing energy consumption needs to be properly addressed: this implies that an electrical grid has to embed new optimizing tools for energy efficiency, both in supply and demand, through monitoring/control infrastructures based on sensors/actuators networks and appropriate demand response programs. In the not-too-distant future, part of the new electricity consumption will be provided by electric vehicle fleets that, thanks to their storage capacity, will have huge potential in controllable loads, drawing power and storing energy, when not in use.

Historically, the power grid had been designed to collect large quantities of energy from power plants and distribute it to a large number of consumers/customers through a centralized control, one-way flow of power (“passive” grids). Given the growing penetration of distributed generation, in particular from renewable sources, customers are now becoming small-scale producers.

With micro-generation from renewable sources, individual consumers will produce electricity autonomously, achieving energy independence. In this context, the electric grid needs to support a two-way flow: from large power stations to end customers and the other way around.

The electric grid of the future will no longer be just a channel for transmitting and distributing electricity from large power stations to end customers. A Smart Grid which integrates producers and consumers could determine in advance consumption demands and flexibly adapt the production of electricity to its consumption:

与传统电网完全不同，智慧电网带来的是全新电网管理模式。

电网模式在过去3-5年中发生了巨大的变化。我们所必须面对的新挑战包括：扩大利用间歇式和分布式电源，减少温室气体排放量和满足日益增长的能源需求。针对这些问题，一个新的、革命性的电网，即：智能电网应运而生了。这种电网发展的基本理念是提高能源利用效率、推动分布式可再生能源发电。智能电网的目标是最大限度地提高系统的可靠性，坚强性和稳定性，并协调消费者、生产消费者、电网和市场运营商等对电源需求与供给的关系，降低成本，减少对环境所产生的影响。

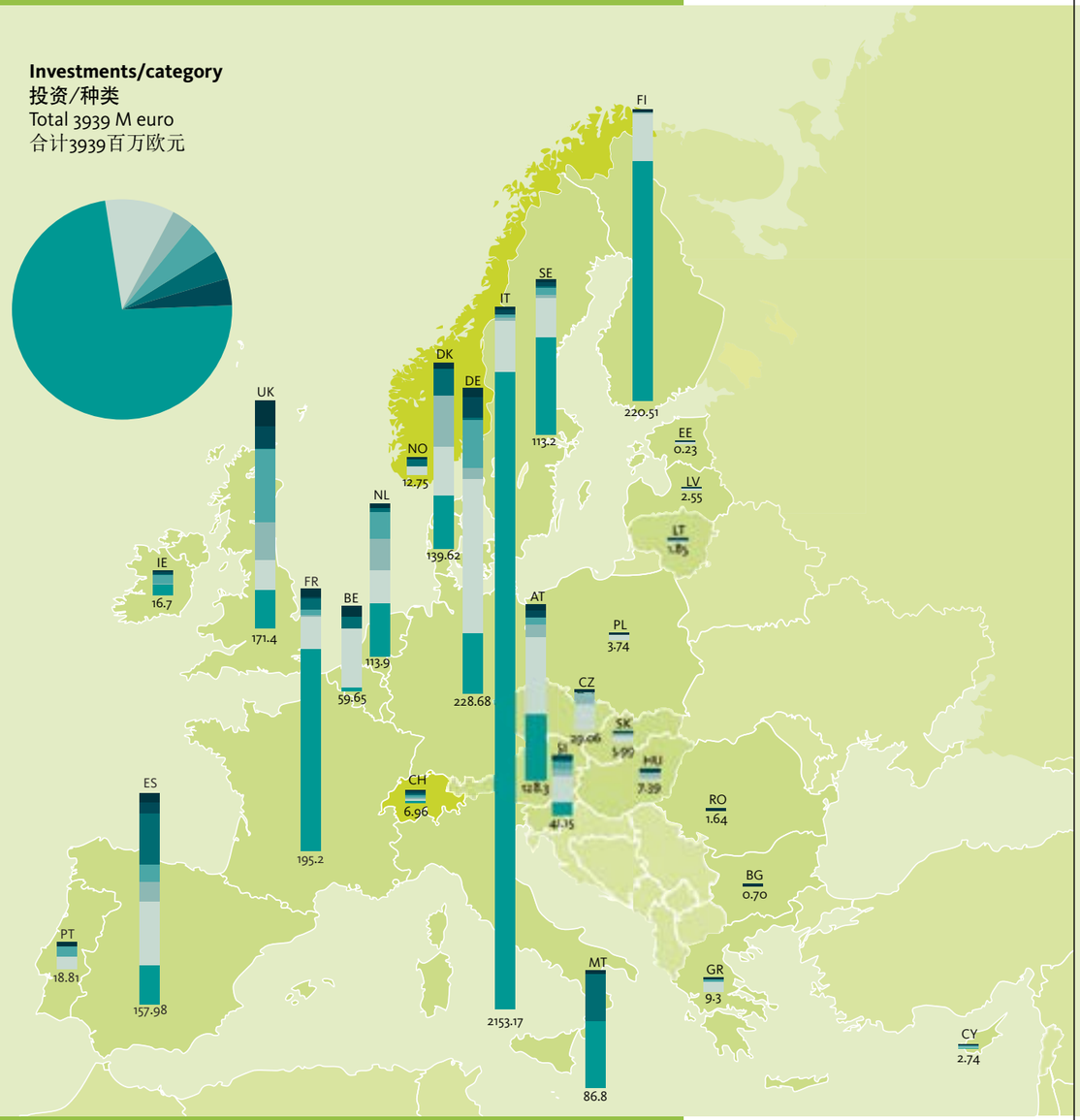
在大多数国家，需要妥善处理好不断增长的能源消耗这个问题：这意味着在电力供应和需求端，电网应当拥有新的、优化能源效率的工具，包括基于传感器/致动器网的监测/控制系统和恰当的需求响应系统。在不太遥远的将来，电动汽车将具有一定的蓄电容量，可用来满足部分用电需求。在待机状态下，电动车在可控负荷潜力和储存电力方面有着巨大潜力。

历史上电网的功能是从发电厂接收大量电能，并通过集中控制和电力的单向流动（“被动”电网），将电力分配到大量的消费者/客户端。随着分布式发电的日益渗透，特别是来自可再生能源的发电，事实上客户正逐步转变为小规模发电企业。

个体消费者可以利用可再生资源进行自主发电，因此也就逐步实现能源独立。在这样的背景下，电网需要支持双向流动：即在大型发电站与终端客户之间实现双向电力流动。

未来的电网将不再只是一个从大发电站到终端客户进行输配电的网络。 智能电网将生产者和消费者一体化集成，可以事先确定消费需求，并根据预测消费量来灵活进行发电调整：电网系统中所有参与者都相互沟通，从而提高能源效率和电网可靠性。

