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ENERGY POLICY AND CLIMATE MITIGATION

Remarks by

NEIL HIRST

SENIOR POLICY FELLOW, GRANTHAM INSTITUTE, IMPERIAL COLLEGE LONDON

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It is a great honour for me to speak at this Symposium, marking the inauguration of this new graduate programme on public policy at Tokyo University.

The energy sector is the source of about two thirds of global greenhouse gas emissions. This means that climate mitigation is inextricably linked to energy policy and technology. We need top down negotiations on climate targets, but we also need bottom up development of national energy policies and the development and adoption of advanced technologies. They are the opposite sides of the same coin. Energy policy needs to be driven by the climate imperative, but at the same time climate negotiations must have regard to the realities of what is achievable in different national circumstances through energy policy.

Unfortunately the international institutions for multilateral cooperation on energy policy are out of date and no longer fit for purpose. It's a serious problem for climate mitigation and, indeed for other energy policy objectives. In these remarks I will argue that fixing this problem should now be high on the agenda of the world's multilateral diplomacy.

I want to start with two topical examples of how the practicalities of energy policy, and changing national circumstances, inevitably impinge on mitigation strategy. In one case the effect is to reduce carbon emissions, and in another case to increase them.

In 2008 the IEA – along with other experts - was projecting a shortfall of gas production in North America and steadily rising imports of LNG. The IEA was not alone in that view because in 2009 six new LNG import terminals were under construction and there was planning consent for a further 19. We now know that shale gas production has revolutionised that situation with gas displacing coal in US power stations and there are substantial plans for the US to become a gas exporter. This has played a big part in turning around America's CO2 emissions outlook with the result that US carbon emissions from energy fell by 12% between 2005 and 2012. None of this was driven by climate policy and, as baseball players say, the benefits to the global environment can be said to have come out of left field.

The other example, which is perhaps equal and opposite, is Japan. We all sympathise with the terrible blow that Japan suffered from the Tsunami in March 2011. A direct consequence has been the closure of Japan's nuclear power stations. As a result, in November last year, the Japanese

government announced a change in Japan's emissions outlook. Emissions were expected to increase by 3% between 1990 and 2020 instead of the 25% reduction that was previously aimed for. Japan was criticised for this change but, in all honesty, it is hard to see how it could have been otherwise. Japan is already one of the most energy efficient nations on earth and the flexibility shown by the Japanese people in responding to supply constraint was altogether exceptional. Nuclear power accounted for about 30% of Japan's electricity before the tsunami and the alternatives, at least in the short to medium term, inevitably involve fossil fuels. Just as with the United States, the causes of this change had nothing to do with climate policy but the impact on greenhouse gas emissions is inevitable and substantial. Of course I realise that the future of nuclear power in Japan is still very much undergoing debate and I hope that climate mitigation will be one of the factors taken into account, but of course it cannot be the only one or, probably, even the main one.

One of the ironies from these two examples of how national circumstances impinge on energy policy and on greenhouse gas emissions is that new LNG production in Africa and in the Middle East originally intended for markets in North America has now been re-routed to Japan, albeit at very substantial cost.

If we accept the need to build the global response to climate change through viable national energy policies, reflecting national circumstances, then what are the key elements of these policies and how can the international community bind them together in a global response to the threat of climate change?

I am going to discuss this firstly in very general terms and then in relation to the worlds three largest emitters, China, the US, and India.

We all know that global climate negotiation has been a rocky path and that the world is far from being on track to achieve the agreed target of limiting global warming to 2 degrees C. But it would be quite wrong to conclude that global efforts to mitigate climate change have failed and have had no impact. In fact their impact has been substantial, although still inadequate.

The Copenhagen climate summit of 2009 is widely regarded as having represented a major setback for climate mitigation and in terms of the management of expectations that is certainly true. However Copenhagen was also a catalyst for all the world's major emitting nations to bring forward national emissions limitation targets. The International Energy Agency has estimated that, taken together, these targets, if achieved, will be sufficient to reduce the expected level of global warming from something in excess of 6 degrees in their Current Policies Scenario to above 3.5 degrees in their New Policies Scenario, in which all these commitments are assumed to be met. It may not be sufficient, but it's a substantial impact.

We need to work towards binding international targets that can manage climate change to within safe limits. The Durban platform and the meeting of World Leaders that the UN Secretary General has called for September this year are expected to provide the framework for this.

However energy policy is not just about climate mitigation. It is usually regarded as having three main pillars, of security, affordability, and environmental protection. Even that is a simplification because governments also have to have regard to employment, innovation and technology, various social objectives including poverty eradication, and international geopolitical objectives. National

circumstances differ on such vital aspects as climate, resources, and administrative and technical capabilities, as well as social and economic factors. National energy strategies have to take account of this.

