

Climate of Opinion

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Commentary

Arrested development: why tech transfer can be done better – Paul Domjan¹

As the international community becomes increasingly serious about developing an approach to climate change that successfully binds both developing and developed countries into a policy framework, discussion of technology transfer has come to gain an increasingly prominent place. The principal reason for this is that technology transfer is one of the only channels available within the current institutional arrangement which allows the transfer of wealth from developed to developing countries. The purpose of this transfer is to assist developing countries with the damage caused by climate change and to incentivise them to lower their own emissions. Given the importance of technology transfer as the main vehicle for this wealth transfer, we must ask whether technology transfer under the United Nations Framework Convention on Climate Change (UNFCCC) lives up to its promises and delivers as much as it might. Sadly, this initial survey suggests that it may not.

Parties to the UNFCCC are required by the convention to engage in technology transfer from developed to developing countries. This includes an obligation both to take “practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how” and to “support the development and enhancement of endogenous capacities and technologies of developing countr[ies].”

In practice, technology transfer within the UNFCCC framework, whether solely within the context of the UNFCCC or within subsequent mechanisms under the Kyoto Treaty, such as the Clean Development Mechanism (CDM), are conducted solely on a project basis. The project-based approach to technology transfer has clear political benefits. First, it is much simpler to negotiate than a more comprehensive and obligatory system. Second, it is hard for either party to object to a mechanism that only happens with mutual consent from both sides, whether largely government-to-government under the

UNFCCC or conducted by private firms under the CDM. By contrast, it would have been politically impossible to negotiate the UNFCCC if it had required a substantial commitment to technology transfer beyond these individual voluntary projects.

However, a project-based approach tends to capture mostly one-off low-hanging fruit and leads to a number of structural problems. For example, the project-based approach makes it difficult to establish business assistance centres to facilitate technology transfer on a broader and more sustained basis. In the past, business assistance centres have been shown to be a key component in technology transfer in industries ranging from electronics to oil services.² They are a key intermediary to pairing capable local firms and local entrepreneurs with foreign investors that bring key technologies and skills to the table.³ Foreign investors often have difficulty both identifying local opportunities and identifying capable local partners. Business assistance centres can help in both of these areas. Some existing business assistance centres, like the Confederation of Indian Industry’s Green Business Centre, are supporting the CDM, but none appear to be supporting long-term technology transfer under the UNFCCC. This is particularly worrying because the CDM may not be renewed under the successor treaty to Kyoto in 2012, which limits incentives for green business assistance centres to focus on long-term wealth transfer projects.

Similarly, a project-based approach makes it difficult to address limitations to technology transfer in particular and green business more generally that may exist in the policy environment in recipient countries. In order for technology transfer to be effective at a macro level, a technology which has been transferred to one local firm ultimately needs to be provided to other local firms through supplier relationships with the initial firm. In this process, known as Hirschman linkages, a backward technology linkage from an international firm to a local firm is followed by forward linkages from that firm to others in the local economy. Any number of local barriers to growth of firms can hamper these forward linkages, minimising the effective impact of technology transfer. An approach to

technology transfer that focuses on long-term transfer across many years and projects provides a much stronger incentive to remove such barriers than a large number of one-off projects.

A number of further specific problems with the current approach to technology transfer were noted at the Bali conference (December 2007). Dissatisfaction with the general lack of focus and clear goals for technology transfer manifested itself at the conference in the form of complaints by developing countries about a lack of focus on adaptation in technology transfer. The lack of focus on adaptation is evidence of the broader problem which sees that while the UNFCCC includes an understanding of the process of technology transfer and the steps involved, there has been little focus either by the UNFCCC or by the academic community on establishing what technology needs to be transferred and why it is failing to be transferred currently.⁴

Accordingly, I would like to suggest a number of simple steps, drawn on experience of technology transfer in other industries, to help develop a more effective framework for technology transfer:

- 1) The UNFCCC needs to set clear and specific goals, either on a sectoral or a country basis, for technology transfer outcomes. Even if this technology is transferred through project-based mechanisms, this will at least provide a metric with which to assess technology transfer.
- 2) Once these goals are set, they will provide a clear basis from which it will be possible to assess if the current environment provides strong enough incentives for foreign firms to transfer technology, whether because of a simple profit motivation or in order to take advantage of existing project-based mechanisms like the CDM.
- 3) Having identified existing incentives, it will then be possible to identify any market failures that may be currently preventing this transfer from taking place or to identify additional structural incentives, whether positive or negative, that are needed to encourage foreign firms to participate in this transfer. These additional incentives may well include structural

technology transfer requirements and accompanying funding for supporting long-term investment by the developed world in the developing world beyond individual projects.

