GLAECONOMICS

Current Issues Note 19

The role of London's financial services sector in mitigating and adapting to climate change

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Transport for London

LONDON DEVELOPMENT AGENCY

MAYOR OF LONDON

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Greater London Authority
September 2007

Published by
Greater London Authority
City Hall
The Queen's Walk
London SE1 2AA
www.london.gov.uk
enquiries **020 7983 4000**
minicom **020 7983 4458**

ISBN: **978-1-84781-064-9**

Cover photograph
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GLA Economics provides expert advice and analysis on London's economy and the economic issues facing the capital. Data and analysis from GLA Economics form a basis for the policy and investment decisions facing the Mayor of London and the GLA group. The unit is funded by the Greater London Authority, Transport for London and the London Development Agency.

Contents

'By working with the grain of the market, we free innovation, flexibility and entrepreneurship that promotes growth rather than holding it back … and it makes the economic opportunities of a climate-friendly energy policy real and tangible.'[1]

- Gordon Brown

Introduction

This paper examines the role that London's financial services sector is playing, and can play, in helping society to mitigate and adapt to climate change. Amongst other things this involves: the financing of new environmental technologies; carbon trading; and creating markets, insurance products and other innovative services. London's globally leading financial services industry is in a prime position to drive new markets, products and services forward benefiting both the world's future climate and London's position as a financial centre.

London – the international market of choice

'London's Alternative Investment Market, commonly known as AIM, has become the dominant small-cap listing venue in Europe and, in the eyes of some commentators, a viable alternative for US issuers. Since 2001, 870 companies have listed on AIM, compared with 526 on NASDAQ. The trend has recently accelerated.'[2]

- McKinsey

London has become the international market of choice for the green sector focused around world leading capital markets – particularly, the presence of a well-informed investor community and a supportive over-arching political framework.

Another important element in London's environmental cluster which should not be overlooked is its academic resource base. The London School of Economics has established a lead in a number of climate change and forecasting related areas and is currently working with the London Accord[3]. Imperial College is globally renowned for technologies research and has established a London nanotechnologies[4] research centre. It is also playing an important role as an incubator for innovative environmental start-ups such as Ceres.

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[1] Gordon Brown, Speech to UN ambassadors in New York, 20.04.06
[2] McKinsey, 2007, Sustaining New York's and the US' global financial services leadership. View: www.senate.gov/~schumer/SchumerWebsite/pressroom/special_reports/2007/NY_REPORT%20_FINAL.pdf
[3] The London Accord is a co-operative research venture by global investment banks and research institutions into the economic and financial aspects of climate change investment. It also involves non-governmental organisations and academics and is scheduled to publish the findings of its research in December 2007.
[4] Nanotechnology is a multi-disciplinary field of applied science and engineering dealing with the control of matter on a scale beneath 1µm. It is a broad term covering a range of different, but sometimes inter-related, subfields. For further details see www.nanotec.org.uk.

The importance of AIM for new environmental technologies

AIM is the London Stock Exchange's international market for smaller companies which was launched in 1995. The objective was to give smaller companies from any country or economic sector, the opportunity to raise capital on a market with a pragmatic approach to regulation and with a streamlined admissions process. Critical for many start-up 'cleantech'[5] firms, AIM does not have any minimum criteria in relation to capitalisation or firm track record, replacing these types of requirements only with the need for a nominated adviser from an approved register. AIM is increasingly becoming the home for cleantech firms across the globe. One driver for this has been the recent tightening in the regulatory environment for NASDAQ in the United States on the back of the Sarbanes-Oxley Act. The increasingly litigious nature of US markets has also played a part.