Fig. 1: European Smart Grid projects (2000-2011)
图1: 欧盟智能电网项目（2000-2011）

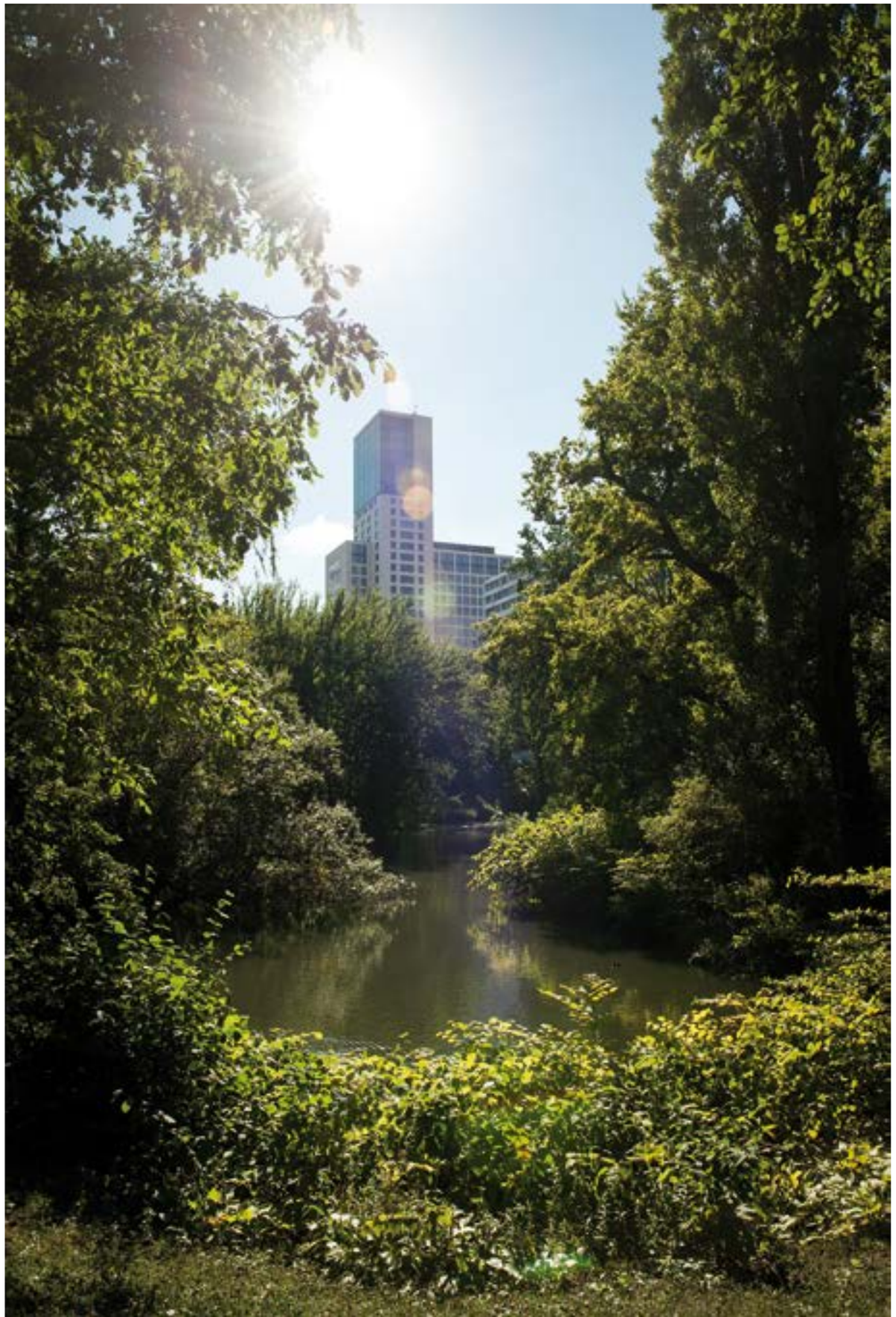


Source: Joint Research Centre 2011
信息来源：联合研究中心 2011

智能电网系统的一个关键特征是充分利用先进技术，例如利用如智能仪表，可以为参与者提供有针对性的、即时的信息。这些技术使得发电厂、系统管理者和客户都能接收到电力需求和价格的瞬时信息，并以最有效的方式来满足电力需求。智能电网对消费者和输电设施之间的关系将进行一场革命。通过实施Telegestore项目，Enel公司已在意大利安装了3200万个智能电表。通过这些智能仪表，Enel可以定期收集汇总电压质量和电力中断信息、日供电信息、有功和无功电能计量，并进行远程合同管理。智能电表能够传输电力消费信息、接受合同参数更新，并远程管理供应端。意大利提供了20亿欧元，占2000-2011年期间总投资近一半的资金，其中很大一部分用来支持“Telegestore”项目。图1表明资金分配国家和支持项目种类情况。总体来看，欧盟12国的投资金额远远小于欧盟15国，无论从项目数量还是从开始启动智能电网工作的时间，都能说明这个问题。一个特例是马耳他，这个国家投资了8000万欧元用于智能仪表和实施远程管理系统。不同国家采用智能电网的步伐不同，导致跨越国界进行国际贸易与合作更加困难，并直接危及欧盟能源政策目标的实现。知识共享与各国经验教训传播可以在未来帮助弥合这种差距。另一个重要方面是：由于具备了监测和远程控制能力，可以向消费者提供消费和价格方面的信息，提高用户意识，从而实现智能电网节能的功能。同时，这种监测和控制服务系统具备实施需求侧管理与需求响应计划的功能，可以精准满足用电需求。通过需求侧管理技术的合理应用，并向消费者推出激励计划，可以做到控制用电量并弥补传统发电供电不足、或不可控需求的骤降和可再生能源发电波峰等问题。由于采用了需求响应（DR）技术，在很短的时间和特殊情况下，可直接或间接地强制减少用电。传统的DR技术通常被用来平衡与供需相关的经济问题。然而，通过智能电网，可以利用需求响应技术来提高系统的可靠性，瞬时降低能源消费，以防止可再生能源间歇性发电所带来问题。
智能电网在提供关于建筑和个体家庭的实时监测信息和远程控制负载能力方面发挥关键性作用，有助于减少能源消耗和优化，并达到操作DR计划的要求。智能电网不仅可以提高终端用户的效率，而且也是一个更有效的电网，大大减少发电、输电和配电过程的损失。智能电网系统可以提高T&R意识

all participants in the grid system will communicate and work with each other to increase the efficiency and reliability of the grid.
A key feature of a Smart Grid system is the use of advanced technologies, such as smart meters that provide participants with relevant, real-time information. These technologies allow generators, system managers, customers to receive instantaneous information on electricity needs and prices, and to work together to meet electricity needs in the most efficient way possible. Smart grids will revolutionize the relationship between consumers and the distribution infrastructure.
With the Telegestore project, Enel has performed the roll-out of 32 million smart meters in Italy. These smart meters allow Enel to periodically collect data on voltage quality and interruptions, daily consumption, active and reactive energy measurements, and remotely manage contractual activities. Meters are able to transmit data regarding consumptions, receive updates of the contractual parameters and remotely manage the supply connectivity. With a budget of over euro 2 billion, Italy accounts for almost half of the total investments between 2000-2011. A large part of this budget is however attributable to the "Telegestore" project. The figure 1 shows the allocation of the budget across different countries and project categories.
In general, EU12 countries show a much lower level of investment compared to EU15 countries, a fact mainly explicable with the lower number of projects and generally to a later start in Smart Grid development. A remarkable exception is Malta, which is investing over euro 80 million in the deployment of smart meters and the implementation of a remote management system. The different pace at which Smart Grids are deployed across Europe could make trade and cooperation across national borders more difficult and jeopardize the achievement of the EU energy policy goals. Knowledge sharing and the dissemination of lessons learned in other countries can help to bridge the gap in the future.
As another main aspect, Smart Grids can ensure energy savings due to the monitoring and remote control capabilities, which increase the users' awareness by providing information about consumption and costs. At the same time, such monitoring and control services can ensure the implementation of demand-side management and demand response programs to enhance such impacts and align them with the grid needs. Through the proper application of demand-side management technologies, and by providing incentives to consumers, it is possible to control consumption so that it matches shortages in the conventional generation capacity or the uncontrollable dips and peaks of renewable generation. Thanks to Demand Response (DR) technologies, it is possible to directly or indirectly force consumption reduction in critical situations in a short time. Traditionally DR technologies were typically used to attend to economic concerns related to balance supply and demand. However, nowadays they can be

