Major issues in the post Kyoto – Protocol period
Economic and Social Research Institute, Cabinet Office, Government of Japan
Seminar and Panel Discussion, Roppongi Hills Mori Tower 40F, Tokyo[1]
March 16, 2007

Frank J. Convery, Heritage Trust Professor of Environmental Policy, University College Dublin, Ireland frank.convery@ucd.ie

Executive Summary

A. The Atlantic-Pacific Emissions Trading Arc (APETA) – from EU ETS to US ETS and JA ETS

From **2013**, there will be:

An emissions trading scheme in CO_2 and other greenhouse gasses will exist in the US (US ETS) the European Union (EU ETS), Japan (JAETS), Australia (AU ETS) and Canada (CA ETS) and these will be linked. The design and implementation of the Pacific-Atlantic trading arc will be informed by the experience of the European Union Emissions Trading Scheme (EU ETS), and will generate a price signal for all greenhouse gas emitters that says to all *emitters*:

'If you can reduce GHG emissions, you can make money'.

And to all *innovators*:

'If you can develop a technology that reduces emissions you can make money.'

There will be a wave of new greenhouse gas reducing industry and services – the 'low carbon economy' - created by this shift in the developed world leadership, creating millions of new jobs, wealth, and relocation of economic activity to those global regions that develop comparative advantage. Japan will be one of the 'winners'.

These schemes will be linked, such that there is fungability between schemes, and a common price.

This will happen because:

[1] This analysis is based mainly on: Convery, Frank J. and Luke Redmond, 2007. 'Market and Price Developments in the European Union Emissions Trading Scheme', *Review of Environmental Economics and Policy*, Volume 1, Issue 1 (forthcoming), Oxford University Press, and is informed by Ellerman, Denny A and Barbara Buchner, 2006. 'Over-Allocation or Abatement? A Preliminary Analysis of the EU ETS Based on the 2005 Emissions Data' FEEM *Working Paper No. 139.06*, Milan, November.

- The public and leadership of the EU continues to be highly concerned and committed
- Post Bush 2, the US will finally assert leadership in the climate change area using trading as the primary vehicle, and Canada, Australia and New Zealand will shortly follow
- Japan will realise that not participating in such a market will make addressing the climate change issue more expensive, and miss out on the innovation effect that the price stimulus provides
- The allowance price comprises in effect an import tax on imported fossil fuels and assists in reducing vulnerability on supplies of oil and gas and natural gas from the Middle East, Russia etc.

From **2017**, China and India will agree to cap their emissions, and participation in the Atlantic Pacific Arc Trading Scheme will follow, probably around 2020. Other countries – Brazil, Canada, Mexico, S.Korea, Indonesia - will follow. At this point also, Russia will decide to join a trading scheme.[2]

This will happen because:

- Their economies will be increasingly dependent on trade with the original Atlantic-Pacific Arc countries. While formal trade barriers are precluded by WTO rules, there will be increasing consideration of border taxes and other trade related sanctions applied to those countries not in a capped trading scheme.
- These countries are very vulnerable to negative effects of climate change. Public pressure will build on their governments to be seen to join the global effort to reduce the risks of catastrophe.
- They will be given an attractive package comprising some combination of generous allocation allowances, aid and trade-related concessions in exchange for agreeing with this effort.

B. There are insights to be learnt from EU ETS

These include: miracles happen, and people evolve; the power of the Zeitgeist – the spirit of the moment – is not to be underestimated; the European Scheme achieved a sufficiency of convergence across a continent of diverse economies and cultures; history is always a surprise – most allowance price predictions got it wrong; an important achievement of the EUETS was to keep it (relatively) simple; no price cap and no inhibition of innovation; people love to trade and to gamble; reduction in emissions is quickly achieved; the European horizon – 2005-2012 – is too short on its own to induce major new capital investment in carbon reduction and carbon-reducing innovation**;** ensure the integrity of monitoring, reporting, validation and enforcement; the need for an informed, dedicated, well-resourced and focused organisation with the authority to drive the process; a key benefit of the European Scheme has been to animate greenhouse gas reducing projects in third countries;

[2] The top 12 emitters in the year 2000 (Million tonnes of CO_2 equiv in brackets) – US (6872), China (4963), European Union (4742), Russian Federation (1916), India (1889), Japan (1351), Brazil (849), Canada (684), Mexico (526), South Korea (519), Indonesia (505), Australia (491) – accounting for over 75 per cent of emissions in that year will be involved. Source: World Resources Institute, Washington DC.

complement trading with other policies that drive the innovation impulse; a scarcity price must emerge; don't aspire to total coverage, but be flexible in regard to expansions of the scheme; a half loaf is better than no bread; there are tradeoffs between price effects, environmental effectiveness and equity; don't give free allocations to new entrants; policy is a process that evolves.