4) Once firms from the developed world have been adequately incentivised to transfer technology, there is a clear opportunity to establish business assistance centres, like India's Green Technology Centre, to match local firms and entrepreneurs with foreign investors and technology. This will help to ensure that technology transfer happens through the private sector, where it will be driven by the profit motive and where markets will have a greater role than in government-to-government transfer. This will ensure that the technology diffuses through the local economy quickly and efficiently.

5) In order for this to happen, the UNFCCC needs to recognise that the local business environment and the constraints that it places on local firms that receive technology transfer has a crucial role to play by facilitating the growth of firms that successfully adopt foreign technology. In particular, technology transfer funding needs to address not only the technologies themselves, but also potential policy barriers to the growth of recipient firms.

The bulk of future emissions will come from developing countries. Without clean technologies in place, they will find it impossible to curb emissions. Therefore, even if the developed world managed to achieve its emissions targets of a 50% cut by 2050, we would all fail in our global climate goals. As the current framework is failing in its technology transfer goals, a comprehensive review is in order. The goals we have set ourselves are not impossible – we just need to find the best way to achieve them.

¹ Paul Domjan is Energy Fellow at the Stockholm Network and a Director of John Howell & Co Ltd.

² On electronics, see World Bank. *Competing for FDI: inside the operations of four national investment promotion agencies*. (Washington, D.C., World Bank, 2005). On oil and gas, see Domjan, P. 'Supplier Development in the Oil and Gas Sector of Kazakhstan', in *Getting Competitive, Staying Competitive: The Challenge of Managing Kazakhstan's Oil Boom*. (Washington, D.C., World Bank, 2005).

³ Cross-sectoral partnerships, which have some of the same advantages in, for example, firm identification and local knowledge as business assistance centres, seem to facilitate climate technology transfer. See Forsyth, T. (2007). “Promoting the ‘Development Dividend’ of Climate Technology Transfer: Can Cross-sector Partnerships Help?” *World Development*.

⁴ For a survey of what research has been done, see Peterson, S. (2008). “Greenhouse gas mitigation in developing countries through technology transfer?: A survey of empirical evidence.” *Mitigation and Adaptation Strategies for Global Change*.

Can a better-informed technology transfer of renewable energy be achieved for developing countries? – Dr Judith Alazraque Cherni¹

Despite overall renewable energy investment picking up pace over the last few years, investment decision-making with respect to renewable energy technology transfer to developing countries continues to suffer from the prevailing practice of overlooking the relevant physical and social circumstances of users and places, particularly in rural and poor areas. As a result, a good proportion of the development assistance for renewable energy technology transfer to developing countries has, to date, been deemed somewhat of a failure. However, current favourable investment trends not only provide a suitable context for attempts for a better-informed technology transfer strategy to work, but require that good practices are initiated as early as possible.

Although some technology transfer attempts from developed to developing countries have succeeded in their project goals, many have not. A number of these projects have often not only failed to demonstrate institutional and commercial viability, but have also lacked maintenance mechanisms, affordable credit, and incentive structures for their sustainable operation. Moreover, they have been marred by unimpressive technical performance and the use of generally unsuitable equipment in relation to users’ needs and local conditions.

This last point is particularly problematic, as obtaining appropriate knowledge on the local and regional conditions in advance of any energy technology transfer is absolutely crucial for its success. Ultimately it benefits all involved, the

demand as well as the supply side. As such, these pre-requisite considerations can lead to a much more successful technology transfer.

There is no reason why a change of practice along these lines cannot be made. In fact, the sooner this practice of obtaining appropriate local knowledge is adopted, the better. This is largely due to the fact that investment in this field is only set to grow. The earlier good practices are put in, therefore, the better the outcomes will be for all involved, – not only for our global climate goals but also for the general economic and technical development of developing countries.

There are currently three main trends in the renewable energy technology field that indicate a relatively favourable policy and business climate, which will go towards generating additional policy support and further investment in this sector in the near future.