（输配电意识），并提供实时系统运行状况信息。这使得电网运行的误差更为降低——从而更为高效。据电力研究所估计，到2030年通过减少调压造成的损失，可节约35到280亿度电（EPRI，2011）。智能电网可以推动插入式电动汽车得到广泛使用，进一步减少污染物排放和对石油的依赖程度。国际能源机构估计，随着电动汽车（EV）和插入式混合动力电动汽车（PHEV）的显著增加，到2050年交通部门将占总电力消耗的10%。（国际能源机构，2011）。如果对机动车充电不能够实现智能管理，则会提高电网峰值负荷。当用电需求降低、可再生能源发电增多时，智能电网技术可以使充电更有战略性地进行。
由于电动机动车可以储备电力，因此，在待机状态下具有巨大可控负荷和蓄电能力。智能电网技术可以保证在低需求和高发电期间对电动机动车进行智能充电。从长时段来看，必要时还可以将电池系统的蓄电调动起来以供机动车使用。
此外，蓄电池和超级电容器等蓄电创新技术都已面世，不仅表现出良好的性能，而且降低了成本。由于智能电网日趋呈现平面化结构，新能源储存技术的需求也不断增加。传统电网具备一定灵活性（例如水电站），但它要求是在同一个地方，以相同的方式进行发电——是一种集中式、自上而下的模式，因此限制了蓄电容量。然而，新的存储设备在位置方面不要求靠近电厂，可以安装在电网的任何位置。这种灵活性可以支持将间歇性能源集成管理，并缓解用电高峰出现堵塞的情况。通过将新蓄电技术和智能电网联合使用，不仅可以保证大规模用电客户，而且对每一栋楼宇或邻居都可以做到发电与用电相匹配。
综上所述，智能电网是一种全新的电网模式，彻底打破传统电网的理念。因此，通信和电力流动不再是单向的，而是双向和实时性，客户和"生产消费者"成为重要的合作伙伴。智能电网的发展与实施正在稳步推进，但也面临许多挑战仍然需要加以解决。存在一些技术类和非技术类的挑战，具体包括以下内容:
_ 当今通信基础设施不足，必须加以改进，使各部件和系统、公共网络、设备装置，以及操作和规划功能相互连接。
_ 数据管理和分析不够，不足以有效地收集，存储和解释数据。



used to improve the system reliability, instantaneously reducing the energy consumption to prevent problems resulting from the intermittence of renewable generation.
Smart Grids can play a key role by providing information about the real-time monitoring of buildings and individual households and by providing the ability to control loads remotely, contributing to the energy consumption reduction and optimization, as well as ensuring the needed requirements to operate DR programs.
A Smart Grid can not only promote end-user efficiency but also promises to be a more efficient grid, reducing losses in generation, transmission and distribution of power.
Smart grid systems would allow improved awareness of T&D (transmission and distribution) and system conditions in real time. This would allow the grid to be operated with tighter margins of error – and thus more efficiently. The Electric Power Research Institute estimates that reductions in line loss attributable to voltage regulation could save from 3.5 to 28 billion kWh in 2030 (EPRI, 2011).
Smart Grids can enable the widespread use of plug-in electric vehicles**,** further reducing emissions and oil dependence. The IEA estimates that the transport sector will make up 10% of overall electricity consumption by 2050 thanks to a significant increase in electric vehicles (EV) and plug-in hybrid electric vehicles (PHEV) (IEA, 2011). If vehicle charging is not managed intelligently, it could increase peak loading on the electricity infrastructure. Smart grid technology can enable charging to be carried out more strategically, when demand is lower and when the production of electricity from renewable sources is high.
However, the electric vehicles, due to their storage capacity, have huge potential as controllable loads, drawing power and storing energy when not in use. Smart Grid technology can ensure the smart charging of electric vehicles, during periods of low demand and/or high generation. In the long-term, it could also enable electric vehicles to feed electricity stored in their batteries back into the system when needed.
Additionally, innovative energy storage technologies, such as batteries and supercapacitors are already available and presenting increasing performance and decreasing costs. The need of new energy storage technologies is also increasing due to the alternative planar structure of the Smart Grid. The traditional grid already has energy flexibility (hydropower dams), but it is in the same place and is generated in the same manner - centralized from top to bottom - which limits the storage capacity. However, the new storage devices do not need to be located near to the power plants and can be installed at any point on the grid. That choice enables the support to the integration of intermittent energy and congestion mitigation. The new energy storage technologies associated with the Smart Grid capabilities can ensure the matching between generation and consumption in different grid levels, not only on a large scale but also in each neighborhood or building.
In the light of the above information, the Smart Grid represents a completely novel electric grid paradigm that drastically breaks with the basis of traditional electric grids. Thus, communication and energy flows are no longer unidirectional, but bidirectional and in real-time, and the customers and "prosumers" become important players. Significant progress is being made toward the development and implementation of a smart grid, but there are many challenges that still need to be addressed. A number of technical and non-technical challenges are identified that cut across all the topic areas, including the following:
_ Communication infrastructure today is inadequate and must be improved to enable interconnections between various components and systems, public networks, and devices, as well as operations and planning functions.
_ Data management and analytics are not sufficient for effectively collecting, storing, and interpreting the massive amounts of data that can potentially be collected.
_ Robust operational and business models are needed to enable effective operations and planning that can incorporate diverse generation sources, storage options and models for flexibility.
_ Privacy of information is still uncertain and is needed to assure consumers that personal information is protected and its release is controlled; this will lead to greater acceptance of smart grid technologies.
_ Coordination of policy and regulations on smart grid policies is insufficient—creating uncertainty and a business environment that is not supportive of risk-taking and innovation.
_ The business case for smart grid technologies is still uncertain and lacks clarity; investments are complicated by uncertainties over who should pay for upgrades (e.g., consumers, utilities) and how and when these costs will be recouped.
As explained above, the road to a Smart Grid has plenty of challenges, but there are also many benefits for different stakeholders in undertaking to overcome them. Large efficiency gains through reduced operational costs and lower network losses represent a benefit for electric utility. Thanks to the smart grid, power flows along distribution lines will be constantly monitored; leaks, failures and problems will be identified in time. If a better quality of service is ensured more *reliability* will be guaranteed.
Consumers, who are increasingly aware thanks to electronic support, are encouraged to interact in the energy market. Participants are actively involved in the system to find out which service best fits their specific needs. Enhanced customer satisfaction will imply more *accessibility*.
Increased hosting capacity for clean distributed renewable energy resources, reduced air pollution and improved quality of life represent an environmental benefit. Less carbon emissions in the atmosphere will imply more *sustainability*.

_ 需要建立稳健的运行和商业模式，从而将不同的发电来源、存储选项和灵活模型进行统一规划和有效管理。
_ 信息私密性仍具不确定性。如何更好地保护个人信息、不外泄信息等，是对客户的基本保障。只有在更大程度上接受智能电网技术，才有可能实现个人信息保密的目标。
_ 智能电网的相关政策法规不够协调，造成商业投资环境不太理想，对风险投资与技术创新造成阻碍
_ 智能电网技术的商业案例仍然是不确定的，缺乏透明度；由于改造升级费用（例如消费者、公共事业管理部门）承担主体尚未确定，如何以及何时将投资收回也尚不知，因此造成投资更具不确定性。
综上所述，通向智能电网之路还面临很多挑战，但各利益方在克服这些障碍后还是会有很多益处的。通过降低运营成本和降低电网损耗可以获得很大效益。正是由于智能电网所具备的先进性，才实现了对输配电过程中电流情况进行实时监测，可以及时发现漏电、故障等问题。如果服务质量有保证，那么电网的可靠性也将大大增强。随着电子技术的发展，消费者们越来越意识到可以在能源市场上实现良好互动。大家可以积极参与到电网中，找到最适合自己的服务。提高客户满意度将意味着更高的网络访问率。提高接收分布式可再生能源的能力、降低空气污染、改善生活质量，这意味着给我们的生态环境带来更大的益处。减少二氧化碳排放意味着更加可持续的发展。

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Industrial Energy Efficiency Enhancement: Case Study in Northwest Chinese Areas
中国西北地区工业能效提升案例

Ma Gang, Ningxia Commission of Economy and Information Technology
宁夏回族自治区经济和信息化委员会 马刚

Ningxia, located in the northwest of China, is a minority living area. Relying on coal, limestone, silica and other mineral resources, over the years it has developed its main industries, such as coal mining, thermal power, calcium carbide and other high energy-consuming industrial raw materials and become an important national production area of calcium carbide, ferroalloy, magnesium and other high energy consuming products. Heavy industrial structure means that Ningxia faces enormous pressure with regard to energy conservation and emission reduction, however, at the same time there is great room for energy conservation. Since 2005, the energy consumption for industrial added value per 10 thousand Yuan in Ningxia cumulatively decreased by 33%, which was a great success. The main measures taken were as follows:

1. Improving regulations, energy management and energy conservation management

Conservation of resources is a basic state policy of China. Over the years, Ningxia, in accordance with relevant national regulations and policy requirements, adhering to basic principles of paying equal attention to resource development and economizing, and giving high priority to energy-saving conservation, continued to strongly support company responsibility for energy saving, and formed an energy-saving work pattern based on governmental guidance and market-driven rules.

