

**Developing a low-carbon economy to
spur the global economic recovery**

Batten Lecture

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Good evening, and let me thank you for inviting me to deliver the inaugural Batten Lecture. I would first like to say a few words about James Batten, for whom this lecture series is named. Mr. Batten was the headmaster of King's College from 1969 to 1988. During his time at the College, he increased the number of pupils, introduced girls to the school, and oversaw the construction of a number of new buildings. He and his wife Sue are remembered fondly by many former students for the standards they set for staff and pupils, as well as for their involvement in school life.

I am therefore honoured to be here tonight to speak at the first lecture named for Mr. Batten. I will be focusing on how the financial crisis and the climate crisis are interlinked – and how we can solve both together. I will begin by discussing how the financial crisis has developed, and how international institutions are being reformed to deal with the economic downturn. I will then move on to discussing broader issues of market failure, and how they are linked to climate change. Then, I will discuss public policy and public finance interventions to address climate change, including putting a price on carbon, which is critical. Finally, I will conclude by discussing the opportunity that we have to build a sustainable, prosperous future for ourselves by addressing climate change and economic recovery from the financial crisis together.

I. The development of the financial crisis and institutional reform

The economic downturn has been a watershed event, an event that we were all utterly unprepared for – public and private sectors, banks and regulators. What we know in hindsight is that mistakes were made on all sides, by banks, regulators, rating agencies, and investors. But let me also emphasize that certain parts of the banking sector were in large measure responsible for the crisis, and so it is up to us to do our utmost and put in place measures to avoid a recurrence in the future. And at Deutsche Bank, we are working very closely with policymakers and regulators to show leadership as we begin to emerge from the crisis.

While there are some initial signs that economies are beginning to recover, the recovery is not yet self-sustaining. Clearly, compared with six months ago or so when

we were still in free fall, we are in less troubled waters. Based on the roughly 50 percent rally in some of the major stock indices – as well as news from Japan, Germany and France that economic growth has resumed – one could argue that global economic recovery may be underway by the beginning of next year.

While we were still navigating in dense fog six months ago, this has lifted, to some degree – but substantial uncertainty still remains. The impact on the real economy of the complete drying up of liquidity and credit after the Lehman collapse was quick and dramatic, with world trade coming to a near standstill – which had severe consequences for export economies like Germany, China and Japan. The full brunt of these dislocations has not yet fed back into the financial system and banks' asset quality. But even without another shock to the system, it seems pretty clear to me that recovery will be painfully slow and volatile, and that we will have a longer, rather than shorter, period of below potential growth.

The unique developments in financial markets and the real economy have been mirrored by policy action. Because this crisis has moved on such an unusual path, there has been no blueprint for how to deal with it; as a result, many measures have been experimental in nature. Central banks around the world have to be commended on their creativity at times, and the fiscal stimuli provided by governments from the US to China, Europe to Korea, should lift output growth globally by about 1.5 percent point this year – or, more accurately, limit the fall to perhaps 1.3 percent rather than nearly 3 percent.

Over the coming years, one of the challenges will be, of course, how to withdraw the massive liquidity injections and drive down fiscal deficits from the 10 percent of GDP levels they have now reached in countries like the US and the UK. Even more fundamental is the extent to which this crisis may have altered – at least for the time being – perceptions about the role of the state, the governance of international institutions, and the future of free market capitalism.

In that vein, the financial crisis has catalyzed reform of international institutions. In particular, it has been the occasion for unprecedented coordination of fiscal stimulus

efforts. In the longer term, it has highlighted the need for better international supervision and governance, as well as the need for China, India and other emerging economies to assume their rightful leadership position within international institutions.

These issues have been played out in particular through the G-20. In November, 2008, the G-20 met for the first time at head-of-government level in Washington. At subsequent meetings in London and Pittsburgh, the role of the G-20 as the primary global forum for cooperation and consultation on matters pertaining to the international financial system was cemented.