Firstly, there has been a marked surge of interest by governments, international and regional agencies, as well as the private sector, in renewable energy technology and its transfer to developing countries. Critical economic, environmental and social concerns are backing this course of thought. Amongst these are the growing unease with future oil supply; unprecedented high oil prices and their destabilising impact on poorer economies; the desire to control carbon emissions in the light of mounting global climate change; and finally, a growing population, particularly, but not only, in the rural areas of developing countries that lack access to modern sources of energy.

Renewable energy can play a big part in addressing these concerns, by not only filling some of these energy gaps, but also by contributing to achieving sustainable development

and the alleviation of poverty, a pledge made by many governments as part of the UN Millennium Development Goals. Moreover, the Stern Report (2006), which assessed the economic impact of climate change, has called for a 2-5 times increase in R&D funding for renewable energy, in part due to the consideration that the poorest and least-developed countries will suffer earliest and most from global climate change.

Secondly, the Kyoto Protocol has boosted the renewable energy technology market via three tools that were created under its auspices: two financing instruments – Joint Implementation (JI) and the Clean Development Mechanism (CDM), and a market mechanism – International Emissions Trading. These have led to increased investment in more environmentally-friendly energy production, as well as in clean production technologies and energy efficiency. CDM, the project-related instrument that was created to increase co-operation with developing countries, has gone some way to promote technology transfer in this capacity. However, projects have had mixed results to date, as discussed above.

Many renewable energy technologies are, in fact, already competitive in today's markets, e.g. solar water heaters and solar heating in buildings in China, and wind energy in Germany. Increasingly the governments of developing countries, such as China, Peru, and Argentina, are also incorporating technology innovation and promotion of renewable energy into their legislation.

Thirdly, the post-Kyoto Protocol period has already shown the extent to which renewable energy technologies have benefited from significant market development over the past few years. For example, 20% of all investments in the global power sector went to renewable power in

2007, and the technology costs have been greatly reduced. Moreover, developing countries are increasing their share of global energy production. Between 1980 and 2003, there has been an almost nine-fold increase in global renewable energy generation worldwide, with developing countries producing an estimated net power of 52 billion kWh from geothermal, solar, wind, wood and waste, that is, a sixth of the world total. Scenarios of renewable energy shares in primary energy in Latin America also show an increase from 28% in 2003 to 70% by 2050, with Africa's share increasing from 47% to 58%.

These trends suggest that within the next few years, market-based progression will swing even further in favour of renewable energy right across the board. It is likely that this trend will continue given the influential role of factors such as an increasing attention given to finding adaptation methods, including energy that could improve survival chances in the face of climate change; a preoccupation with reducing poverty world-wide; and finally, a worldwide rise in competition between renewable energy companies of all sizes. It is therefore crucial that this is done well, and that lessons are learnt from past mistakes.

As such, increasing the role that indicators of livelihood improvement and sustainable development play in the decision-making process with respect to technology transfer is a pre-requisite. This would not only lead to more successful technology transfer in economic and technical terms, but it would also factor in key concerns about social equity and environmental sustainability.

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Climate change technologies: the new IP battleground – Helen Davison¹

Do Intellectual Property Rights (IPRs) help or hinder the flow of climate change technologies to

the developing world? This question has been asked on a number of occasions over the past couple of years and was posed again at last month's European Patent Forum held in Ljubljana, Slovenia. Indeed, the debate has recently taken on a particular sense of urgency. Today, the World Health Organisation identifies changing

global temperatures as a significant threat to public health, with those in the non-industrialised world being the most vulnerable to the effects of climate change despite bearing the least responsibility for its causes. It has therefore become widely accepted that technologies which would help developing countries adapt to changing temperatures must play a key role in the fight against climate change. Moreover, as the bulk of future carbon emissions will come from the developing world, technologies which will help to mitigate these carbon emissions without harming the economic development of these countries are a must.