1.1 Implementing energy conservation management with specific targets, we established a responsibility system for fulfilling decomposed energy-saving targets. The government assigned energy conservation targets to key energy-consuming enterprises, and signed responsibility letters of annual energy conservation targets. Moreover, the government conducted rigorous assessments on the final outcomes of enterprises' energy conservation targets and carried out rewards and penalty systems. Among them, enterprises whose comprehensive energy consumption was higher than 10,000 tons of standard coal were managed by the government of an autonomous region; enterprises whose comprehensive energy consumption was less than 10,000 tons of standard coal were managed by the municipal government. Through target management, almost all the main energy-consuming enterprises have

宁夏地处中国西北，是少数民族地区。多年来，依托煤炭、石灰石、硅石等矿产资源，发展起以煤炭开采、火力发电、电石等高耗能原材料产品为主的工业，成为全国重要的电石、铁合金、金属镁等高耗能产品的生产区，重型化的工业结构使宁夏面临巨大的节能减排压力，同时，也存在着巨大的节能空间。从2005年至今，宁夏万元工业增加值能耗累计下降33%，取得了巨大成绩。其采取的主要措施是：

一、健全法规制度，提升能源管理水平，强化管理节能

节约资源是中国的一项基本国策。多年来，宁夏根据国家有关法规和政策要求，坚持了节约与开发并重、节约优先的基本原则，不断强化企业的节能主体责任，形成政府引导和市场驱动相结合的节能工作格局。

（一）实施节能目标管理，建立了层层分解落实的节能目标责任体系。政府将节能指标下达给重点用能企业，签订年度节能目标责任书，并对企业节能目标完成情况进行严格考核，实行奖惩制度。其中，年综合能源消费量高于1万吨标准煤的企业由自治区政府管理；年综合能源消费量小于1万吨标准煤的企业由市级政府管理。通过目标管理，重点用能企业基本都成立了节能工作领导小组，设置了能源管理岗位，聘任了节能专责具体负责节能工作，并在政府节能主管部门备案。（图1）

在政府的主导下，实施万家企业节能低碳行动，开展能源管理体系建设，把能源管理与企业生产经营有机结合，提高能源管理和利用水平。对于未完成节能目标的企业，通过开展能源审计摸清企业能源消耗家底，查找节能潜力，编制节能规划，实施节能改造，提升能效。

（二）加强法制约束，建立了比较完善的节能法

Fig. 1: Filed numbers of professional staff in key energy-consuming enterprises
图1: 重点用能企业能源专员备案数量

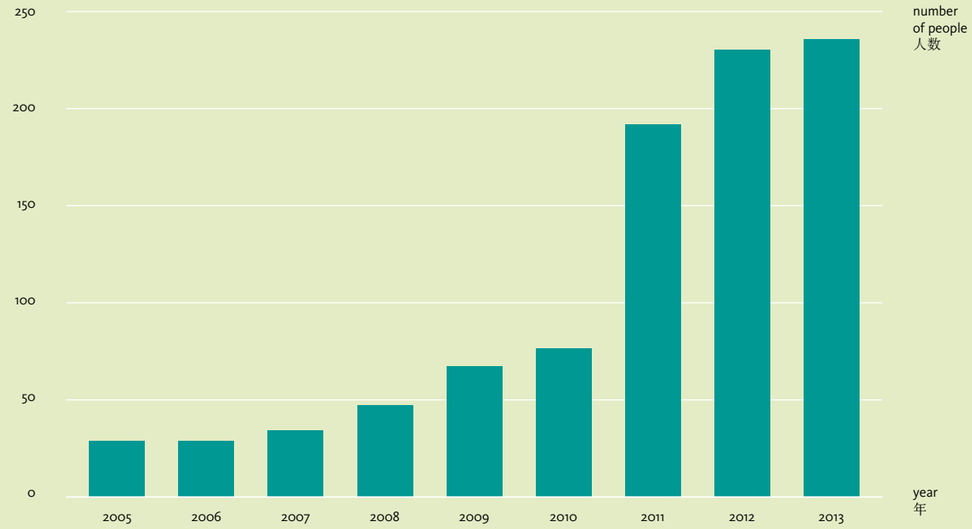
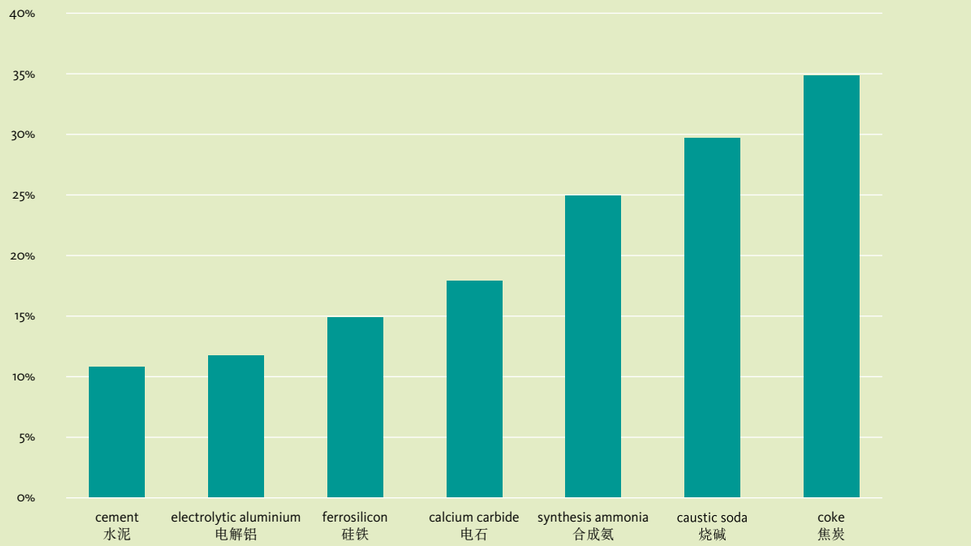


Fig. 2: Reduced rate of unit cost of main energy-consuming products
图2: 主要耗能产品单耗降低率



规制度体系。在国家出台的《节约能源法》及相关标准的基础上，地方政府制定了一系列地方法规、规章。如:《宁夏回族自治区节能监察办法》、《宁夏回族自治区节能降耗“十二五”考核奖惩办法》等，编制了《自治区“十二五”节能规划》、《自治区“十二五”节能减排综合性工作方案》、《节能降耗行动计划》、《主要工业产品能耗限额》等。为确保各项政策措施落实到位，政府不断加大节能执法监察力度，监察企业数量逐年增加，每年对能耗限额标准执行情况和高耗能落后机电设备淘汰情况监察的企业不少于50户，重点对能耗波动较大的企业进行节能监察，责令单位产品能耗超标的企业限期整改，整改不达标的，给予处罚。

（三）实施动态监控，建立了科学的节能预警调控机制。通过开展工业企业能耗统计在线监测试点，建设自治区级能耗在线监测平台，实施工业企业能源管理中心建设，加强对能耗数据的分析和应用。每月对全区能耗增长情况和新增用能项目进行分析，对节能形势进行预前判断，及时采取有效措施防止能耗过快增长。建立了节能预警晴雨表制度，按季度对能耗较高的地区和企业实施节能预警通报，促进企业采取有效措施遏制能耗过快增长。政府每年多次组织节能统计培训，提高企业能耗统计能力。

二、应用节能新技术，实施节能技术改造，强化技术节能

（一）实施重大节能工程。2005年以来，组织工业企业实施了发电机组通流改造、余热发电、能量系统优化、锅炉及热力管网改造等重大节能技改项目，实现节能量500多万吨标准煤。2012年，启动了电机能效提升计划，计划在三年内，实现节能量20多万吨标准煤。通过节能技术改造，全区主要耗能产品生产水平大幅提高，产品单耗显著降低，能源利用效率整体水平显著提高。（图2）

（二）加强节能新技术、新机制推广。技术进步是实现节能降耗的基础条件，先进的工艺、技术、设备应用是取得技术节能的保障。鼓励科研院所针对本地区主要耗能产品和生产工艺进行技术攻关研发，带动企业技术升级；召开节能技术推介会，重点对工业企业能源管控系统、高效风机泵类节能系统、低温余热回收发电技术、矿热

set up leading energy conservation groups and energy management positions. They have also hired staff in charge of energy conservation and placed it in a file within the government's main energy conservation department. (Figure 1)

Under the guidance of the government, implementing 10,000 enterprises' low-carbon energy conservation actions, and conducting the construction of energy management systems, we achieved a proper combination of energy management and production and enterprise operations in order to improve energy management and utilization levels. For enterprises that did not finish energy conservation targets, through conducting an energy audit, we discovered the actual situation regarding enterprises' energy consumption and their energy conservation potential, and then developed an energy conservation plan, implementing energy conservation reconstruction and finally promoting energy efficiency.