The rise of the G-20 is important – while it observes the principle of restricting membership to a fixed number of countries in order to ensure the effectiveness and continuity of its activity, it is a fundamentally more inclusive and representative group than the G-8. While G-8 countries represent 60 percent of global GDP, only 14 percent of the world’s population resides in G-8 states. The G-20 economies, on the other hand, comprise 85 percent of global GDP and two-thirds of the world’s population, encompassing critical emerging economies like China, India, and Brazil – none of which was represented in the G-8. The G-20 is clearly the right forum now for coordinating international economic policy, as well as for enhancing surveillance and improving governance of the international monetary and financial system.

The rise of the G-20 has taken place within a broader context of international institutional reform, including discussions about expanding the UN Security Council – which is beyond the scope of this evening’s lecture – and making the International Monetary Fund stronger and more representative. Indeed, the G-20 agreement in Pittsburgh called for shifting the Fund’s country weightings toward emerging markets. The shift of quotas from over-represented to under-represented countries will increase the institution’s global legitimacy, and will bring the institution’s governance structure more closely into line with the current shape of the global economy.

But IMF reform is broader than just shifting the country weightings to emerging markets. The G-20 agreement also called for an examination into the size and composition of the IMF Executive Board. The Pittsburgh agreement asked the IMF to

look at how it could enhance its effectiveness, increase the Fund Governors' involvement in the strategic oversight of the institution, and promote staff diversity. As part of the reform process, the G-20 agreed that the heads and senior leadership of all international institutions should be appointed through open, transparent, and merit-based processes.

IMF Managing Director Dominique Strauss-Kahn acknowledges that change at the IMF will not happen as quickly as some would like. But much has been done over the past year to make the IMF – as well as other international institutions such as the World Bank – more representative of our changing world. This has strengthened these institutions. They have been further strengthened by the early success in the economic stimulus packages coordinated through the G-20, as well as by the infusion of at least half a trillion dollars to the IMF, which will more than double its ability to lend.

One final area where the role of the IMF is shifting, in response to the financial crisis, is in the increasing prominence of the Fund's Special Drawing Rights. Special Drawing Rights function as a sort of international currency, pegged to a basket of four major world currencies – the US dollar, the Euro, the Japanese Yen, and the British Pound. Every five years, the IMF Executive Board determines the relative weight of the four currencies in the basket used to determine the value of Special Drawing Rights. The relative weight is based on the importance of the four currencies in international trade.

While no new Special Drawing Rights were created between 1981 and 2008, in April, 2009, the G-20 authorized the IMF to issue \$250 billion of new Special Drawing Rights to augment the foreign reserves of members, especially those of emerging economies. This increased the number of Special Drawing Rights in existence by more than eight-fold.

The increase in the number of Special Drawing Rights came on the back of the suggestion of China's Central Bank Governor Zhou Xiaochuan that Special Drawing Rights might be an appropriate replacement, over time, for the dollar as the world's

reserve currency. Zhou outlined a set of steps that would bolster the role of Special Drawing Rights, including:

- Setting up a settlement system between Special Drawing Rights and other currencies to allow it to become widely accepted in international trade and financial transactions;
- Promoting the use of Special Drawing Rights in international trade, commodities pricing, investment, and corporate book-keeping;
- Creating financial assets denominated in Special Drawing Rights;
- And improving the valuation and allocation of Special Drawing Rights, including moving to a system backed by real assets, such as a reserve pool, to boost market confidence in its value.

A shift to Special Drawing Rights as a global reserve currency could be a step along the way to correcting the global trade imbalances between countries that save a lot, like China, and countries that spend a lot, like the US. But while the US Treasury Secretary Timothy Geithner has indicated that he is open to the increasing use of Special Drawing Rights, a shift away from the dollar as a reserve currency will not happen in the foreseeable future. Much remains to be done before such a shift could occur, including examining if Special Drawing Rights should be linked to a broader basket of currencies, which would potentially include the Chinese Renminbi and the Indian Rupee. Indeed, in the long term, it is more likely that we will see the emergence of several reserve currencies, including the Euro and the Renminbi. While the latter is quickly moving towards internationalisation, full convertibility will only occur in the long run.