What has been more controversial, however, has been the debate over how best to ensure that these green technologies flow to where they are most needed. Reflecting the importance of the issue at the U.N. conference in Bali in December 2007, a section on technology transfer was included in the Bali Action Plan calling on countries which are negotiating a new post-2012 global warming pact to consider ways of removing 'barriers' to technology transfer and improving access to clean technologies. But what are these barriers? It has been suggested that it is IPRs that are blocking access to green technologies. In a submission to the United Nations Framework Convention on Climate Change (UNFCCC), Friends of the Earth call for a review of IP agreements which they claim are blocking the effective transfer of technologies that support sustainable development.²

Technology Transfer: The Role of IP

The debate around IP and access to 'essential' technologies is highly emotional, touching on issues of human rights, fairness and the responsibility of the developed world to help those in the developing world adapt to a changing climate. To this end there have been suggestions which effectively translate into the IP system being undermined via a regime of compulsory licensing. But while calls to put the needs of the developing world above the need to protect IP may have a significant emotional appeal, the arguments do not match the empirical evidence.

In fact, the protection of IPRs plays a fundamental role in the transfer of technology, not only by

nurturing the development of new technologies in the first place but also by creating a secure and attractive environment in which knowledge transfer, in its various forms, can take place.³ A 2005 study found that IPRs, in the form of patent rights and effective enforcement mechanisms, have a positive effect on technology inflows of high-tech products. In particular, the study shows that those developing countries that strengthened IP regimes experienced an increase in licensing agreements with parties in developed nations, enabling firms from developing nations to effectively access and exploit new technologies and know-how.⁴

Private Sector Role

It is certainly true that technology will play a key role in the fight against climate change. However, it is also true that it will be the private sector that, given the appropriate investment environment, will be in the best position to develop these technologies. Not only can it identify the most effective and efficient ways of reducing carbon and saving money, but it also has the capital to make risky investments into new and innovative technologies, as well as to bring them to the market.

Driven by concerns about national security, energy independence, the increased price of oil and the incentives and policies coming from US, European and Asian governments, these investments are already starting to occur. Cleantech Capital Group estimates that between 1999 and the first quarter of 2006, a total of \$8.8 billion was invested in clean technology ventures, and up to 2009, another \$8.7 billion will be poured into the sector.⁵ However, ensuring that investment in the development of innovative technologies will continue rests on maintaining a secure and stable investment environment – and that includes strong IPRs. As U.S. Trade Representative Susan Schwab noted in Bali last year: "If you want venture capital funds going to such inventions, the entrepreneurs, the businesses that invest, need to know they're going to get a return on their investment".⁶

There are a number of mechanisms that can be experimented with to ensure that appropriate climate change technologies flow from the

developed to the developing world without destroying the IP system that provides incentives to invest in these technologies in the first place. In the pharmaceutical industry, for example, technology transfer initiatives have been used to help local firms in least-developed countries and sub-Saharan Africa to manufacture essential medicines like second-line HIV medicines.⁷ There are obvious problems with making parallels between the energy sector and the pharmaceutical industry - an industry which is similarly resisting calls for compulsory licensing measures. Unlike drugs, wind turbines cannot be manufactured particularly cheaply once the underlying technology has been worked out. The point is that, with a bit of experimentation, there are nonetheless ways of promoting access to green technologies without compromising the system that provides the impetus for R&D investments to be made in mitigation and adaptation technologies.

Meanwhile, simply eliminating tariffs and removing unnecessary trade barriers on green goods and services would be a welcome start. A proposal to eliminate trade barriers for solar, wind and related technologies failed to gain support in Bali amid disagreements over the failure to include biofuels such as ethanol and sugar cane, upon which the US and EU levy steep duties to protect their heavily-subsidised domestic producers.

Conclusion

As the Stockholm Network's recent report, *Carbon Scenarios: Blue Sky Thinking for a Green Future*, points out, the bulk of future emissions will come from newly-emerging economies. Hence, comprehensive technology transfer is fundamental to enabling the developing world to mitigate their emissions. What is needed is an evidence-based discussion of the role of IPRs both in stimulating innovation and in allowing the fruits of that innovation to flow to where they are needed. Otherwise the climatic, economic and social consequences could be grave.

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² Friends of the Earth. *Friends of the Earth International Submission to UNFCCC: Elements for the Terms of Reference for the Review and Assessment of the Effectiveness of the Implementation of Technology Transfer* (Feb 2008).

³ Pugatch, M.P. *The International Political Economy of Intellectual Property Rights*, (Edward Elgar 2004).

⁴ Lippoldt, D. and Park W. *International Licensing and the Strengthening of Intellectual Property Rights in Developing Countries During the 1990s*, (OECD Economic Studies, Vol. 40, Paris, 2005).