C. Adapting to Climate Change will become a major industry.

There are alterations in how and where we live and work already 'in the pipeline' in regard to climate change. These will require a range of 'soft' – e.g. adjustment in management of risk, insurance and re-insurance, new governance arrangements, planning and zoning laws and regulations regarding land use and buildings, compensation for damage etc.- and hard responses – coastal and storm resistant engineering, development of bioengineering solutions for new crops, new medical treatments for newly vulnerable populations. Those countries and regions that have successful prior experience with catastrophe management, are challenged early on by climate change, and have the flexibility, imagination and technical and financial resources to respond quickly – the Netherlands? Japan? - will benefit most. [Note: This theme is not developed further in the text below]

1. Introduction and Context

If all of planet earth were ruled by one government, then all the costs and all of the benefits of taking action to mitigate climate change would accrue to all of planetary society. In such a situation, the costs and benefits of taking action to address climate change could be estimated, and a decision taken as to what extent to mitigate the emissions of greenhouse gasses.

However, we do not (yet) have planetary government, but over 160 national jurisdictions. In this situation, if only some countries take sufficient action to reduce emissions and the ensuing damage, the others who do not do so capture the benefits, without incurring the costs; they are the familiar 'free riders' in economics parlance. And because free riding is possible, countries are always tempted to wait for the others to move, and so no action or insufficient action takes place. And the global commons moves closer to dysfunction. Where large countries move and take action, but the small emitters take no action, there is a tyranny of the small over the large. Small countries in effect say: 'we hardly contribute to this problem, let's leave it to the big boys to solve it.'

Reducing the free rider problem to the point where the largest greenhouse gas emitters do not behave in this fashion is the essence of the challenge facing Japan and the global community post 2012.

Most clubs are organisations that members join voluntarily; they pay membership subscriptions, and are admitted to the club on the understanding that they will comply with the club rules. Because membership is voluntary, there is a reasonable presumption that the benefits each individual or organisation gains from membership exceeds the costs of joining, including

adherence to the rules. Many clubs provide a series of services, including access to important people, a congenial milieu for meeting friends and business associates, a library and restaurant, access to a golf course etc..In the climate change world, what we have globally are three clubs: the Kyoto caps club, comprising those who have accepted ceilings on emissions; the Kyoto novices club, comprising those developing countries who have ratified the Protocol but not accepted caps; the Kyoto rebels club, comprising mainly developed countries which did not ratify Kyoto.

The essence of the post 2012 challenge is to create an incentive structure that makes it easy for members in all three clubs to address reduction of emissions such that the benefits of so doing exceed the costs, and the free rider problem shrinks to manageable proportions. This challenge has been addressed at this Forum in previous years, led by the FEEM group,[3] with the focus on modelling alternative regional coalitions that might emerge, the centrality of innovation in moving the agenda forward, and the role of R&D in this context.

I want to provide a more intuitive sense as to how the future might evolve, using the club as a metaphor. Clubs succeed only in so far as they bestow benefits on the members that exceed their costs. Clubs that fail to provide this positive balance lose members and become extinct. Those that continue to provide net benefits thrive. How can we structure incentives such that most countries wish to join the climate change endeavour club, i.e. make the benefits exceed the costs?

There are 12 countries - US, China, European Union, Russian Federation, India, Japan, Brazil, Canada, Mexico, South Korea, Indonesia, Australia - that contribute over 75 per cent of emissions. The key policy objective is to bring these 12 inside the activist tent. My basic premise is that this can be done incrementally, so that as the 'Kyoto caps club' grows, the novices and the rebels feel they have more to lose by staying out than by joining. I address this sequence by focusing first on the US, then the European Union and Japan, followed by China and India.

2. The US

One reason why the US will join in the effort is its unwillingness to cede leadership permanently in any serious global endeavour. This can't easily be modelled, but it is in the US DNA to be in front. Once there is general acceptance that human activity is causing some of the climate change we observe, and that the implications for human well-being could be very serious, the leadership will move. There is another, related reason; there is a sense of moral purpose in the American personality that transcends narrowly defined cost and benefit calculus, and this will also be a spur to action. [This is the same impulse that drives Sweden to lead in addressing climate change,

[3] See for example: 'Climate Change Policy Regimes, International Trade and Economic Growth' with Carlo Carraro, Marzio Galeotti, Barbara Buchner, Claudia Kemfert, FEEM, 2004

notwithstanding the modelling that shows it could be a beneficiary of global warming]. Finally, more and more business leadership in the US is tilting towards climate change control, with emissions trading as the preferred instrument for addressing same. It may take until 2012 before these impulses find expression in serious action, but I believe it will happen. For the US, the benefits will in the first instance by psychic. But of course there will also be a flow of other more tangible benefits, including the reduction in damages that will accrue from reduced emissions, the soft and hard technologies that are developed to address both the challenges of abatement and of adaptation. With the commitment of California to lead the climate change battle in the US, the venture capitalists and the research community in Silicon valley are already gearing up to provide the creative impulse to drive innovations in energy efficiency and carbon reduction; this will complement the R&D efforts of major companies such as General Electric who are already heavily involved. There will be difficulties, in particular related to the dominance of coal in electricity generation, and its expression in the voices and votes of various Senate and House elected representatives, but action will flow. What form is this likely to take? I believe that emissions trading will be an important strand, and that allowances will be fungible between EU ETS the US and perhaps other schemes post 2012.