What is clear from all of this is that we are in the midst of an exciting and fundamental debate about the future of international finance and particularly, over the future role of the IMF. The redefinition of the institution has the potential to be truly transformational. As the global recovery gets underway, Strauss-Kahn has argued that the role of the Fund should not just be that of a lender of last resort, but that of a global insurance fund that states can draw on in difficult times. This would fundamentally reshape the role of the Fund, and has the potential to increase global economic stability.

The debate about the future role of the IMF is taking place in the midst of other discussions about reforming global governance, be it within the G-20, the UN, the World Bank, or the WTO. The chance to accomplish sweeping reform does not come often – while we look at reshaping the global financial system, we should also reflect on how best to correct the market failures that contribute to another of the most pressing problems we face today: climate change.

II. Market failure and climate change

Climate change is itself the result of a series of market failures. These shortcomings in current market design have resulted in 150 years of investment in a “sub-prime climate”. Unravelling that investment will be complicated, and will require action both in the private and public sectors.

Let me begin discussing climate change by reviewing the five most important market failures at work in the space. A number of my colleagues at Deutsche Bank recently participated in a working group of civil servants and private-sector climate change experts, chaired by my former World Bank colleague Lord Nicholas Stern, that identified these market failures and developed public policy and public finance mechanisms to address them.

The most important and pervasive market failure that they identified is related to greenhouse gas emissions, which cause long-term and global damages. Until recently, no price was levied on the greenhouse gas externality, which caused a surplus of emissions because polluters did not pay for the true costs of their activities. This is now beginning to change. In Europe, emissions caps have been put in place under the EU Emissions Trading Scheme – which applies to energy-intensive sectors including power, oil refining, iron and steel production, among others. The sectors covered by the EU Emissions Trading Scheme represent about 40 percent of total EU emissions. Emitters in covered sectors must hold enough allowances – which recently have sold for about €15/ton – to cover their emissions. In the UK, a complementary scheme – the Carbon Reduction Commitment – has been established to cover sectors that are not included in the EU Emissions Trading Scheme. And other geographies, such as

Australia and New Zealand, are poised to follow suit, while the US is discussing implementing a similar cap-and-trade scheme under the American Clean Energy and Security Act of 2009, more commonly known as Waxman-Markey. All of this represents progress – but other market failures remain, requiring public policy and public finance intervention beyond pricing the greenhouse gas externality.

The second market failure is linked to building clean technology networks. Much of the action that we need to take to address climate change will take place in capital-intensive infrastructure and energy markets. In some cases, investment is needed to expand networks, and the social benefits of investing in network expansion often exceed the private benefits, especially early on. These benefits that accrue to society are called network externalities. Because the full benefit of network expansion is not realized by the individual or firm investing in the network, the market response is an underinvestment in expansion. Public intervention may be necessary to set up the network and coordinate early membership. One example of where this could be beneficial would be public intervention to coordinate the development of a network of recharging stations for hybrid vehicles.

The third market failure is tied to path-dependence on high carbon technologies. We have been investing heavily in these technologies for decades, and this has brought down costs as learning has occurred. The investment that spurred this learning was backed initially, may I point out, by public money – a classic case of this was the stake the British government held in BP for much of its history, which was justified by concerns about energy security and national security. Shifting away from high carbon technologies will initially be costly, and it will take time for learning and experience in clean technologies to catch up to that we have acquired through 150 years of experience in fossil energy. Well-designed public policy and public financing can accelerate this critical learning process.

The fourth market failure is related to spill-over effects. The learning and experience I just described sometimes has the characteristics of a public good, when not protected under patents. Because the benefits of learning and experience are not all internalized by firms that invest in low-carbon technologies, there tends to be an underinvestment

in the creation of knowledge, including R&D in the energy sector. Public investment is needed to address this market failure. This is not currently happening. The International Energy Agency notes that investment in low-emission R&D declined by 50 percent between 1980 and 2004. While this has recovered some since then, we still do not invest nearly enough in the sector. Lord Stern, in his report on the Economics of Climate Change, urges governments to double their clean energy RD&D budgets to restore them to at least the levels seen in the early 1980s. Quadrupling current levels of public energy funding to \$20 billion a year would be preferable, if we hope to bring clean energy solutions down the learning curve. This investment would also have the attendant benefit of promoting energy security.