⁵ 'Venture Capitalists See Potential in Green Businesses', *Entrepreneur Magazine*, Sept 2006.

⁶ 'Rich and Poor Clash over Boosting Technology Transfer at Bali', *International Herald Tribune*, Dec 14 2007.

⁷ IFPMA, *Partnerships to Build Healthier Societies in the Developing World*. (April 2008).

Publication – *Carbon Scenarios: Blue Sky Thinking for a Green Future*¹

On Monday 9th June 2008, the Stockholm Network launched its climate policy report, *Carbon Scenarios: Blue Sky Thinking for a Green Future*. The aim of the Carbon Scenarios project was to gauge the potential future development of international climate change policy and the climatic and economic impacts it would have.

The scenarios

The three scenarios – *Kyoto Plus*, *Agree & Ignore*, and *Step Change* – are the end result of this endeavour and were developed in collaboration with a group of experts from the fields of climate science, economics, policymaking, technology and business.

Kyoto Plus looks at current policy trends within the United Nations Framework Convention on Climate Change (UNFCCC) and projects a positive momentum for the period 2008-2015. The scenario envisages a new treaty being agreed at the 2009 Copenhagen conference, with a

global cap on carbon emissions being put into place in 2012. The course is one of ‘moving forward slowly together’, at the speed of the slowest participant.

Agree & Ignore is the flipside of *Kyoto Plus*—its dark twin. Instead of focusing on the positive momentum that is present in the current policy context, it examines opportunities for delays and backsliding. In this scenario, although there is also an agreement for a post-Kyoto framework, it is much weaker than in the first scenario. Essentially, this is an elaboration of the consequences of an agreement that ‘talked the talk’ but didn’t ‘walk the walk’.

The final scenario, *Step Change*, is more of a case of blue sky thinking. It looks at what would happen if policy took a radically different direction, as a result of global economic security being threatened by a series of stochastic weather events. The proposed radical policy is a global cap on the production of carbon.

Outcomes

The question we ultimately wanted to answer was whether the policy pursued in these scenarios would lead to success. We decided to benchmark success using the target that the UK government, the EU and the UN have set themselves –staying under 2°C of global warming above pre-industrial levels. Unfortunately, none of the scenarios succeeded. Looking at the likely temperature increase by 2100, at 90% probability *Kyoto Plus* achieved a 3.31°C increase, *Agree & Ignore* a 4.85°C increase and *Step Change*, a 2.89°C increase. These figures are based on emissions figures by the Stockholm Network (on the basis of the International Energy Agency’s Reference and Alternative Policy Scenario emissions models) and climate modelling by the Met Office Hadley Centre.²

However, although all three scenarios failed to stay under a 2°C increase, in both climatic and economic terms *Step Change* had the best long-

term outcomes. The temperature failure was the first lesson we drew from these scenarios, leading us to conclude that the UNFCCC process was not necessarily the optimal choice in terms of both climatic and economic success.

Two further lessons which we drew from the scenarios were that comprehensive technology transfer to the developing world is absolutely crucial for successful climate change mitigation, and as there will be substantial climate change within the course of this century, adaptation assistance needs to be taken more seriously. To download a copy of the report, please visit the Energy & Environment section of our website:

<http://www.stockholm-network.org>

Response

The report has received a substantial amount of coverage, both in newspapers and on blogs. Some of this has been straightforward reporting, some of it complementary, and some of it, critical. As such, we are very pleased with both the complements and the criticisms, as the overriding goal of the project was to stimulate debate on climate change policy.

For details of the coverage, please visit the Energy & Environment section of our website:

<http://www.stockholm-network.org/>

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² It is important to note that the emissions modelling was done by the Stockholm Network. The Met Office Hadley Centre’s role was to convert the emissions into climate scenarios. The Met Office Hadley Centre does not prefer any particular scenario or advocate any particular set of future emissions.

Microclimates – Top stories in energy and environment

Turkmen delight

The EU has broken through in efforts to lessen its dependence on Russian natural gas with a concrete offer of an extra 10bn cubic metres a year being made available from Turkmenistan. President Berdymukhammedov's pledge to the EU comes amid intense competition for access to Turkmenistan's huge gas reserves.

