



esd sinosphere

Part of the Camco Group

Using Financial and Market-based Mechanisms to improve Energy Efficiency in Buildings in China

运用融资手段和市场机制提高中国的建筑能效

International experience & the CDM

国际经验及**CDM**(清洁发展机制)

18 February 2009 2009年2月18日

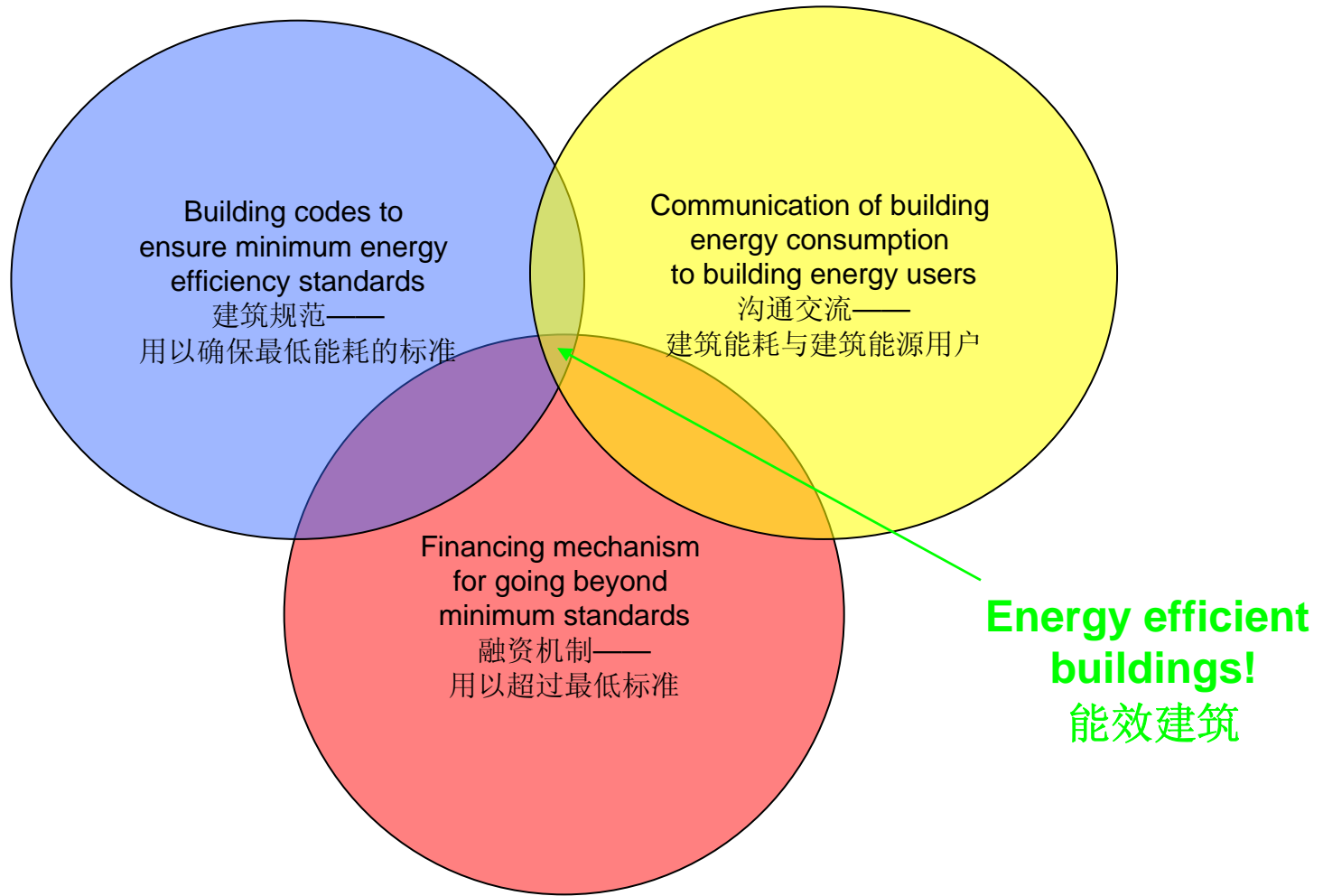
Rachel Child

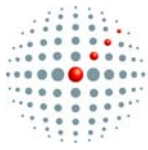




Contents

主要内容





Communication – a UK example

沟通交流——一项英国例证

- In Europe, the “Energy Performance in Building Directive” sets requirements for building energy certificates in EU countries.