The fifth market failure arises from inadequate and unevenly distributed information. This has prevented many cost-effective energy efficiency improvements from taking place. Government intervention may be able to address this market failure by collecting and disseminating knowledge that would be under-provided by the private sector, and by setting performance standards to deal with behavioural barriers.

III. Public policy and public finance interventions

Because of the complexity of the issue we are dealing with, a well-crafted policy regime must be developed. The public sector should be careful not to take on roles that should be carried out by the private sector. This is especially true in these difficult times, when public debt is high in many countries, and budgets will be constrained going forward. However, where macroeconomic factors – like the externalities we just discussed – justify intervention, governments should step in.

To be successful, a policy regime must:

- be long-term, transparent and consistent with secure and predictable payment mechanisms;
- be appropriate, targeting support according to the technology type and level of maturity;
- introduce incentives that decrease over time as technologies move towards market competitiveness;

- eliminate non-economic barriers, including electricity grid access, administrative obstacles, lack of information and social acceptance;
- provide fair and open access to distribution channels
- have strong public acceptance and support;
- be enforceable.

Putting a price on the carbon is the most important element of climate policy. Like the debate about global reserve currencies, this sits at the very core of the problem, and must be addressed with care. Alongside carbon pricing, other public policy and public finance interventions will be necessary to address the other market failures I identified earlier, as well as to address issues of equity and common but differentiated responsibility between major industrialized countries that have high historical contributions to atmospheric greenhouse gas stocks, and developing countries that have historically contributed less to the problem. I will discuss carbon pricing first, and then will move on to other public policy and public financing mechanisms.

There are a number of lessons that have come out of early emissions trading regimes – both under the EU Emissions Trading Scheme and through the Kyoto Protocol mechanisms such as the Clean Development Mechanism – that should be kept in mind when setting up future carbon markets.

Firstly, on allowance auctioning, free allocations of carbon credits tend to create market distortions. Therefore, allowances should be auctioned to covered entities so that prices are determined on the basis of fundamental supply and demand. Although some free allocation may be necessary as a form of transition assistance at the beginning of cap-and-trade regimes, the earlier auctioning is introduced for all covered sectors, the more efficiently the market will set prices over the longer term.

Secondly, on benchmarks, the reference levels used for setting the starting point for emissions abatement by entities covered under the system can quickly become irrelevant in light of rapid and dramatic changes in macroeconomic conditions. One example of this is the use of 1990 as the benchmark in the Kyoto Protocol.

Subsequent deindustrialization in former Soviet bloc countries has led to large surpluses of international emissions permits, known as Assigned Amount Units, in these states. This “hot air” may in turn be sold on to countries that have not scaled up domestic abatement measures, reducing international carbon prices and potentially compromising the effectiveness of global emissions caps. The body regulating future carbon trading systems should have the flexibility to review benchmarks, according to prescribed criteria, and to adjust them periodically, using prescribed formulæ, in order to ensure that there is a scarcity of allowances in the system that will, in turn, spur a minimum level of effort to abate emissions by the covered entities.

Thirdly, on short-term market intervention, periods of high volatility and low liquidity can discourage investments in clean technologies. This is because volatility drives up the cost of capital, which is critical when financing long-term projects. The system would benefit from a marketing board that has discretion (within transparent and narrowly defined parameters) to borrow or lend allowances on a short term basis to ensure the efficient functioning of the market in a manner similar to the actions of a central bank.

Fourthly, on offsets – which offer a way for polluters to comply with reduction requirements by purchasing carbon credits generated by those with lower marginal costs of abatement – the provision of domestic and international offsets will encourage entities outside the trading system to undertake projects, and potentially programs of work, that reduce emissions. Offsets help to improve efficiency across the wider economy, and provided they are fully fungible with allowances for compliance, they are much more effective in containing costs than price floors and ceilings, which can lead to market distortions.