We need top down climate targets that will make it possible to limit global warming to safe levels, as required by the UNFCCC Treaty. But they are meaningless or, to put it another way, are bound to fail, unless they can be backed up by viable national strategies of energy policy and technology. All the governments of the major polluting nations govern by consent. We hope that they will provide leadership on the vital topic of climate mitigation, but, at the end of the day, they have to find solutions to their energy problems that meet the needs of their people.

This point might be thought to be blindingly obvious. But it is also highly controversial. Some will say that if we come at the challenge of climate change from the perspective of energy policy we are bound to find partial solutions based on incumbent business models that in no way match up to the gravity of the climate challenge. But in my view the seriousness of this challenge is a good reason why we cannot afford to build, as we say in English, castles in the sky. The energy transformation that we need must be economically and technically viable. There is heavy lifting to be done.

I am now turning to China, India, and the US. I want to illustrate the central issues of energy policy that are impacting on the greenhouse gas emissions of each of these major players.

Starting with the US, oil accounts for more than 40% of US carbon emissions. After years of neglect the US is at last getting tough on vehicle efficiency. The new standards, announced in August 2012, will require average fuel economy of 54.5 miles per gallon by 2025 as compared to 29 miles per gallon today and 35.5 miles per gallon in 2016 under previous standards. It's a big step forward which the administration has said will halve greenhouse gas emissions by 2025. It is interesting to note that climate change was not the first reason given by the US administration when announcing this policy. The first reason was to reduce dependence on imported oil – a longstanding objective of US energy policy.

The next biggest source of US emissions is coal, mainly burned in power stations. Support for the US Environmental Protection Agency to regulate the carbon emissions of existing coal power stations is a centrepiece of the US government's climate mitigation policy. The EPA are working on the new regulations, which are going to be hugely controversial in coal states. Upon their success – together with the maintenance of renewables and energy efficiency programmes, and of course the shale gas revolution – hinges the ability of the US government to deliver on its target of reducing greenhouse gas emissions by 17% from 2005 levels by 2020.

I am now going to talk about China and India.

First of all, a general point about developing nations. The 2009 Copenhagen Accord is one of the main building blocks of climate negotiations. The objective that it contains of holding the increase in global temperature below 2 degrees Celsius is well known. Just as important, but not as well known is the agreement that "social and economic development and poverty eradication are the first and overriding priorities of developing countries". That is not a negotiating position of developing countries, it's an agreed statement by all the major parties. Since almost all the increase in emissions in the coming decades is expected to come from developing nations its importance can

hardly be overestimated. It means that meeting the rapidly increasing energy needs of developing nations in an affordable way has got to be at the heart of global climate mitigation strategy.

In recent decades China is acknowledged by the UN to have achieved the greatest alleviation of poverty in the history of mankind. But as explained in China's official statement to the Cancun climate conference of 2010, "As a developing country with per capita GDP of only US$3,700 and ranking around 100th place globally, China still has a huge population living in poverty and is confronted with multiple challenges of economic development, poverty eradication, improving people's livelihoods and protection of climate".

As part of the preparations for the Copenhagen climate summit in 2009, China made a voluntary commitment to reduce its carbon dioxide emissions per unit of GDP by 40-45% from 2005 to 2020. At the Grantham institute, Imperial College, we made assessments of that commitment, as well as the commitment that India made at the same time. By reaching the target China will be saving more than two billion tonnes of CO2 emissions p.a., which is more than three times the total level of the UK's emissions today.

China's strategy is, of course, closely bound up with its 12th Five Year Plan which runs from 2011 to 2015. In announcing the plan the Chinese government signalled a focus on sustainability and the environment. The then Prime Minister, Wen Jiabao said, " We must not any longer sacrifice the environment for the sake of rapid growth and reckless rollouts, as this would result in unsustainable growth featuring industrial overcapacity and intensive resource consumption". China's efforts for climate mitigation are closely connected to this wider objective of rebalancing the economy away from heavy industry and towards higher value industries and services.

Our analysis, which is available on the Grantham Institute Imperial college web site, suggests that the targets that China has set are not easy to meet but that they are achievable. The most critical areas for reducing the growth of carbon emissions to 2020 will be:

- Further modernisation of the coal power fleet.
- Increasing investment in low carbon technologies such as nuclear and renewables
- Rationalising and modernising the less efficient parts of the iron and steel and cement industries, and
- Setting and enforcing higher efficiency standards for industry, buildings, and transport.

These are all areas where the Chinese government is making major efforts.