AIM has been unique in being able to attract IPOs[6] from other countries. Prometheus is an alternative and renewable energy company that installed the world's first 'waste to LNG'[7] commercial scale plant and which was admitted to AIM in the autumn of 2006 even though it is US-based. As well as firms specialising in hybrid fuel cells (such as Proton Power Systems), bio-ethanol (Renova, which is also US-based), wind turbine systems and components (Clipper, also American) and alternative vehicles (such as battery electric scooter producer, Vectrix), it also specialises in firms dealing with corporate finance for the alternative energy sector and firms which specifically search out management teams with innovative concepts but little capital in order to acquire an interest in environmental businesses. Canaccord Adams' ROS[8] Index demonstrates that environmental technologies listings on AIM have outperformed the AIM market as a whole over the period from 2004.

The financing of new 'renewable' technologies

Global investment in clean energy has more than doubled since 2004. There have been a number of drivers behind this:

- An increase in prices in some traditional sources of energy and volatile price movements in some others creating market instability. However, the volatility of gas prices has created very mixed market signals for renewable sources of energy.

- Aging infrastructure in developed countries leading to sporadic blackouts. For example, during the exceptionally hot weather of 2003 all of mainland Italy, Sicily and parts of Switzerland were hit by a blackout affecting 56 million people

[5] The development of products and services using technologies to reduce resource depletion, pollution, waste or other negative environmental impacts.
[6] Initial Public Offering – the first sale of a firm's shares in order to raise capital.
[7] Liquefied Natural Gas
[8] Resource Optimisation & Sustainability Index. For more information about Canaccord Adams, view: www.canaccordadams.com.

and trapping 30,000 on public transport networks. Conversely, a 'cold snap' in November 2006 combined with routine engineering work in Germany, created a blackout for five million people in France and further blackouts across parts of Belgium, Italy, Croatia and Iberia.

- Supply bottlenecks in some of the more rapidly growing developing economies – particularly in large and rapidly expanding urban areas such as Mumbai.

- New materials sciences such as nanotechnology in which London has played a key role in some of the most important breakthroughs.

- Global deregulation of the energy supply industry.

Many renewables technologies have run into obstacles to their commercialisation making private investment less attractive: the rising price of high-grade silicon limiting the expansion of photovoltaics, planning hold-ups delaying wind farms, the finding of a carbon-neutral technique for the powering of fuel cells delaying the advancement of the hydrogen economy and general problems with the storage of renewably-sourced energy. That means the necessary breakthroughs will sometimes involve completely new technologies and London's universities will play a vital role in that.

London's academic sector's contribution

Imperial College owns 71 per cent of Imperial Innovations and has agreed a 15-year pipeline agreement with them. Imperial Innovations is one of the UK's leading technology transfer companies, which allows the commercialisation of technology resulting from the College's research activities. This means that as well as having incubators focusing specifically on low carbon technologies, Imperial Innovations has been able to develop a track record in fuel cells and energy efficiency including Ceres, HydroVenturi (which recently won the Shell Prize for Innovation in Addressing Climate Change) and HeliSwirl Technologies, which was recently awarded a £100,000 research and development grant from the Carbon Trust. Imperial Innovations is also a shareholder in the AIM-listed NanoScience which acquired Toumaz Technology, a developer of low power integrated circuits. The Low Carbon Seed Fund will invest in companies aiming to develop clean or alternative energy sources, focusing on the period between prototype and mass-market product as it is often this 'scale up' period which companies do not survive.

The London School of Economics' role to date has been very different, working in a broad range of disciplines from probabilistic forecasting, analysis of the economic rationale for Kyoto and the effects of climate change on economic development. To help underwriters best understand the risks associated with climate change, as well as the limits of mathematical modelling, Lloyd's is funding a PhD student at the Centre for the Analysis of Time Series (CATS) and Lenny Smith, a Director of CATS is engaged on the London Accord project.

Whether investing in climate change mitigation through renewables technologies becomes financially viable depends largely on how the European Union's Emissions Trading Scheme (EU ETS) performs – and London has a vital role as it is by far the largest single player of any European city.