Lastly, on investment in clean technologies, the proceeds of allowance auctioning should be used by government to provide financial incentives that promote investments in renewable energy and other clean technologies integral to a low carbon economy. Interventions that reduce risk for clean technology projects, such as feed-in tariffs or loan guarantees, are particularly attractive.

Public policy interventions beyond carbon markets will also be necessary to address the market failures I discussed earlier. From analysis conducted to develop the McKinsey greenhouse gas abatement cost curve, we know what sectors can have the most impact in the fight against climate change, and we also understand the public policy interventions that have proven to be most effective in each of these areas.

Energy efficiency measures present us with roughly one-third of the abatement potential we need – much of it at negative cost, meaning that over time, these measures more than pay for themselves. To capture the abatement opportunity from these measures we need standards – for appliances, vehicle mileage, fuel carbon content, industrial energy efficiency – and we need building codes.

Low-carbon power can yield an additional 20 percent of the abatement potential we need, while, in many cases, also improving energy security. To capture the abatement opportunity from these measures, we need a combination of renewable portfolio standards and feed-in tariffs.

Forestry and agriculture present about half of the abatement potential we need. Much of this is low-cost, especially in tropical rainforests. To capture the abatement opportunity from these measures, we need policies to avoid deforestation, increase afforestation and reforestation, and encourage higher-productivity land-use and low-carbon agricultural management. We also need to ensure that land use is fully incorporated into the Copenhagen agreement, which I will come to in a moment.

A number of countries have adopted some of these policies, but wide-spread, coordinated, and consistent adoption is required. Out of the Copenhagen agreement, we will need three things.

Firstly, in the developed world, we need ambitious caps on emissions, which means that these countries will have to agree to binding limits on how much they will emit through 2020. This will require emissions reductions of between 25 and 40 percent from developed countries – but what is currently on the table for Copenhagen does not go nearly far enough, delivering barely half of what we need by 2020.

Secondly, each country – and especially those in the developing world – should develop and implement low carbon growth plans that are internationally reported, monitored, and verified. Each low carbon growth plan should be appropriately targeted, of course, to the individual circumstances of each country under the principle of common but differentiated responsibility that is enshrined in the United Nations Framework Convention on Climate Change. Within the framework of their low carbon growth plans, developing countries would specify abatement through Nationally Appropriate Mitigation Actions, which are also called NAMAs, and set out adaptation needs through National Adaptation Plans of Action, which are also called NAPAs.

Thirdly, we need financing for climate change. Work we have done with Project Catalyst, which is an initiative that brings together leading experts to provide analytical support to climate change negotiators, indicates that annual financing flows of €65-100 billion will be required from the developed to the developing world to fund climate change efforts. Some of this can will be funded through carbon offset markets. But public financing mechanisms, run internationally by the MDBs, bilaterally, or domestically through national development banks and investment agencies, will be necessary as well.

Going into Copenhagen, there are a number of proposals on the table for how to raise the necessary funds for public financing for climate change. There include international auctioning of Assigned Amount Units (the carbon credit granted to states under the Kyoto Protocol), direct government transfers, an international CO₂ tax, international maritime and aviation levies, and concessional loans raised from the private sector with developed country government guarantees.

Out of the work conducted with Project Catalyst, a global financial architecture is emerging that would transfer financial resources from developed to developing countries and that would be effectively regulated, credible, and transparent. The elements of this architecture include:

- Climate partnership agreements, where developed and developing countries would enter into evolving, long-term partnerships to finance low carbon growth plans, either in full or in part. Monitoring, reporting and verification would be required for both funding commitments of developed countries and the delivery of mitigation and adaptation actions;
- A network of bilateral trust funds, on both the developed and developing country sides of the partnership, that would create funding commitments ready to be drawn down by developing countries;
- A global green fund that would help to finance mitigation and adaptation measures not addressed by bilateral deals;
- A fast start fund would enable and encourage early action by funding capacity building, NAMAs, and NAPAs in the first years after Copenhagen. This is particularly important for reducing deforestation, where an interim finance facility could generate over 1.5 Gt of abatement annually by 2015 at less than €5 billion per year;
- A global oversight function to provide system coordination, account for the contribution of different parties, match sources and uses of funds, and support the emergence of a set of shared rules, conduct norms, and best practices;