3. The European Union (EU)

The EU will continue as a leading member of the Kyoto caps Club for a few reasons; some countries establish their identity by engaging in freedom fights with colonial masters, or defending borders against invasion. The modern EU lacks such a unifying tradition; in fact, perhaps the most important reason the Union exists is to eliminate causes of war and conflict. Addressing climate change provides a bonding challenge and opportunity that simultaneously transcends war and provides a sort of idealism – 'saving the world with European leadership' - that most of the almost 500 million citizens of the Union can share. Also, compliance with Kyoto in general, and the EUETS in particular, has so far not been seen to damage competitiveness.[4]

3.1 The European Union Emissions Trading Scheme (EUETS)

The European Union Emissions Trading Scheme will continue post 2012 for the following reasons:

- Strong political support
- Producing results
- More congenial than command and control at individual plant level
- Already characterised by a number of vested interests, including:

- Traders who like to make money
- Bureaucracies
- Free allocations that involve billions of assets transferred

- No evidence that competitiveness is being damaged.

[4] In fact, economic growth in the EU has risen above trend since 2004.

Insights from EU ETS for the US and Japan

There are insights to be derived from the EU ETS which are relevant for the design and implementation of parallel linked schemes in the US and Japan. These include:

(a) Miracles happen, and people evolve.

Europe opposed trading to meet greenhouse gas targets at Kyoto in 1997 and is now a fervent advocate. The same can happen in the US and Japan

As the Psalmist puts it: *The stone which the builders rejected has become the corner stone.*

(b) The power of the Zeitgeist – the spirit of the moment – is not to be underestimated

As Keynes has expressed it:

The ideas of economists, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist…. I am sure that the power of vested interests is vastly exaggerated, compared with the gradual encroachment of ideas.

(c) The European Scheme involved achieving a sufficiency of convergence across a continent of diverse economies and cultures.

This involved developing and implementing allowance allocation and implementation mechanisms in 25 countries (now 27) with 23 official languages and GDP per capita ranging from $43,000 (Ireland) to $14,000 (Latvia)

And this has happened in spite of the fact that European nations sometimes seem to embody the mutual antagonisms captured by Edward Mortimer: *A nation..is a group of people united by a common dislike of their neighbours, and a shared misconception about their ethnic origins*

In comparison, the US and Japan are relatively culturally homogeneous, and this is an advantage in moving to embrace trading.

(d) History is always a surprise – most allowance price predictions got it wrong.

The price stayed in the 15-30 Euro ($19.5 – 39.0) a tonne range for about 12 months – higher than most expectations. So bet against the pundits.

(e) An important achievement of the EUETS was to keep it (relatively) simple, featuring:

- No price caps
- Cap and trade
- Based on installations
- No need for permission to trade
- One gas initially (CO_2)
- Sectors included are readily identifiable - power and heat (>20MW) – although some debate about what to include - and most heavy industry.

There is pressure from special interests to complexify; they argue with Camus: *We are all special cases.* This was resisted, mostly on the basis that if an installation were exempted, it would have to make 'equivalent effort' under a command and control or tax regime.

(f) No Price Cap

There were price oscillations over the pilot phase of EUETS, and this might encourage the idea that there should be a price cap. This should be resisted, on the grounds that we should not presume to set a ceiling on the ambition of innovators – who come mainly from outside the emitters group - by setting a ceiling on the CO_2 price. If for example it transpired that it took a price of €30 per tonne to make carbon sequestration and storage financially viable, thereby revolutionising the viability of coal powered generation in a low carbon economy, it would be a huge mistake to have capped the price at €25. Instead, we should address the root causes of swings, including inadequate provision of demand supply data - currently annual in EU ETS; if the major emitters reported quarterly, at the same time as they report on their financial performance, this would allow smoother adjustment, as would removal on temporal constraints on banking and borrowing. The EUETS did not provide for banking from the pilot phase (2005-07) to the second phase (2008-12).

(g) People love to trade and to gamble

As Adam Smith observed, this is a uniquely human trait: *Man is the only animal that makes bargains; one dog does not change bones with another dog.*

In EU ETS, there was rapid development of the futures market, with 7 brokers and 5 exchanges in operation, serving buyers and sellers at a variable cost of 0.01 to 0.05 Euro cents per tonne.