在欧洲，“建筑能效指令”规定所有欧盟成员国都要实施建筑能源证书制度

- In the UK, there are 2 types:

在英国，有两种类型的证书:

- Energy performance certificates (EPCs) are based on a calculation assuming standard use of the building. EPCs will be required when a building is constructed, sold or let i.e. as a part of a property transaction.

能效证书(EPCs)，是在假定某建筑标准使用的基础上，根据计算数值，评估确定其能效级别。EPCs作为财产交易的一部分，在建筑物的建设、买卖、租让过程中，均要求出示。

- Display Energy Certificates (DECs) based on the actual energy used by a building over a year (the Measured or ‘Operational’ Rating). DECs must be displayed prominently by all ‘Public Buildings’ over 1,000m².

能耗展示证书(DECs)，是在根据建筑在超过一年时间内的的实际能源消耗数值，评估其能耗水平，即实测或运行等级。所有大于1,000平方米的公共建筑，均要求将其DECs证书陈列在显要位置。

- Similar systems are in place in other EU countries

其他欧盟国家采用相似的机制



Display Energy Certificates for buildings 建筑能耗展示证书

Headline indicator
标题指示

CO₂ emissions
tonnes/year
年二氧化碳排放量

Year-on-year
improvement
同比提高

Additional technical
details in fine print
附加技术细则

Display Energy Certificate

HM Government

How efficiently is this building being used?

A Government Dept
12th & 13th Floor
Jubilee House
High Street
Anytown
A1 2CD

Certificate Reference Number:
1234-1234-1234-1234

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more information on how to interpret this information on the Government's website www.communities.gov.uk/lepbid.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient

| | |
|---|----------|
| A | 0-25 |
| B | 26-50 |
| C | 51-75 |
| D | 76-100 |
| E | 101-125 |
| F | 126-150 |
| G | Over 150 |

100 would be typical

108

Less energy efficient

Total CO₂ Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO₂.

| Year | Electricity | Heating | Renewables |
|----------|-------------|---------|------------|
| Mar 2006 | ~180 | ~100 | ~20 |
| Apr 2006 | ~150 | ~80 | ~20 |
| Apr 2007 | ~120 | ~60 | ~20 |

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

| Period | Rating |
|----------|--------|
| Apr 2007 | 108 |
| Apr 2006 | 136 |
| Mar 2006 | 156 |

Technical information

is used in this building. Consumption data based on actual readings.

Main heating fuel: Gas
Building Environment: Air Conditioned
Total useful floor area (m²): 2527
Asset Rating: 92

| | Heating | Electricity |
|---|---------|-------------|
| Annual Energy Use (kWh/m ² /year) | 126 | 120 |
| Typical Energy Use (kWh/m ² /year) | 120 | 95 |
| Energy from renewables | 0% | 20% |

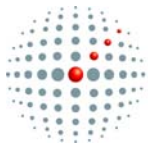
Administrative information

This is a Display Energy Certificate as defined in SI2007-001 as amended.

Assessment Software: OR v1
Property Reference: 891123775612
Assessor Name: John Smith
Assessor Number: ABC12345
Accreditation Scheme: ABC Accreditation Ltd
Employer/Tracing Name: EnergyWatch Ltd
Employer/Tracing Address: Alpha House, New Way, Birmingham, B2 1AA
Issue Date: 12 May 2007
Nominated Date: 01 Apr 2007
Valid Until: 31 Mar 2008
Related Party Disclosure: EnergyWatch are contracted as energy managers
Recommendations for Improving the energy efficiency of the building are contained in Report Reference Number 1234-1234-1234-1234

Building energy efficiency in the CDM & other financing mechanisms used internationally
CDM建筑能效领域及其他国际融资机制

3



Financing mechanisms: the CDM

融资机制：CDM

- Even though there are a number of registered CDM projects for industrial energy efficiency in China, there are no registered projects for building energy efficiency

尽管在中国的工业能效领域有很多已注册的CDM项目，在建筑能效领域却还没有项目经过注册

- Across the world there are only 5 projects looking at energy efficiency in buildings, even though the CDM EB has approved a number of methodologies.