We cannot accomplish what needs to be done without emerging markets. We therefore need to put in place the proper financing mechanisms – combined with international carbon markets – in order to help them achieve lower emissions. These financing mechanisms, in turn, must be designed to leverage further private financing flows, because, as UN estimates indicate, private sector investments will cover 86 percent of financing needs of climate change.

Equally important is the need for developed and developing countries to work together and demonstrate true leadership when confronting climate change. The principle of common but differentiated responsibility is enshrined in the Kyoto Protocol. Likewise, compensation for the adverse effects and impacts of response measures is stipulated by the United Nations Framework Convention on Climate

Change. These principles recognize that developed countries bear much of the historical responsibility for climate change, and that developing countries must be compensated for helping to solve a problem that was largely not of their own making. This is only fair.

But tomorrow's world is the world of the emerging markets. By 2050, about 90 percent of the world's population will live in these countries. These same countries will also contribute substantially more to global GDP. Their leadership in climate change is essential to ensuring a successful transition to a low-carbon world.

IV. The opportunity to build a sustainable, prosperous future

Unfortunately, private-sector investments in climate change sectors have been curtailed by the credit crisis. Using renewable technologies as an example, this is clear. In 2008, about \$150 billion of private finance went to clean energy. In the first half of 2009, only \$39 billion was invested in the same sector. This represents a 33 percent decrease from 2008 levels. In part this reflects the tight credit market conditions and the worst recession since the second World War, which has depressed energy demand and weakened cash flow positions of corporates. The other factor – which is in part linked to the economic downturn – is the sharp drop in carbon prices in Europe.

Through global fiscal stimulus packages, governments have begun to address this decline in clean investments. In all, nearly half a trillion dollars of green stimulus has been put in place since the beginning of the economic downturn. In Asia, green stimulus measures account for nearly 20 percent of total government stimulus packages. In the region, roughly \$300 billion has been dedicated to green efforts, with South Korea and China leading the pack. In the Americas, the green element has been about 12 percent of the total package, or roughly \$120 billion. In Europe, the green component was just 10 percent at about \$55 billion.

While the green measures in the fiscal stimulus packages enacted over the past year are very helpful in the fight against climate change, more action on climate change must take place in the near-term, as we wait for the Copenhagen agreement to come

into effect. Support must be provided for near-term adaptation needs, reduced deforestation, and technology sharing. Securing financing for these areas in the near-term is especially important for small island states and least developed countries, which are most vulnerable to climate change. It is also critical to building the trust required to reach a robust agreement in Copenhagen.

As we take green efforts forward, public funds will need to be deployed creatively and used to leverage private funding more than ever before, given government budget constraints. Interventions that mitigate the specific risk factors facing climate-friendly technology – and that possess the highest leverage ratio – must be used. These include loan guarantee schemes, credit lines, public “funds of funds” (also known as cornerstone funds), and political and other insurance schemes.

The current financial and economic difficulties should not distract us from the urgency of the task if we want to have a chance to limit global warming to 2 degrees. Why? Because the drop in output we are currently experiencing will only provide temporary relief from emissions. Because even if we act immediately and decisively by making steep cuts in our emissions, the chances are only about 60 percent that we can avoid warming of over 2°C, which scientists tell us is a threshold we should avoid crossing. And finally, we cannot delay action because it will take decades to scale up the low-carbon infrastructure and restructure high-carbon value chains.

But more broadly, green growth can lead us out of the crisis. Research conducted by the Center for American Progress indicates that \$100 billion of economic stimulus invested in green sectors can create up to 2 million domestic jobs in the United States. It is clear from fiscal stimulus packages around the world that governments have taken this message on board.