Carbon markets and London's global influence

Although the EU ETS has been beset with difficulties - particularly with regard to the over-allocation of permits and the creating of long markets in most of the member states – it has traded and it has been effective.

'The EU ETS has succeeded in imposing a price on CO_2 emissions. This is more than can be said for any other country or group of countries. As such it is by far the most significant accomplishment in climate policy to date.'[9]

Tighter permit allocations building on the lessons of Phase 1[10] should make for a more effective market in future. Given time and the more critical response to the Phase 2[11] National Allocation Plans submitted by member states, the market will recover from the over-allocation of permits and the loss of market confidence triggered by the Spring 2006 leaks revealing over-allocation. Since March 2007 there has been a recovery and greater stability in the price of carbon.

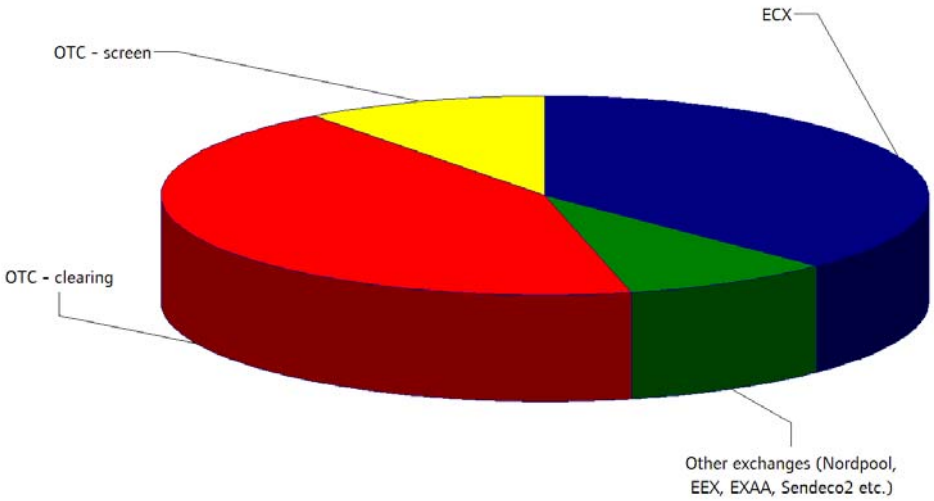
The fact that the United States has again rejected carbon 'cap and trade' reduces the likelihood of global carbon emissions cuts but has some possible advantages - as well as disadvantages - for London's financial services sector in taking forward its current lead role[12]. At present only US markets have the capacity to pose a major competitive challenge to London's global dominance in carbon emissions permit trading, having the necessary experience in SOx and NOx[13] trading and with the US accounting for nearly one-quarter of the world's carbon dioxide emissions. Whilst the US remains isolated from any post-Kyoto trading plan it is unlikely to be able to capitalise on this potential, allowing London the opportunity to embed its role deeper. However, a lack of US participation in carbon markets could also restrain progress towards a global carbon price and constrain the overall size of the global market, thereby reducing benefits for London.

The UK established a lead in European carbon trading, having run a non-fungible prototype, 'UK ETS'. It was the first nationwide scheme of its kind and was brought into being under the November 2000 Climate Change Programme. UK ETS suffered from many of the problems which were also faced by EU ETS Phase 1. Assessments of whether the scheme was a success vary but its very existence undoubtedly prepared UK companies for the EU scheme and gave London the skills and infrastructure needed to

[9] Ellerman and Buchner in Review of Environmental Economics and Policy, 1/1, Winter 2007.
[10] Phase 1 started on 1st January 2005 and will expire on 31st December 2007.
[11] Phase 2 covers the period from 2008 to 2012.
[12] The US President's slight change in tone at the beginning of June 2007 could transform this situation, leading to a more globalised market in which the US – and ultimately, also China – play a significant role. Between them they account for 50 per cent of all global carbon dioxide emissions.
[13] Sulphur oxides and nitrogen oxides.

put the City in a prime mover position. Looking to the longer-term picture this will prove to be absolutely critical as the emissions trading market has the potential to become the single largest global commodity market.