1.2 Strengthening the legal constraints, we have established a relatively perfect energy conservation legal system. Based on the introduction of Chinese “Energy Conservation Law” and other related standards, local government has formulated a series of local rules and regulations, such as: “Energy Conservation Supervision Measures in Ningxia Hui Autonomous Region”, “Twelfth Five-year Plan on the Assessment of Incentives and Disincentives of Decrease of Energy Consumption in Ningxia Autonomous Region”, “Twelfth Five-year Plan on Energy Conservation in Autonomous Regions”, “Twelfth Five-year Plan on the Comprehensive Program of Energy-Conservation and Emission-Reduction in Autonomous Regions”, “Energy-Conservation and Consumption-Reduction Action Plan”, “Energy Consumption Limits of Major Industrial Products” and so on. To ensure that all policies and measures were put in place, the government continued to increase supervision and law enforcement in energy conservation and the number of enterprises monitored increased each year. Every year, there were at least 50 enterprises to be monitored with regard to their implementation of energy consumption limits and elimination of high energy-consuming equipment. The focus was on enterprises with volatile energy consumption, and those enterprises whose energy consumption per unit was beyond the standard were ordered to rectify the situation within a time certain time frame, and if the rectification was not up to standard, the enterprise would be punished.

1.3 Through dynamic monitoring, we have established an early warning scientific regulatory system of energy conservation. By conducting an online monitoring pilot project regarding industrial enterprises' energy consumption statistics, we set up an autonomous regional energy consumption online monitoring platform, carrying out center construction of energy management and strengthening the analysis and application of energy consumption data. Every month we analyze the regional

growth of energy consumption, add new programs and pre-judge an energy consumption situation and then take effective measures to prevent excessive growth of energy consumption. Meanwhile, we have set up the energy saving early-warning system, implementing an energy conservation early-warning bulletin quarterly to high energy-consuming regions and enterprises in order to promote enterprises and take effective measures in preventing excessive growth of energy consumption. The government organizes energy conservation statistical training to improve the statistical capacity of energy consumption many times a year.

2. Applying new energy-saving technologies, implementing technological innovation, strengthening technical energy conservation

2.1 We have implemented major energy conservation projects. Since 2005, we have organized industrial enterprises to implement the transformation of generator set flow passage, waste heat power generation, energy system optimization, boiler, heat pipe network and other major technical transformation projects of energy conservation and we achieved the energy conservation of 5 million tons of standard coal. In 2012, we initiated a motor energy efficiency promotion plan, with the plan to reduce it to 20,000 tons of standard coal within three years. Through energy conservation and technical transformation, the production level of main energy-consuming products within the whole region rose greatly; meanwhile, unit product consumption reduced significantly, and the general utilization of energy efficiency improved appreciably. (Figure 2)

2.2 We have strengthened innovative energy conservation technologies and expanded new mechanisms. The use of advanced technologies was the basic requirement for achieving energy conservation and consumption-reduction. Additionally, advanced technologies, equipment and applications guaranteed technical energy conservation. We encouraged scientific research institutes to do technical research and promote technological upgrading, countering the main energy consuming products and technologies in the region. Besides this, we held energy conservation technical introduction meetings, focusing on energy management systems, energy-efficient fan and pump systems, low temperature waste heat recovery power generation technology, submerged arc furnace energy-saving technology, with professional lectures and case presentations to encourage enterprises to adopt advanced, practical and efficient energy conservation technologies to transform existing equipment and processes, upgrading technology and reducing energy consumption.

2.3 Implementing enterprise energy efficiency leader systems, we established typical models in major energy-consuming industries, building energy efficiency

炉节能改造技术等进行专业讲解和案例介绍，鼓励企业采用先进、实用、高效节能技术改造现有装备和工艺，提升技术水平，降低能源消耗。

（三）实施企业能效领跑者制度，在主要用能行业树立节能典型示范，建立能效标杆，带动全行业共同提高能效。对于行业标杆企业，在政策、金融等方面给予优先扶持。对于单位产品能耗超标的高耗能企业生产用电执行惩罚性电价，以经济手段推动企业节能。

三、转变发展方式，加快产业转型升级，强化结构节能

（一）以节能减排为主线和重要抓手，实施产业升级和结构调整。大力发展低能耗产业，依托内陆开放型经济实验区建设，加快发展陆港经济、现代物流、葡萄酒产业、清真食品和穆斯林用品产业，稀释其他产业能耗。

（二）发展循环经济。实施了3批循环经济试点创建，开展了工业园区循环化改造，大力延长产业链和提高资源综合利用。形成了煤-电-铝-材，煤-电-化工-建材产品等具有地方特点的循环经济产业链，资源产出率和产品附加值显著提高，引导示范作用明显。宁夏一家企业消耗煤炭和电力生产电石，电石用来生产聚氯乙烯，电石炉尾气用于发电，电石渣用来生产水泥，公司主要产品是聚氯乙烯和水泥，基本实现资源吃干用尽，实现成本最低化，利益最大化。

宁夏属于经济欠发达地区，在正确处理经济发展与保护环境的关系中，始终坚持科学发展观，坚持适度、有序开发利用煤炭资源，坚持以节能减排为出发点和落脚点，杜绝敞开口子使用能源，为后人留下蓝天、绿水和发展空间。

benchmarking and driving the entire industry to jointly improve energy efficiency. For industry business models, we provided priority support for policy, financial matters and other aspects, as well as for high energy-consuming enterprises whose unit energy consumption exceeded the standard limit, and we implemented punitive tariffs for electricity in order to promote energy conservation via economic means.

3. Transforming development, accelerating industrial transformation and upgrading and strengthening structural energy conservation

3.1 With energy conservation and emission reduction as the main purpose and an important starting point, we implemented industrial upgrading and structural transformation. We vigorously developed low-energy consumption industries, and accelerated the economic development of inland ports, logistics, the wine industry, the halal food and Muslim product industry, relying on the construction of an open economic experimental area to the diluted energy consumption of other industries.

3.2 Developing a circular economy, we implemented the construction of three batches of a circular economy pilot and carried out the circulation reform of an industrial park to extend the industrial chain and improve resource utilization. We formed circular economy industrial chains with local characteristics such as coal - electricity - aluminum - wood, coal - electricity - chemicals - building materials and so on. Accordingly, resource productivity and product added value improved significantly, and the role of the guiding model was obvious. A good example is a Ningxia enterprise whose main products were PVC and cement. It produces calcium carbide using coal and electricity, then makes use of the calcium carbide to produce PVC, generating power and cement with a calcium carbide furnace exhaust gas and carbide slag respectively. This enterprise basically realized the target of making full use of its resources and achieved the maximize benefits at the lowest cost.

Ningxia, an economically underdeveloped region, during the process of balancing economic development and environmental protection, always adheres to the scientific outlook on development and insists on moderate and orderly development and utilization of coal resources, regarding energy conservation as the starting point and standpoint at all times, never using resources completely in order to leave the sky blue, the water green and room for development for future generations.