世界上只有5个建筑能效领域的项目，虽然CDM执行理事会(EB)已经批准了一些方法学。

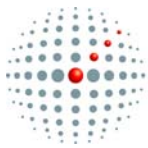
- Why is the CDM failing for building energy efficiency projects when this is such a large part of global carbon emissions?

在作为全球碳减排重要组成部分的建筑能效领域，CDM为何没有发挥作用？

- Building energy efficiency projects can be split into 3 types of project:

建筑能效项目可以分为3种类型：

- Energy efficient domestic appliances 节能家电
- New buildings 新建建筑
- Refurbishment of existing buildings 既有建筑改造



Energy efficient appliances – barriers (i)

节能家电——面临障碍(i)

- Energy savings per measure are very small so a large number of measures would be needed to make a project viable. This would make a project logistically very complicated.

单项措施带来的节能量很小，因此需要采用多种措施来保证项目可行。这将导致项目计算上复杂化。

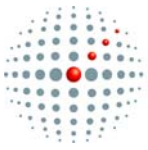
- Commercial issues: who owns the CERs (Manufacturer? Distributor? User?)

商务问题：谁拥有经核证的减排量（制造商？分销商？用户？）

- Additionality – over the lifetime of the measure, an EEA probably represents the least cost option

额外性问题：从一项措施的生命周期来看，节能家电很可能代表了最经济的选择。



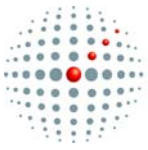


Energy efficient appliances – barriers (ii)

节能家电——面临障碍(ii)



- Emissions reductions calculations 减排量的计算:
 - How to take account of the rebound effect (if it costs less to use a light bulb, maybe people will just leave their lights on for longer – cancelling out energy savings?)
如何应对反弹效应 (由于使用节能灯更加经济, 人们在也许会下意识地忽略使用时间, 这就使得节能效果大打折扣)
 - How to take account of free riders (people who might have installed the measure anyway)
如何考虑那些“免费搭车”的人 (那些可能已经安装了紧凑型荧光灯管的人们)
- Monitoring emissions reductions: Robust sampling procedures are needed and transaction costs could be high
减排量的监测: 需要完整有效的取样程序, 交易成本可能很高



Whole buildings – barriers (i)

整体建筑——面临障碍(i)

- In one building many measures may be installed (e.g. CFLs + solar hot water heater). This would be 2 different methodologies.

很多项措施很可能在一座建筑物里实施（比如说紧凑型荧光灯管和太阳能热水器）。这将使用两种不同的方法学。

- Commercial issues: who owns the CERs? 谁拥有经核证的减排量？

- For new buildings, construction company or the building owner or the building occupier?

对于新建建筑，谁将拥有经核证的减排量？建设公司？建筑物拥有者？还是建筑物居住者？

- For existing buildings, it is likely that many different building owners would be involved in one project

对于已有建筑，一个项目可能涉及许多不同的建筑物拥有者

- Emission reduction calculations: how to set a baseline? 减排量计算：如何建立基准线？

- For new buildings, would need to find a ‘comparable’ building

对于新建建筑，可能需要选择一栋“可比较”建筑

- For existing buildings, would need to have historic data on the energy consumption of the building

对于已有建筑，可能需要本建筑能耗的历史数据



Whole buildings – barriers (ii)

整体建筑——面临障碍(ii)

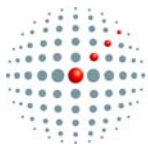
- Monitoring emission reductions: how to make sure savings are from measure installed and not from other external factors (e.g. changes in external temperature)

减排量的监测：如何确定能源是通过我们实施的措施节省的，而不是通过其他外部因素（比如外部温度的变化）

- As finally, as the amount of CO₂ saved is (relatively) small, the amount of revenue that could be received through the CDM is also small...and maybe not enough to act as an incentive to do the project

最后，二氧化碳减排量很小（相对来说），作为CDM项目带来的收益可能也相应很小.....可能不足以成为此类项目的激励机制





So if there are so many problems with the CDM, why bother?

既然如此多的问题，为何还要采用CDM？

- All additional revenue is helpful!