Figure 1: European carbon trade shares (2006)



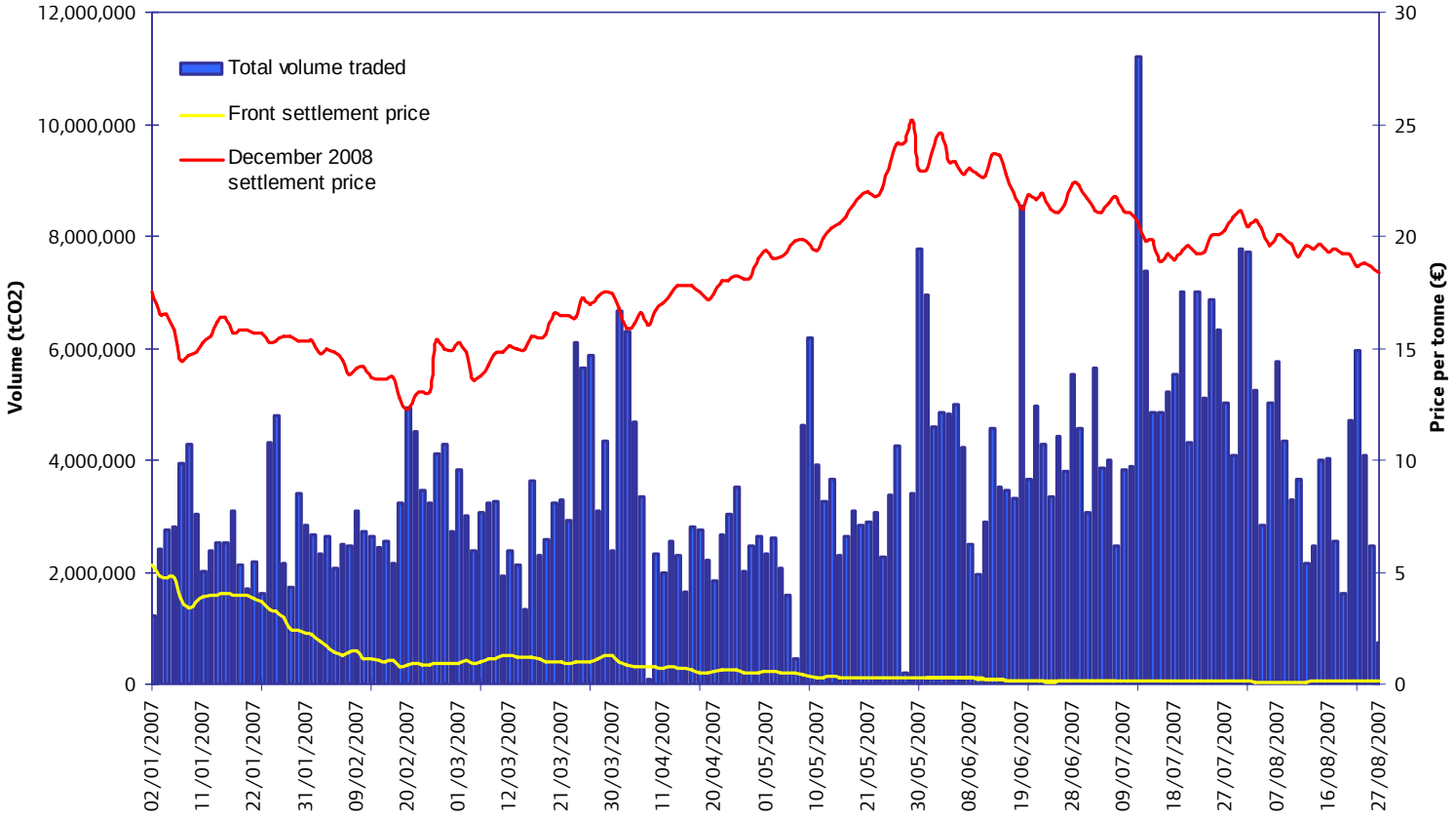
Source: GLA Economics calculations from various sources such as ECX, IETA and the World Bank