VIU training program echo from participants
威尼斯国际大学培训计划 学员回音

This section is written by the Chinese participants in the trainings in Italy. We hope hereby to provide the Newsletter readers with an authentic flavour of the training experience.

“学员回音”由在意大利参加培训的中方学员们供稿的。希望通过刊登学员们的“回音”，能够让“培训园地”的广大读者们多少有些“身临其境”的感受。

Ministry of Environmental Protection of China
Water Pollution Prevention and Control

Italy, November 3-11, 2013
28 participants

During the Water Pollution training (Nov 3-11), the trainees learnt a lot and had a profound understanding of water environment management and treatment technology in developed countries within Europe.
After comparing the water environment management situations in the European Union, Italy and China, the trainees had the following understanding:
First of all, the top design of water pollution prevention should be further strengthened. The Italian Ministry of the Environment, Land and Ocean is fully responsible for the water environment protection and the ministry has independent say and authority so that inconsistent obligation and function overlapping can be avoided. However, in China, there are several departments involved in water management and there is function overlapping among them, which goes against consistent management. A coordinative system should be established at the central government level for these water-related departments in order to restructure the departments and their functions from the top level in an optimal way.
Secondly, a strict responsibility investigation system should be established for law-breaking acts. The Italian government not only resorts to economic punishment, such as fines, it also implements full damage compensation and criminal sanctions, so there is hardly any unlawful emission in Italy. The responsibility investigation system in the Environment Law of China obviously has no such effect yet. We need to learn from Italy and let lawbreakers take the consequence of losing the chance to develop.
Thirdly, we should strengthen environment monitoring as well as the accumulation, analysis of research results and information sharing. Italy attaches great importance to basic research and works hard on the collection, analysis and study of basic data. In Europe, the sharing of monitor data has been realized. In China, the monitoring stations are separate from each other and the data is confined within each department. It is not good for the consistent management, release and sharing of environmental monitoring data.
Fourthly, the disposal of wastewater and mud should be a concern and the pollutant emission standard should be raised. In big and super big cities, incineration and construction material reduction and comprehensive disposal method that are well developed in Europe should be promoted.
Fifthly, openness and public participation should be enhanced. In Italy and the European Union, the accessibility of environment-related information is very high. The public is able to know about all

中国环境保护部
水污染的预防与控制

意大利，2013年11月3日至11日
28人参加

通过本次2013年中意环境管理与可持续发展第三期水污染防治专题技术交流，学员们对欧洲发达国家的水环境管理及治理技术有了深刻的认识，获益良多。对比欧盟、意大利以及国内的水环境管理现状，有以下体会:
（一）进一步加强水污染防治工作的顶层设计。意大利的环境、领土和海洋部全面负责开展水环境保护工作，有完全独立的发言权和权威性，能够有效避免权责不一和职能交叉等弊端。而中国涉水法律和部门众多，有交叉和重叠，不利于统一管理。亟需在中央层面上建立涉水政府部门的协调机制，从而逐步从顶层进行机构和职能优化重组。
（二）建立严格的环境违法责任追究体系。意大利对环境违法行为的追究，不仅限于罚款等经济处罚，更重要的是全部经济损害责任的追究和刑事责任的追究，因此很少存在偷排现象。中国的环境违法责任追究体系显然无法达到相应的效果。需要借鉴意大利的经验让企业的一次违法行为承担以后丧失发展机会的后果。
（三）注重监测与科研结果的积累分析和信息共享。意大利非常注重基础研究，花大气力进行基础数据的收集和分析研究。欧盟实现了监测数据的共享。而中国监测站点的分割化，数据的部门化，不利于环境监测数据的统一管理、发布与共享。
（四）更加重视对污水和污泥的处理，逐步提高污染物排放标准。在大型及特大型城市，推广欧洲已运用成熟的焚烧、建材利用等减量化和综合利用的处理处置方式。
（五）加大信息公开与公众参与力度。在欧盟和意大利，环境信息公开的程度很高，公众能便捷地了解各类环境信息，有权了解相关数据，有利于监督政府的环境管理和企业的环境行为。中国的信息公开程度较低，公众参与较少。
学员们对下一步培训工作的提出了几点建议:
（一）希望能增加意大利过去20-30年的污染治理过程的内容，特别是污染治理过程中采取的具体措施及一些经验和教训。
（二）建议进一步增加案例剖析和考察的课程。

environment-related information conveniently and they have the right to know about the data. In this way, the public can supervise the environmental management of the government and the environment acts of enterprises. However, in China, the information accessibility is relatively low and the public hardly participates.
The trainees proposed some advice for the next training session:
Firstly, they want to know about pollution treatment in Italy in the last 20-30 years, especially the specific measures, experience and lessons during the process.
Secondly, they suggested adding a case study and observation session. There should be more mentors with professional backgrounds.
Thirdly, a subsequent exchange system should be established for the trainees for relevant problem solving and academic exchange.

Chinese Academy of Social Sciences
Eco-Friendly City
Italy November 10-21, 2013
41 participants

From November 10th–21st, 2013, 41 participants from China attended the Sino-Italian Cooperation Program for Environmental Protection training in Italy on the topic of the Eco-city. It lasted 12 days and covered eight themes, discussing environmental issues during the development process, including urban waste, waste water management, air pollution, traffic jams and energy efficiency building, and introduced advanced experiences from Italy and other European countries. Its aim was to promote eco-friendly city construction through innovation and smart cities.

1. The training content was relevant to age requirement and target.
In today's world, for both developing countries and developed countries, the urban environmental problem is an important issue that has been faced or is being faced now. How to realize the synchronization of environmental protection and economic development and the construction of an ecological city has become a problem that governments, including the Chinese government, are trying to solve. The Sino-Italian Cooperation Program - especially its training course - has rightly responded to this need and has targeted China, which is facing challenging environmental issues during its progress of development.

2. The course content was rich with strong practicability.
The training teachers were all high-level technical experts on ecological construction who shared abundant content with the participants. Environmental protection is a practical subject and also a complicated engineering system. The training topics covered all environmental components, and the content was comprehensive and systematic. Each lecture included theory and technology so the participants could take what they needed.

3. The training was organized in an orderly way, both in China and Italy.
The 12-day training opened our eyes, and here we would like to provide some suggestions for the organizers' reference:
1. We suggest the Italian side invite better interpreters or use Chinese interpreters. During the course of the training, some confusion was brought on by the translation.
2. For the training form, we suggest adding some group discussion, which could help increase the class activity and enthusiasm of participants.
3. It would be better to reduce some classroom lectures and add some site visits, arranging the site visits with a reasonable amount of time.
4. Some schedules were tight and the participants felt a little bit tired, which had an effect on the next day.

在授课教授的选择上，建议进一步增加专业背景老师的比例。
（三）探索建立学员的后续培训交流机制，共同开展有关问题的科技攻关或学术交流。

中国社会科学院
环保型城市
意大利，2013年11月10日至21日
41人参加

2013年11月10日至21日我们一行40人参加了中意环保合作生态管理高级培训班意大利阶段培训，本次培训的主题是"生态友好城市"历时12天，共分8个专题对学员们进行了培训，分别讨论了城市发展过程中的环境问题，包括城市垃圾、水污染管理、空气污染、交通堵塞以及节能建筑等，介绍了意大利以及欧洲其他国家的先进经验，通过创新、建设智慧城市等方式来促进生态友好城市的建设。短短12天的培训让我们受益匪浅，有以下几点感受与大家分享:

1、培训内容切合时代需求，针对性强
当今世界，无论是对于发达国家而言还是对于发展中国家而言，城市环境问题都是它们曾经面对或正在面临的重要问题，如何实现环境保护与经济发展的同步，建设生态友好城市，也一直是包括中国政府在内的各国政府矢志解决的问题。中意环保合作项目的开展尤其是相关培训课程的开设，正是回应了这种客观需要，特别是对于当前正面临环境问题挑战的处于发展过程中的中国具有很强的针对性。