But more broadly, green growth can also be the driver of a new age of prosperity, much as IT was in the last quarter of the 20th Century. We have already seen countries like Germany and Denmark build vibrant green manufacturing sectors through well-targeted government support. In Germany, this has resulted in a quarter of a million jobs in the country’s renewable sector – with continued, rapid growth

projected through 2020. In Denmark, about 200 companies are now active in the wind sector; some, like Vestas with its ~€10 billion market cap, are quite large. Other countries have also recognized the potential for green growth to be a driver of future prosperity. Abu Dhabi's \$15 billion investment in the Masdar Initiative – which brings together urban planning, education, research, industry, and finance – has the potential to diversify the emirate's economy, generate high-quality jobs, and provide comfortable and environmentally sustainable housing to 50,000 people. Finally, for the poorest countries around the world, adopting low-carbon technologies can allow them to leapfrog old approaches – as Lord Stern recently noted in New York, these countries can avoid some of the costs of large grids, for example, in the way that the deployment of mobile phones in these countries helped cut the need for telephone wires.

Major emerging economies like China and India are urbanizing quickly. A recent study by McKinsey & Company found that by 2025, China will have nearly one billion urban dwellers. In that year, 221 Chinese cities will have more than one million inhabitants – compared with 35 in Europe today. As China adds 350 million to its urban population, an astonishing amount of infrastructure will be constructed. 40 billion square meters of floor space is expected to be built, in five million buildings. China's new buildings and cities can be highly energy-efficient, powered by clean energy, and served by new mass transit systems – helping to lock-in a clean future for China and the world – or not. China's citizens can work in well-paid green jobs – helping to build a sustainable, prosperous future for their country – or not.

We have a decision to make: Do we continue to invest in a “sub-prime climate”, or do we start to build a sustainable, prosperous, low-carbon future?

Final negotiations are now in progress around the world in the lead-up to Copenhagen. A lot of activity is underway. At the UN General Assembly last month, Chinese President Hu Jintao committed his country to cutting CO2 emissions by a notable margin of GDP by 2020 from 2005 levels. At the same event, US President Barack Obama recognized the urgency of climate change, and cited the progress that is being made with climate and energy legislation in the US House of Representatives and

Senate. The EU has repeatedly stated its commitment to cut greenhouse gas emissions by 30 percent from 1990 levels within the context of a global deal, while work some of my colleagues have done show that their mandated renewables targets may deliver even deeper cuts. Brazil already sources more than 80 percent of its power from renewables, and has pledged to reduce deforestation by 72 percent by 2017. India's National Action Plan on Climate Change pledged the country to 8 national missions in key areas including solar power, forestry, sustainable agriculture, and energy efficiency. And the new Japanese government has boosted the country's commitment to reduce emissions from 15 percent below 1990 levels by 2020 to 25 percent.

These six geographies – China, the US, the EU, India, Brazil and Japan – are responsible for about 60 percent of global greenhouse gas emissions. A global deal in Copenhagen will require their leadership – just as their leadership within the G-20 was essential to the successful global fiscal stimulus that was put in place earlier this year. The statements and pledges that these countries have made on climate change are encouraging, but much remains to be done before we have a global climate deal and are on the path to sustainable, low-carbon growth.

My conclusions are clear:

- We have no time to waste in addressing climate change. The talks in Copenhagen cannot be allowed to fail.
- The financial crisis clearly poses an additional challenge to the already challenging task of addressing climate change. It has renewed the challenge to reform governance of global institutions to better reflect the growing role of major emerging market economies in our world.
- But we know we can deliver the emissions reductions required – it is technically feasible.
- Public policy needs to be stepped up, including in emerging markets, where emissions growth needs to slow dramatically.

- We need to identify clever, innovative financing mechanisms that can help ensure mitigation action in the developing world.
- And all over the world, we need to look for business-to-business solutions and synergies; especially in the new energy infrastructure arena, we need public-private partnership collaboration that can unlock a wave of sustainable green growth.
- Above all, we need to work hard to reform markets, correct for market failure, and rebuild trust in them – since without functioning markets for environmental products and services, low carbon growth will remain elusive.

Thank you very much for your attention.