The majority of exchange-traded carbon goes through the ECX (European Climate Exchange[14]). Of the 560 million tonnes of carbon dioxide (CO_2) traded via exchanges in 2006, nearly 453 million went through ECX. Competition in the European trading market comes from the European Energy Exchange (EEX) in Leipzig and from Oslo's Nordpool, Energy Exchange Austria (EXAA) and Spain's Sendeco$_2$ in what is a consolidating market. These exchanges began with very different specialisms within the market. However, just over half of all carbon trades are Over The Counter (OTC) but more than 500 million tonnes of this goes via clearing, often operated by the exchanges, rather than on-screen. This means that in total the market was nearly 1.2 billion tonnes of CO_2 in 2006. ECX has recently merged with the Chicago Climate Exchange (CCX) but both have the same parent company, the AIM-listed, Climate Exchange plc. founded by Neil Eckert which has its offices on Bishopsgate. Over the summer of 2007, ECX experienced its highest traded volumes on record, reaching a new peak on 11 July when it breached the 11 million tonnes of CO_2 mark in daily trade - see

[14] Although ECX is technically based in Amsterdam, like the Chicago Climate Exchange (CCX), it is owned by parent company, Climate Exchange plc. which is AIM-listed. Together with ICE, ECX launched a Carbon Financial Instrument futures contract based on allowances issued under EU ETS. ICE Futures is Europe's leading energy exchange and ICE is legally based in London.

Figure 2[15]. The Chicago Exchange recently announced the formation of a Californian Climate Exchange in response to Governor Schwarzenegger's signing of the AB32 Act[16].

Figure 2: European Climate Exchange carbon settlement prices and trade volumes (January - August 2007)



Source: ECX

Although the system is not yet all it could be, EU ETS has established a mechanism for setting a cross-national price of carbon which extends beyond the member countries through the Clean Development Mechanism. It has therefore established the basis for a wider international system and has demonstrated that trading can produce a carbon price – a fact that will be hard to ignore in future global climate negotiations. This implies that London's lead in the trading market is likely to become more rather than less important.

London's insurance sector

According to some estimates the insurance industry is the largest industry in the world with revenues exceeding $3 trillion per annum[17]. London's insurance industry structure

[15] The majority of 11 July trades were 'exchange for physical' trades where the exchange is used to lower the credit risk attached to a transaction.
[16] 'Assembly Bill 32', the Global Warming Solutions Act 2006, codifies California's stated goal requiring that emissions known to cause global warming be reduced back to 1990 levels by the year 2020. This will be achieved by a state-wide cap and trade system beginning in 2012.
[17] Mills E, 2005, Insurance in a climate of change

is fundamentally different to the rest of the UK as it tends to handle high-exposure risk. The London market's gross premiums were estimated to be at least £26.7 billion in 2005, up 19 per cent on the previous year[18].

Insurance markets are well-adapted to dealing with weather risks. Now they will also have to adapt to longer-term changes in climate and the risks that this will bring. Each of the world's 50 largest economies faces some degree of risk from natural hazards. Climate change can be expected to make these risks worse. The increasing frequency of catastrophic events over the last few years has generated an increased questioning of whether traditional backward-looking models are suitable for insurance premium estimation purposes and this has driven the sector to work more closely with climate experts. The publication of probability-based forecasts such as UKCIP08[19], generated by the Hadley Centre in Exeter is a major step forward from the UK insurance sector's perspective. Events such as those organised by the London Climate Change Partnership bring the insurance sector into formal contact with the Environment Agency and local administration but it is also important that full advantage is taken of the resources and expertise offered by London's academic community in climate modelling. The concern for the insurance sector is not what 'average' weather will look like but the frequency and intensity of extreme events.