<http://tinyurl.com/4hf7f8>

Going back on their coal

Over the next five years, Italy will increase its reliance on coal to 33% from 14%. Power generated by Enel from coal will rise to 50%. And Italy is not alone. Driven by rising demand, record high oil and natural gas prices, concerns over energy security and an aversion to nuclear energy, European countries are slated to build about 50 coal-fired plants over the next five years, plants that will be in use for the next five decades.

<http://tinyurl.com/5njqbs>

Greece plunges into the South Stream

In April 2008 Greece formally agreed to host a section of Gazprom's planned South Stream natural gas export pipeline, furthering its goal to become a regional transport hub for oil and gas supplies to Europe. Gazprom, Russia's state-controlled gas monopoly, is building the pipeline in a partnership with Eni, the largest Italian energy company, to carry up to 30bn cubic metres a year of Russian gas across the Black Sea to Bulgaria. From there it will split into two routes – one going north toward Slovenia and Italy, and another going south to Greece and across the Adriatic to Italy.

<http://tinyurl.com/499ar7>

Always look on the bright side of life

The world's largest solar photovoltaic farm, generating electricity straight from sunlight, is taking shape near Moura, a small town in a thinly populated and impoverished region of Portugal, which boasts the most sunshine per square metre a year in Europe. When fully commissioned later this year, the £250m farm set on abandoned state-owned land will be twice the size of any other similar project in the world, covering an area nearly twice the size of London's Hyde park. It is expected to supply 45MW of electricity each year, enough to power 30,000 homes.

<http://tinyurl.com/4753d4>

The Franco-German Partnership gets some va-va-voom

Germany and France have agreed a common approach on a law to reduce carbon dioxide emissions from new cars, removing an obstacle to agreement on the measures under France's presidency of the EU. French President Nicolas Sarkozy and German Chancellor Angela Merkel said they supported the European Commission's target of reducing emissions from new cars to 120 grams of CO₂ in 2012 but wanted a "substantial phasing-in".

<http://tinyurl.com/4wr6gd>

Back to the hydrogen future

Japanese car manufacturer Honda has begun the first commercial production of a zero-emission, hydrogen fuel-cell powered vehicle. Honda says it expects to lease a few dozen units in the US and Japan in 2008, and about 200 units within three years. It said the cost of the car, on a three-year lease, would be \$600 (£300) a month.

<http://news.bbc.co.uk/2/hi/business/7456141.stm>

Paris finds the energy to tackle presidency

France has made a common energy and environment policy by the end of the year the top priority of its six-month presidency of the European Union, which begins next week. Scrambling to find a popular project to re-

animate the EU following this month's stunning rejection of the Lisbon reform treaty by Irish voters, France said yesterday its goal was to help turn Europe into the world's leading sustainable economy. This would put the EU in a strong position to shape post-Kyoto global agreements on cutting carbon emissions. "Europe cannot demand a global redivision [of carbon emissions] if it is not capable of organising it among its own 27 member countries," the French government declared in a policy statement.
<http://tinyurl.com/4b5av5>

California unveils ambitious climate plan

In June, California took a major step forward on its global warming fight by unveiling an ambitious plan for clean cars, renewable energy and stringent caps on big polluting industries. The plan, which aims to reduce pollutants by 10% from current levels by 2020 while driving investment in new energy technologies that will benefit the state's economy, is the most comprehensive yet by any U.S. state. It could serve as a blueprint not only for the rest of the United States, but also for other big polluting nations like China and India, planners and environmental groups said.
<http://tinyurl.com/4szpl2>

China calls for help on climate change

China's Minister of Science and Technology, Wan Gang, has called on the international community to increase the flow of technology to developing countries to help them fight climate change. He said developed nations "need to establish a mechanism for technological transfer" of environmentally friendly technology so developing countries can afford them.
<http://tinyurl.com/43jg9f>

Canada's Kyoto conundrum

Canada will be investigated on suspicion of violating rules for registering greenhouse gases that are the mainstay of a U.N.-led fight against global warming, official documents show. Ottawa could be suspended from rights to trade carbon

dioxide if found to be in breach of the rules by the enforcement branch of the U.N.'s Kyoto Protocol. Greece was suspended in May 2008, the first state to face such a sanction.
<http://tinyurl.com/4fhd5c>

Storm in a cup

The Lieberman-Warner Bill, the strongest global warming bill ever to make it to the US Senate floor died in early June after a nasty, brutish and short debate.
<http://tinyurl.com/4v3lu9>