I am now turning to India, which ranks no 3 in the world for CO_2 emissions from energy.

Also during preparations for the Copenhagen climate summit, India registered with the UNFCCC its voluntary endeavour to reduce the emissions intensity of its GDP by 20-25% by 2020 compared to 2005. The ambition may seem more modest than China's but we have to remember that India starts from a position of energy consumption per head that is less than half that of China and only a small fraction of that in developed countries.

India is the second most populous nation on earth, after China. In spite of India's impressive growth rate in recent years, poverty remains a huge problem. According the World Bank about one third of the world's poorest people live in India. India suffers from acute power shortages and increased energy supplies are critical for the success of India's strategy for economic development and poverty reduction. India's Expert Committee on Integrated Energy Policy has said that India needs to "pursue all available energy sources, both conventional and non-conventional".

As with China we concluded that India's target is probably within reach through strong policies and provided that the necessary resources can be made available. The most critical areas are the reform of the power industry and investment in efficient and low carbon capacity, modernisation of the steel industry, more efficient lighting and appliances, and efficient vehicles. These challenges are recognised by the Indian government which has major programmes to address them. These include the Perform, Achieve, and Trade programme to improve the efficiency of more than 700 of India's most energy intensive installations, the Ultra-Mega project for the installation of efficient new coal plant, and major investment plans for nuclear power, hydro, and wind. N the longer term India has a national mission for conversion to solar power.

I have given these examples because I want to illustrate the issues raised by the global effort to mitigate climate change and how they relate to the wider drivers of energy policy. At the heart of all this is energy efficiency, in the widest sense, in power generation, industry, vehicles, buildings, appliances. Some of it is about restructuring and modernising heavy industry. Some is about implementing incremental improvements in conventional technologies, including power stations and vehicles. A lot of it is about the rather unglamorous tasks of administration, regulation, benchmarking, and enforcement of efficiency standards. Making all this happen is a hard grind and there is undoubtedly a hassle factor that can be resented. But by and large all these initiatives go with the grain of wider energy policy objectives including reducing cost, modernising industry, and promoting economic growth.

Japan, of course is a leading player in the promotion of energy efficiency and the "top runner" concept, invented in the Japan, has been widely emulated. There needs to be an international dimension to these programmes not only because of our shared responsibility for climate but also because many of the industries that manufacture the relevant equipment are themselves global.

There is nothing new in what I am saying, and I notice that of the urgent measures that the IEA are now urging to save the 2 degrees target, 49% concern energy efficiency and 21% are about modernising coal fleets. The others are the minimisation of methane emissions from upstream oil and gas (18%) and reduction of subsidies for fossil-fuels (12%).

I was also pleased to see that the latest agreement between the US and China in their Joint Climate Change Working Group concentrates in some of these same areas. If an international agreement could be reached on some the key principles, guidelines, and measures for international cooperation to transform the efficiency of power stations, buildings, vehicles and appliances around the world that would be a powerful basis for the next round of climate abatement. I am not suggesting that this would be easy or simple. It would need to take into account the different circumstances of each national, including its stage of economic development.

For instance in developed nations I think it should be an early objective to begin phasing out coal power generation altogether except where there was a clear and viable strategy to introduce carbon capture and storage. For many developing nations, for whom coal is then most accessible and least cost source of power, the immediate aim should be to ensure, with international help where that is necessary, that new coal power stations are as efficient as possible, and to support longer term strategies to switch to low carbon alternatives.

Of course this is not sufficient. Limiting global warming to 2 degrees, or even getting close to that target, will require that we reduce carbon emissions from energy to very low levels. That means that we will have to replace much of today's energy infrastructure with low carbon alternatives. The deployment of renewables and nuclear power is making a vital contribution to reducing carbon emissions today and is also contributing to the curve of cost reduction that can make these technologies more attractive in the future. This also needs to be an element in international agreement.

I have been involved in the drawing of many scenarios illustrating how the global energy economy will need to be transformed in the future to meet our climate objectives. We know that the task is huge and that a broad range of technologies will be needed. But there are also a lot of uncertainties and lot of unanswered questions. For instance:

- How acceptable and competitive will nuclear power be in different parts of the world?
- Will the cost of photovoltaics, or indeed other renewables, continue their downward curve so that they become fully competitive as a low carbon energy source, at least in favourable conditions?
- How much progress can we make in reducing the cost and improving the performance of electric batteries and other forms of energy storage so that electric vehicles can become more attractive and so that we can rely on intermittent renewable generation from renewables such as wind or PV for the bulk of electricity supply?
- Will carbon capture and storage become a viable and commercially attractive option at an acceptable carbon price?