London's importance to global insurance markets is very substantial indeed. The Association of British Insurers underwrites 94 per cent of domestic business and Lloyd's of London is known globally for devising innovative insurance solutions to complex problems and providing a service to businesses in more than 200 countries. Lloyd's now underwrites a quarter of the world's wind farms. This implies that the UK's insurance sector's interest in climate forecasting is not limited to the effects of climate change on the UK itself.

Climate change is also likely to promote a number of trends within the sector from increased narrative reporting and increased capitalisation to more flexible and tailored insurance options. A good example of such 'flexible insurance' is 'Pay-As-You-Drive' motor insurance. In this particular case, an externality is internalised by rewarding people for driving less. A number of other products are experimenting with offsetting options. However, there are also some insurance difficulties posed by climate change. For example, new technologies aimed at mitigation and adaptation may be seen by the industry as a greater risk and hence drive higher premiums.

[18] International Financial Services London, 2007, International financial markets in the UK
[19] UKCIP08 is fundamentally different from its predecessor, UKCIP02, in that it is based on a large ensemble of model runs and incorporates information from other IPCC climate models resulting in a statistical distribution of results for each emissions scenario.

Carbon capture and storage (CCS) and carbon abatement technologies

Apart from the rights, efficacy and safety issues surrounding CCS, a plethora of different studies has shown that the capital costs associated with adding carbon capture to fossil fuel plants, whether part of a newbuild design or retrofitted to old plant, are substantial. A number of British companies, such as BP, have been at the forefront of such research. Future prospects of an 'investor bankable' carbon price combined with the possibility of enhanced oil recovery techniques could make CCS a viable prospect. The involvement of BP with the London Accord may help gauge City appetite for the scale-up on CCS technologies in the current energy environment.

Coal carbon abatement technologies were initially designed to remove sulphur dioxide rather than CO_2. On account of the high financial costs they are not frequently used for CO_2 mitigation. Nevertheless, carbon abatement technologies could strengthen the diversity and security of energy supply for the UK and the Hatfield Colliery[20] Integrated Combined Gas Cycle (ICGC) plant proposals have attracted Russian investment in anticipation of a future, higher carbon price.

Risks to the further development of carbon markets

There is an outside risk that the United States might choose to adopt a tax-based system for encouraging reductions in carbon dioxide emissions rather than following the lead of the EU ETS scheme. That would reduce the potential future size of the global carbon market. It would also mean that the United States would be missing out on the benefits of carbon trading and imposing increased cumbersome administration. This would also pose some risks to London and the future of global carbon markets. Firstly, it would impact directly on the potential size of the global market since the US is responsible for nearly a quarter of all global CO_2 emissions. However, it might also have impacts beyond the US by encouraging other countries to adopt tax-based systems, thereby preventing the emergence of a global carbon price and resulting in a series of fragmented and diverse tax regimes. Under a scenario such as this, London's role would be limited to that of the regional carbon trading centre for Europe.

If the US were to take this route it would be going against current trends. Within the US itself the largest state in population terms, California, has already committed itself to a carbon 'cap and trade' system and the UK has signed an agreement with California to explore the potential linkages in carbon markets on both sides of the Atlantic. The other major industrial economy which refused to sign the Kyoto Protocol has also shifted its position. In November 2006 the Australian Prime Minister, John Howard, established a task force to look at options for carbon trading and outlined his vision at the Asia Pacific Economic Council (APEC) forum. At the beginning of June, Australia announced

[20] Hatfield Colliery at Thorne near Doncaster recently re-opened and will be accompanied by an ICGC plant. It will be the first of several supercritical plant projects in the UK which are currently in the pipeline including Teesside, Ferrybridge near Pontefract and Kingsnorth in Kent (although the last of these currently faces some planning complications).

that it would have a carbon trading scheme in place by 2012 even though its carbon targets remain essentially aspirational.