2、课程内容丰富，实用性很强
这次培训师资力量非常强大，都是生态建设政策层面及技术层面国内外的顶级专家，课程内容极其丰富。环境保护是一个实用性很强的课题，也是一个复杂的系统工程。此次培训的课程主题对环保各个组成部分均有涉及，内容具有广泛性和系统性。每一讲座都包括内容理论和技术两大块，便于培训人员在自己的工作中各取所需地吸收借鉴。

3、培训组织井然有序，国内外培训事务均组织得井井有条，对培训工作的顺利进行起到了及其重要的保障作用。
短短十二天时间让我们大开眼界，但也留下了稍许遗憾，籍此提几点不成熟的建议，仅供组织方参考:
1、建议意方安排中文水平更高的翻译或者聘请中方翻译，整个学习过程中翻译带来的学习困惑不少，影响学习效果;
2、从授课形式上，建议增加小组讨论环节，这样既增加了课堂活力，也能充分调动学员参与课程的积极性;
3、建议减少一些课堂讲座，增加一些实地考察与参观，同时合理安排参观时间，室外参观尽量安排上午或天气较好的时候。
4、个别的行程安排时间比较紧张，工作人员和学员都比较疲劳，对第二日的培训效果会有所影响。

VIU training program activities report
威尼斯国际大学培训计划 培训活动

Climate Change: Policy, Greenhouse Gas Emission Inventory and Communication, NDRC

Italy, October 13-24, 2013

39 participants

One of the most important tools when studying causes and impacts of climate change is the greenhouse gas (GHG) emissions inventory, whose reliability is based upon a sound data collection and management system.

By identifying the most significant sources of emissions, policies and measures can be drafted to promote their reduction in the most polluting sectors, therefore making GHG inventories a valuable tool for policy makers.

The VIU training course organized in cooperation with China's National Development and Reform Commission (NDRC) aimed to present the experiences of the European Union and Italy in this field. Many of the lectures introduced the policies and tools put in place by the EU and Italy with the aim of tackling increasing GHG emissions. The discussions with the participants focused on the specific requirements set up for the compilation of emission inventories, both at local and national levels, as well as on how to disclose results to the public and use them for better management of carbon markets. As regards the latter, the European Emission Trading Scheme (EU ETS) is strictly dependent on GHG emission inventories, and the most polluting companies are required to monitor, collect data on and communicate their emissions by law. For this reason, the Italcementi plant in Calusco D'Adda was selected for a site visit as an example of a company subjected to emission limits under the framework of the EU ETS, representing a best practice for GHG emissions control, reduction and communication to the public.

国家发改委气候变化：温室气体排放清单、政策与信息交流

意大利，2013年10月13－24日

39 名学员

温室气体（GHG）排放清单是研究气候变化成因和所造成影响的非常重要的工具之一，其可靠性取决于管理完善的数据采集系统。

在掌握温室气体排放的主要来源后，可制定有针对性的政策和措施来推动主要行业削减排放。因此，排放清单对于政策制定者来说是非常有价值的工具。

威尼斯国际大学与中国国家发展和改革委员会（NDRC）合作组织的培训班，旨在系统介绍欧盟和意大利在这一领域的做法和经验，包括欧盟和意大利在削减温室气体排放方面所采取的政策措施和管理工具。编制地方和国家级清单的具体要求，以及如何将排放清单结果向公众公布以用于更好地管理碳市场，是学员们讨论集中的问题。关于碳市场，欧洲排放交易计划（EU ETS）严格依赖于温室气体排放清单；污染较严重的企业必须监测排放情况、收集排放数据并根据法律规定发布排放数据。为了让学员充分了解企业如何在欧盟排放交易计划框架下进行减排，本次培训专门安排学员们参观了位于卡路斯科达达（Calusco D'Adda）意大利水泥厂。通过现场参观交流，学员们充分了解到企业是如何对温室气体进行控制、削减、并与公众进行交流的。

MEAs and Biodiversity Protection, MEP

Italy, October 20-28, 2013

27 participants

On October 20-28, 2013, a delegation of 27 participants selected by the Chinese Ministry for Environmental Protection of P.R. China (MEP) attended a training course devoted to Multilateral Environmental Agreements (MEAs), with a special focus on biodiversity protection. Protocols on environmental protection are an important topic that MEP has continued exploring for the last few years with dedicated courses. Additionally, in line with the interests of MEP, the globally important issue on biodiversity conservation was also incorporated into this course since there are several international agreements that tackle this theme.

The agenda was therefore designed to discuss the most important protocols on climate change, chemicals, wastes and natural resource conservation, presenting the advancements made so far and some examples of their effects in signatory countries, on the legislation and on the projects developed at national level.

The training course also presented the Italian experience in promoting biodiversity conservation, through specific legislation and the creation and management of natural protected areas at various levels (national, regional etc). A visit to the Dolomiti Bellunesi National Park was organized in order to get firsthand experience from the managers of the park and to answer the questions raised by the participants starting from real practice. A lecture was also devoted to the evaluation of ecosystem services and the attribution to them of a monetary value, as a tool able to better guide the decision-making process toward the protection of natural resources.

环保部多边环境公约与生物多样性保护

意大利,2013年10月20-28日

27 位学员

2013年10月20-28日由环境保护部选派的27名学员参加了“多边环境公约”培训，所涉领域包括生物多样性保护等。

在过去几年里，环保部对环境保护领域的公约给予高度重视，组织了多期专题培训。根据环保部的要求，由于多个环境公约涉及生物多样性保护，因此将生物多样性保护列入了全球环境问题培训课程中。

培训内容涵盖了最主要的环境公约，包括气候变化、化学品管理、废物管理、自然资源保护等；向学员们讲解了各缔约方在这些领域所取得的最近进展、履约成效、以及在国家层面的立法和项目实施情况。

培训班还介绍了意大利在保护生物多样性方面的情况，包括立法以及自然保护区的建立和管理（国家、地区等）等。为了获得对自然公园管理的一手信息，组织学员们参观了Dolomiti Bellunesi国家公园，与公园管理人员直接对话，交流具体管理工作的实践经验。专门安排了“生态系统服务及其价值评价”。这项工作对于保护自然资源非常重要，是决策过程中的重要工具。

EU Best Practices on Air Pollution Control presented at CCICED

The 2013 Annual General Meeting of the China Council for International Cooperation on Environment and Development (CCICED) was opened by Mr Zhang Gaoli, Vice Premier of the State Council, and took place at the Diaoyutai State Guesthouse in Beijing last November. CCICED has played a positive role in promoting China's economic development and environmental protection in the last 20 years or more by conducting in-depth studies on environmental and development issues and putting forward a number of important policy recommendations. IMELS' Director General, Corrado Clini, Council Member of CCICED, held a keynote speech on "The EU Experience in Air Pollution Control" presenting the EU's best practices on air quality and atmospheric pollution control. Among the others, Clini recalled the Italian activities under SICP in support of the Chinese Ministry for the Environment and many Chinese local authorities.
Such cooperative projects have contributed to the set-up of the air quality monitoring system in Beijing, Suzhou, Lanzhou and Urumqi, the capacity building of local officers and technicians, and the drafting of recommendations for the revision of the Chinese legislation on Air Pollution Control.

Premier Li Keqiang Met International Council Members and Delegates of CCICED

Premier Li Keqiang welcomed the council members and delegates attending the 2013 CCICED's Annual General Meeting, and appreciated their concern and support for the environment and development of China, speaking highly of their efforts and constructive role. As a Council Member of CCICED, Director General Corrado Clini of the Italian Ministry for the Environment, Land and Sea (IMELS) attended the meeting with Premier Li and participated in the sharing of views on promoting ecological progress, environmental protection, and global green development. IMELS has played an active role in supporting and participating in the CCICED since 2005 and has confirmed its involvement through Phase V of the Council (2012-2016).