If we are going to get positive answers to these questions we will need to step up our R&D in the areas concerned. Yet according to the IEA OECD countries are devoting only 4% of their RD&D budgets to energy and this percentage has actually declined since the 1990s.

Today there is only one really large energy technology project that can be regarded as genuinely global. That is the ITER project for nuclear fusion, with its reactor now under construction, at Cadarache in France and in which the EU, China, India, Russia, South Korea, and the US are all partners. It's an admirable collaboration, in which major countries are coming together to capture the process that heats the sun for the benefit of mankind. But nuclear fusion, if it ever becomes commercially attractive, is not going to make a difference until well into the second half of the century. Surely we should also be collaborating, in a similar way, on the technologies that could be crucial for the climate mitigation effort in the next few decades, for instance CCS.

So far I have described the essential role that international cooperation on energy policy and technology will need to play in our efforts to mitigate climate change and the importance of working

towards international cooperation on guidelines and strategies. Unfortunately, today, there is a major institutional barrier in the way of achieving that cooperation.

The institutions for international cooperation on energy policy and technology have not kept pace with the modern world. The heart of the problem is that the International Energy Agency, which is today's most substantial body for international energy cooperation, only includes the OECD countries in its membership and excludes the major developing nations such as China or India, which are now amongst the most important players and whose participation is critical. After so many years of international effort to meet the challenge of climate change it is hard to believe that we are still in this situation.

And here I would like to pay tribute to my former boss at the IEA, Nobuo Tanaka, who worked so hard during his period of office as the Executive Director to promote closer engagement of the IEA with major developing nations and, indeed, the eventual enlargement of the IEA's membership.

Today I am working with colleagues in China's Energy Research Institute of the NDRC on a join research project, funded by the UK's Foreign Office, on Global Energy Governance Reform and China's participation.

After extensive international consultations, which are continuing, we have recently issued a first discussion draft of our report. That is available on the web sites of the Grantham Institute, Imperial College, and I invite you to have a look and give us your views.

We have concluded that the institutions for international cooperation on energy have not kept pace with the changes in world energy and that energy governance reform is needed to pursue climate mitigation and support low carbon development options.

I should add that this is not the only reason why reform is needed. The disfunctionality that is undermining our efforts to address climate change is just as much of a problem in other areas of energy policy, such as energy security, the functioning of energy markets, and the need for energy supply to support economic development and eradicate fuel poverty. As I have mentioned before, all these issues are connected and have to be addressed together.

The Governing Board of the IEA is, of course, aware of this problem and has been creative in looking for solutions. They have proposed a closer Association between the IEA and other major energy countries and last November Brazil, China, India, Indonesia, Russia, and South Africa agreed a Joint Declaration in which they expressed common interest in pursuing this idea.

The Association can be major step in the right direction, and I hope very much that it will be a success. It is not a complete solution to the problem of energy governance because without an amendment to the IEA's founding treaty the developing countries could still not be full members. That, of course, has far-reaching implications, but I believe that it will need to be tackled.

Energy governance, of course, is not confined to the IEA. There are many other organisations that make important contributions. In our draft report we review the roles of the most important ones and, in some case, make recommendations.

The UNFCCC is, of course, the legitimate forum for global climate negotiations. However thus far UNFCCC negotiations have concentrated on a top down approach and has not engaged in any depth on the underlying energy policy issues. To some extent this may be changing with the creation of the Technology Mechanism and its Technology Centre and Network and the development of National Emission Reduction Plans (NAMAs) and Technology Needs Assessments. These developments are to be welcomed. But energy policy goes much wider than climate mitigation and the UNFCCC can never be the prime forum for energy policy cooperation. Effective institutions for energy policy cooperation can, however, play an important role in feeding into and underpinning the work of the UNFCCC.

The G20 has a particularly important role in providing leadership at the very highest level. So far the main mission of the G20 has been in the areas of financial regulation and economic recovery. We believe the G20 could also provide international leadership on energy policy issues and on energy governance reform. We are hopeful that energy governance will be on the agenda of the G20 when it meets in Brisbane this November, under Australian chairmanship, and the senior Steering Committee of our project aims to offer its views in good time.

Energy policy and energy technology are at the heart of climate mitigation. They provide the essential foundation for climate negotiations and emissions targets. International cooperation is vital to agree and implement the changes that are needed, across the world, in terms of increased efficiency and technical progress. Unfortunately today's institutions for international cooperation on energy are not well suited to achieve this. There is an urgent need for reform of global energy governance and I hope that this will be addressed by the G20 when it next meets in Brisbane in November.

Thank you for your attention.