任何额外的收益都是有益的！

- The CDM can help to overcome ‘split incentive’ problems as the person installing the measure can get financial benefits.

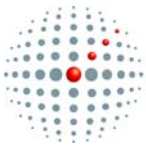
由于安装节能措施的人们可以获得经济收益，因此CDM可以帮助克服“激励分散”的问题。

- CDM registration for a buildings project would, in addition to additional financial revenue, provide reputational benefits comparable to, for example, achieving LEED certification.

注册成为建筑领域的CDM项目，除了获得额外的财务收益外，还将得到声誉方面的收益，比如得到LEED证书（能源与环境设计先锋奖）。

- Robust M&V procedures through the CDM could help to overcome issues with implementation of building codes

CDM中完整有效的监测和核查程序将有助于克服实施建筑规范过程中遇到的问题。



Positive developments

有利进展

■ For energy efficient appliances:

对于节能家电

- CDM EB recently approved a methodology based on ‘deemed savings’ for CFLs so no direct monitoring is required. This will help to reduce transaction costs.

CDM EB(执行理事会)于近期批准了一项用于节能灯项目的“假定节能量”的方法学，该方法学规定可以不必进行直接监测。这将有助于减少交易成本。

- At Poznan, the EB was praised for this and encouraged to do more work in this area.
波兹南会议上，执行理事会的这一决定获得了极大的称赞，并被寄予更高的期望。

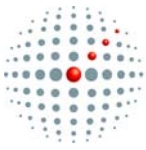
- A methodology for working with refrigerator manufacturers was also recently approved. This is based on benchmarking and also does not involve direct monitoring.

一项旨在促进同冰箱制造企业合作、共同促进减排活动的方法学也于近期获得批准。此方法学是采用基准值分析方法，同时也不涉及直接监测。

■ For whole buildings:

对于整体建筑

- Suggestions to develop a performance based methodology for the CDM
建议开发基于绩效的CDM方法学



An alternative: White Certificates (i)

替代选择：白色证书(i)

- A 'white certificate' represents a certain amount of energy savings (e.g. 1MWh) achieved through undertaking energy saving measures (e.g. improving insulation in a building or replacing incandescent light bulbs with CFLs)

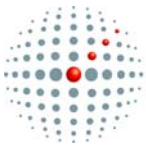
一个白色证书代表通过实施节能措施（如改善建筑物隔热保温性能或用节能灯替换白炽灯）而实现的一定的节能量（如1MWh）

- White Certificates have generally been used together with an obligation on energy suppliers or distribution companies (e.g. electricity, gas and district heating supply companies) to reduce the energy they supply by a certain amount.

“白色证书”通常与另外一项针对能源供应商或分销商（如电力、燃气和区域供暖公司）的强制性政策联合作用，确保这些公司能够节省一定量它们所供应的能源。

- The Certificate demonstrates therefore that a certain amount of energy saving has been achieved and can be used by the energy supplier to prove that they have reached their target.

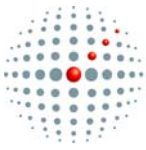
“白色证书”表示，一定的节能量已经被实现了，因此，能源供应商可以凭借其证明自己已经满足了设定的节能目标。



White Certificates (ii)