Conclusion

London has positioned itself as the international market of choice for green technology investment, new insurance products driven by climate change and is at the centre of carbon trading for the EU ETS in spite of initial expectations that Leipzig and Oslo might take a greater share of the market. Thanks to Europe's lead in climate change mitigation, London is not only the leading European city in the field but is now global leader. The capital's insurance sector is also taking a lead in developing new products better suited to climate change event risks and is working very actively with both the Hadley Centre and London's universities to develop improved probabilistic forecasting models.

The UK Government recognises the increasing importance of environmental industries to the UK economy[21] and London's markets are relatively free from the regulation of some potential competitor cities. This has created a dynamic culture which encourages collaborations such as the London Accord rather than constrains them. Environmental products and services are set to expand to become one of the most important sectors in the global economy. London is well positioned to continue an innovative role and to secure a very significant share of this expanding market. Therefore, through innovation in markets, London is not only adapting to climate change to secure its own economic future and generating new jobs in its financial sector but is also benefiting the world as a whole.

In December 2006, the then Chancellor of the Exchequer, Gordon Brown, pledged to make London the world's leading centre for carbon trading. London's policy needs to be one of providing support, encouraging forums for discussion and bringing individual parties together to encourage carbon markets. The promotion of carbon markets will also benefit London financially. The London administration has recognised that a comprehensive carbon pricing mechanism is essential to tackling climate change and the Mayor of London has committed the city to becoming the 'undisputed world leader' in financial developments associated with climate change[22].

An example of this kind of co-ordination role for the London administration is the London Climate Change Partnership which brings together 30 key organisations representing government, climate science academics, domestic and commercial developers and representatives of the transport, finance, health, environment and communications sectors.

[21] UK Government Sustainable Development Strategy, 2005, DEFRA
[22] Ken Livingstone's speech at the World Economic Forum in Davos in January 2007.

Acronyms and terminology

AIM	Alternative Investment Market
APEC	Asia Pacific Economic Council
CCS	Carbon capture and storage
Cleantech	The development of products and services using technologies to reduce resource depletion, pollution, waste or other negative environmental impacts.
CO_2	Carbon dioxide
EU ETS	European Union Emissions Trading Scheme
ICGC	Integrated Combined Gas Cycle
Nanotechnology	A multi-disciplinary field of applied science and engineering dealing with the control of matter on a scale beneath 1µm. It is a broad term covering a range of different, but sometimes inter-related, subfields. For further details see www.nanotec.org.uk.
UK	United Kingdom
US	United States of America

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Chinese

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Hindi

यदि आप इस दस्तावेज की प्रति अपनी भाषा में चाहते हैं, तो कृपया निम्नलिखित नंबर पर फोन करें अथवा नीचे दिये गये पते पर संपर्क करें

Vietnamese

Nếu bạn muốn có văn bản tài liệu này bằng ngôn ngữ của mình, hãy liên hệ theo số điện thoại hoặc địa chỉ dưới đây.

Bengali

আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি (কপি) চান, তা হলে নীচের ফোন্ নম্বরে বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Greek

Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος εγγράφου στη δική σας γλώσσα, παρακαλείστε να επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυδρομικά στην παρακάτω διεύθυνση.

Urdu

اگر آپ اِس دستاویز کی نقل اپنی زبان میں چاھتے ھیں، تو براہ کرم نیچے دئے گئے نمبر پر فون کریں یا دیئے گئے پتے پر رابطہ کریں

Turkish

Bu belgenin kendi dilinizde hazırlanmış bir nüshasını edinmek için, lütfen aşağıdaki telefon numarasını arayınız

Arabic

إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى الاتصال برقم الهاتف أو مراسلة العنوان أدناه

Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

Gujarati

જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.

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