介绍欧盟治理大气污染最佳实践经验

中国环境与发展国际合作委员会（以下简称“国合会”）2013年会于去年11月在北京国宾馆钓鱼台召开。国务院副总理张高丽出席开幕式。
在过去20多年来，国合会在环境与发展领域开展了大量深入研究，提出了一系列重要政策建议，为推动中国经济发展与环境保护发挥了积极作用。
意大利环境、领土与海洋部司长、国合会委员克里尼先生（Corrado Clini）在大会上作了题为“欧盟控制空气污染经验”的主旨发言，介绍了欧盟在改善空气质量、控制空气污染方面的最佳环境实践。
克里尼先生在报告中还回顾了《中意环境保护合作计划》，他指出在中国环保部和许多地方政府支持下，合作计划开展很多活动。这些合作项目对于在北京、苏州、兰州和乌鲁木齐建立空气质量监测系统、提高当地官员和技术人员能力、推动修订中国大气污染控制法规等方面作出了积极贡献。

李克强总理会见国合会国际委员

李克强总理首先欢迎委员们参加国合会2013年会，并感谢他们为中国的环境与发展事业所给予的关心和支持。李总理高度评价了委员们所做出的努力和发挥的建设性作用。
意大利环境、领土与海洋部司长、国合会委员克里尼（Corrado Clini）参加了会见，并与参会代表分享了在推动生态建设、环境保护和全球绿色发展方面的观点和思想。
自2005年以来意大利环境部积极支持和参与国合会工作，并决定将继续支持国合会第五届工作（2012-2016年）。

Sino-Italian Cooperation Project Closing on Carbon Capture Utilization and Storage Technology

The closing meeting of the Sino-Italian CCS Technology Cooperation Project was held in Beijing in November 2013.
The event was attended by representatives and experts from the Department of International Cooperation of the Ministry of Science and Technology (MOST), the Administrative Centre for China's Agenda 21 (ACCA21/ MOST), the Italian Ministry of the Environment, Land and Sea (IMELS), Italy's largest power company, Enel, China's Huaneng Group, the Institute of Engineering Thermophysics of the Chinese Academy of Sciences (CAS), Tsinghua University, Peking University, China University of Petroleum (Beijing), and Beijing University of Chemical Technology, etc. The project was kicked off in October 2010 and developed a pre-feasibility study for CCS technology application in coal-fired power plants in China, including joint research, technology transfer and personnel exchanges. The final output of the project provides a solid basis for improving the CCS technologies and preparation for the demonstration project in China.
This project, supported under SICP, facilitated the start of scientific and industrial cooperation between Enel and China's Huaneng Group, signing the first Memorandum of Understanding to strengthen their collaboration in March 2012, followed by a second one in October 2013.

中意两国合作——碳捕获、利用和存储项目顺利完成

中意两国合作开展的碳捕获、利用和存储项目于2013年11月召开了项目结题会。来自中国科技部国际合作司，中国21世纪管理中心，意大利环境、领土和海洋部，意大利最大的能源企业Enel公司，中国华能集团，中科院热物理研究所，清华大学，北京大学，中国石油大学（北京）及北京化工大学等单位的代表和专家参加了会议。
该项目于2010年启动，对中国的燃煤电厂碳捕获、利用和存储技术（CCS）进行了预可行性分析，包括开展联合研究、技术转让和人员交换等活动，项目产出将提高中国的CCS技术、准备实施示范项目奠定了坚实基础。
该项目得到了《中意环保合作计划》支持，推动了意大利Enel 公司与中国华能集团的科技与工业合作。双方于2012年签订了合作谅解备忘录，并于2013年10月续签了合作协议。

what's ON at VIU
威尼斯国际大学快讯

2014 at VIU begins with lots of energy and new initiatives, just as the Chinese "Year of the Horse" suggests!
In May, the **Sino-Italian Cooperation Program** opens the **11th edition of the Advanced Training Program** on Environmental Management and Sustainable Development, in cooperation this year with eight Chinese partners, including the Chinese **Ministry of Industry and Information Technology** (MIIT) which entered the training partnership in October last year.
Eighteen training courses are scheduled in total, with 14 training sessions in Italy and four in China.
Air Quality is a central topic for the Sino-Italian Training Program 2014: Shanghai and Beijing EPBs have asked for four training courses and the Chinese Ministry of Environmental Protection (MEP) will have three courses on this topic. The focus will be on air quality within an urban dimension, paying great attention to industrial pollution control.
Industrial Energy Efficiency is the second most requested topic for the 2014 edition. It will be a major focus for the four courses of the Chinese Ministry of Science and Technology (MOST) and for the two courses of the **Ministry of Industry and Information Technology** (MIIT). In both cases, the topic goes hand-in-hand with **Innovation, Green Technologies and Science Parks**.
Climate Change is confirmed to be the main topic for the two courses carried out by the Chinese National Development and Reform Commission (NDRC), whereas **Eco-Cities** remains a key topic area for the one course organized by the Tianjin Municipality.
The Chinese Academy of Social Sciences (CASS) will carry out two courses on new topics, namely **Environment and Health** and **Green Growth.**
In cooperation with **Harvard University**, VIU is promoting *Sustainability Science: A short course for researchers* (May 18-23, 2014). The course is designed for young leaders in sustainability research who seek a broader view on the theory, understanding and applications in this rapidly developing field. It is open to researchers from Italy, the EU, China, Brazil and India. The course is directed by Prof. William Clark of the Sustainability Science Program at Harvard University, in cooperation with the Italian Ministry for the Environment, Land and Sea.
A series of **summer schools** will be organized at VIU Campus during the summer term, in cooperation with VIU member universities.
Tsinghua and Tongji are strongly involved in the organization of the *Sustainable Landfilling and Final Sink* Summer School (July 11-20, 2014), within the framework of the International Advanced School in Waste Management, promoted by VIU and IWWG-International Waste Working Group. *Environmental Management in a Changing World: Coping with Sea Level Rise* is a summer school jointly promoted by VIU and Duke University-Nicholas School of Environment. Both initiatives are open to international masters and PhD students (for the full list of schools and for further information please visit www.univiu.org/shss/seminars-summer-schools).

2014年又将开始了！正如中国的"马"年，威尼斯国际大学将充满活力，新合作新倡议接踵而至！
《中-意合作计划》"环境管理与可持续发展高级培训"将于5月份进入第11年头，由威尼斯国际大学与中国8个合作伙伴共同实施该项目。其中，中国工业与信息技术部（MIIT）于去年10月份加入该项目。
今年将一共组织 18 期培训班，其中 14 个班在意大利，4 个班在中国。
空气质量是今年中国与意大利合作培训的主要内容：上海市和北京市环保局要求组织4期班，中国环保部要求举办 3期培训。培训的主要内容是城市空气质量，并要求对工业点源污染给予更多关注。
工业能源效率是2014年第二大培训热点。科技部要求组织4个班，工业与信息技术部要求组织2个班。这两个部门都希望在培训中重点关注技术创新和绿色科技园。
气候变化依然是国家发改委的重点领域，将组织2期培训班；应天津市政府要求，将举办1期主题为生态城市的培训班。与中国社科院将共同组织2期主题为环境、健康与绿色增长的培训班。
将与哈佛大学合作推动**可持续科学：研究员短训班** (2014年5月18-23日)。 该培训班致力于为年轻领导者拓宽眼界，加深对可持续科学理论理解，掌握该领域快速发展现状和趋势。培训班向意大利、欧盟、中国、巴西和印度的研究人员开放，由哈佛大学负责可持续科学项目的 William Clark 教授具体负责。该项目得到了意大利环境、领土与海洋部的大力支持。
暑假期间将与威尼斯国际大学会员学校合作，在校园举办一系列暑期班。
在威尼斯国际大学和国际废物工作组的大力推动下，在"废物管理国际高级学校"框架下，**清华大学和同济大学**将深度参与**可持续填埋和最终处理暑期班**（2014年7月11-20日）。
变化世界中的环境管理：应对日渐增高的海平面是威尼斯国际大学和杜克大学尼古拉斯环境学院合作组织的暑期学习班。这两个培训班面向所有的国际学生，向所有的国际研究生和博士生开放（有关详细信息请访问网站：www.univiu.org/shss/seminars-summer-schools).

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MINISTERO DELL'AMBIENTE
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