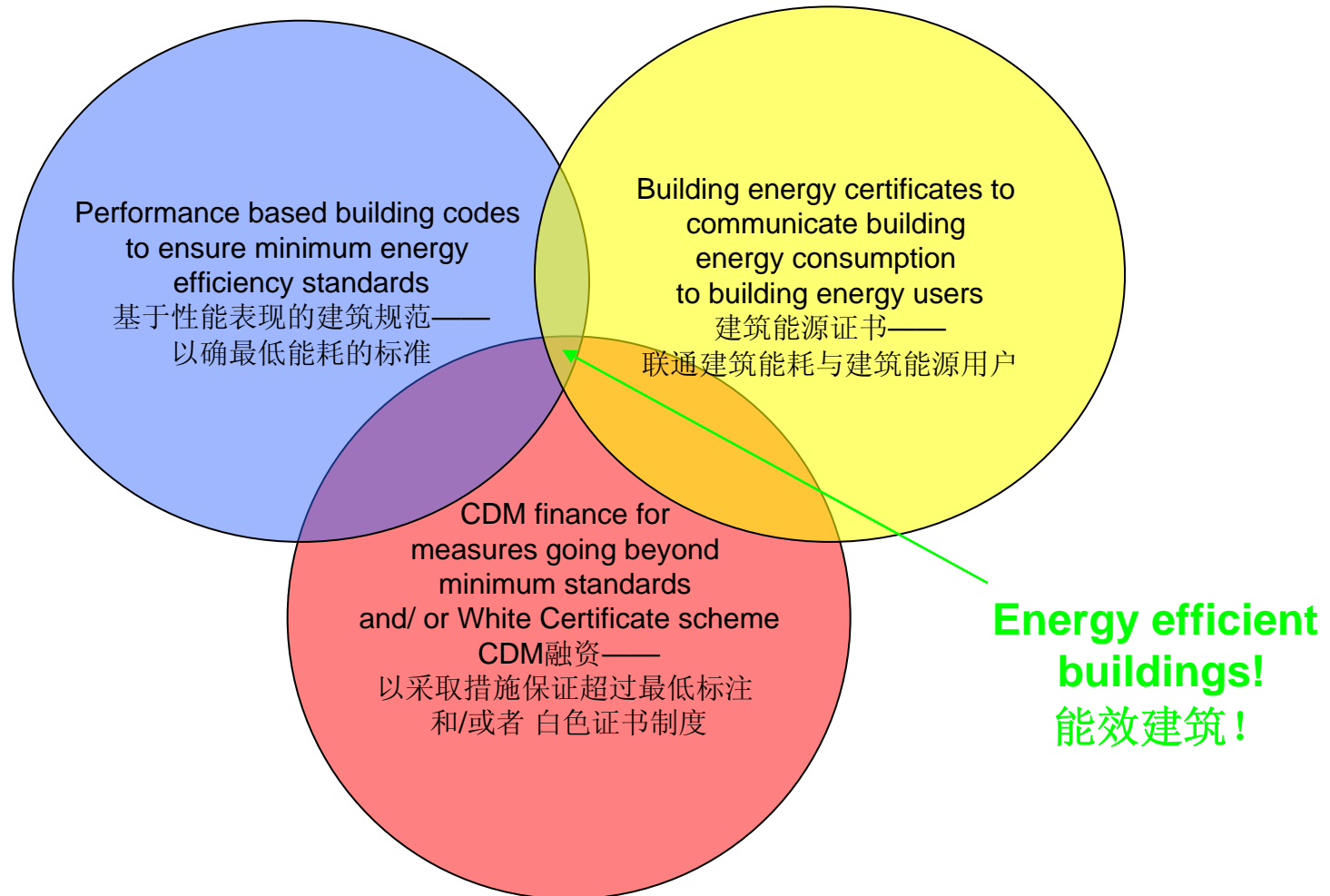
白色证书(ii)

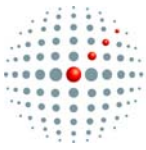
- TWCs are also generally tradable so that obligated parties can meet their target in the most cost-effective way.
“可交易白色证书”通常也可以交易，这使得各责任主题能够通过最有效的方式实现他们各自的节能目标
- White Certificate schemes are operating in New South Wales (Australia), France, Italy & the UK. These existing schemes cover buildings (and in some cases also transport and light industry)
“白色证书”制度在澳大利亚的新南威尔士州、法国、意大利和英国已广泛实施。这些现有制度已经应用于建筑领域（及部分交通和轻工业领域）
- Existing schemes generally support energy efficiency improvements in **existing** buildings and on the promotion of energy efficient appliances.
现有的制度通常支持既有建筑的能效提高及节能电器的推广
- To reduce costs, they have established methodologies to monitor energy savings including an ex ante approach (where energy savings are conservatively calculated before the measure installed and no actual monitoring need take place following installation)
为了降低成本，“白色证书”制度建立了包括事前估算的方法在内的节能量监测的方法学。通常的做法是，在措施事前，对节能量进行保守的计算，在措施实施后不进行实际监测。



The future?

未来情景?





Thank you!

Rachel Child

Rachel.child@camcoglobal.com.cn,

010 8448 1623

Xiao Hong

redy.xiao@esdsinosphere.com,

010 8448 1623