(h) Reduction in emissions is quickly achieved.

In the first year of the pilot phase, reductions below the counterfactual of 3-5 per cent were achieved. Management actions begin to give an immediate payoff

(i) The European horizon – 2005-2012 – is too short on its own to induce major new capital investment in carbon reduction and carbon-reducing innovation**.**

The current EU proposal is to set a mandatory reduction target of 20 per cent to be achieved by 2020, and to reflect this in the allocations to the trading scheme.

(j) Ensure the integrity of the system

Effective monitoring, reporting, verification and enforcement are all crucial. There is anecdotal evidence that performance in these regards was uneven across the 25 Member States, and this will require further action and improvement.

Enforcement is automatic, not dependent on unspecified civil and criminal penalties. Non-compliance is a lot more costly than going to the market.

(k) You need an informed, dedicated, well-resourced and focused organisation with the authority to drive the process.

In the European Commission, a small team of economists successfully lead the process, fully supported by the organisation.

(l) A key benefit of the European Scheme has been to animate greenhouse gas reducing projects in third countries

The European scheme is 'linked' to the Clean Development Mechanism (CDM) and has been an important factor in driving it forward, and bringing China and India into the process. There are proposals to establish a carbon trading exchange in Beijing. Such inclusivity is essential if the global challenge is to be met successfully. It can also provide a stepping stone to caps.

(m) Complement trading with other policies that drive the innovation impulse.

Emissions trading provides an immediate innovation dividend. If the price of allowances is €20 per tonne, and innovation reduces emissions by 10 million tonnes annually, this will produce a dividend of €200 million annually. But this demand side incentive needs to be complemented by supply side push measures, including funding for R&D, tax concessions etc. The EU is providing a range of supports for the development of carbon neutral renewables, and R&D funding for abatement technologies, including carbon sequestration and storage (CSS).

(n) A scarcity price must emerge

In Europe, there are two prices, one for 2007 which is approaching zero, and a futures price for 2008-12 falling in the range €14-18 per tonne. The allocations in the pilot phase were too generous to sustain a strong positive price. These have been cut by ~8 per cent for the second phase, hence the stronger price. It is crucial that supply be sufficiently less than demand – a 'short' market – to ensure a positive price. If and when the EUETS, the US

and Japan are linked, then there will be price convergence across all three schemes.

(o) Coverage and Flexibility

In EUETS, road transport[5] is excluded, on the basis that excise duties on petrol and diesel are already charged on gasoline at high carbon equivalent rates; e.g. in Germany the excise duty on petrol (gasoline) is equivalent to €275.20 per tonne of CO_2
There are proposals to include aviation, and the issue of domestic offsets - e.g. biogas from agriculture – is also being considered.

It is clear that other policy instruments have a key role, e.g. excise duties, mandated energy efficiency standards for new housing; trading will not 'cover' everything.

(p) A Half Loaf is Better than No Bread

The priority in EUETS was not to provide a 'perfect' scheme, but to get a strong price signal that engenders cost effective action quickly, and that supports innovators.

(q) There are tradeoffs between price effects, environmental effectiveness and equity.

In EUETS, allowances were allocated mostly for free.

In some countries, the opportunity cost of the allowances was passed through to consumers in the electricity price, resulting in windfall gains for some utilities. In other jurisdictions, the regulator only allowed utilities to pass through the additional cost of allowances. For consumers, these price effects were masked by the much larger coincident escalation in oil and gas prices, so there has not yet been major public opposition. This has led some of the US proposals – e.g. RGGI - to include auctioning of allowances in their proposals.

The European view has been that the important thing is to get a price signal that reflects scarcity. However, it is likely that more auctioning will be encouraged in the post 2012 scheme.

(r) Dealing with new Entrants

In the European scheme, free allocations have been set aside by Member States for new entrants. This weakens environmental performance, as new carbon intensive plants have been given allocations. There is a case based on EU experience for no free allocation for new entrants

[5] There is a decision by the Commission to convert the voluntary agreement with the automobile industry (which sets fleet targets for CO_2 emissions per kilometre) into mandatory standards. It is likely that trading will be permitted - with the units in grammes of CO_2 per kilometre – so that firms for whom it is very difficult to meet the standard can buy reduction from those for whom it is easier.

(s) Policy is a process

The argument has been made that the volume of allowances traded (2.2 billion tonnes CO_2 annually) is only 6 – 7 per cent of the global total (33 billion tonnes) and therefore won't make any difference in the long run. But it does make a difference, because, by providing a price signal other things begin to happen, including the triggering of action in China in regard to the Clean Development Mechanism, the prospective setting up of a carbon exchange in Beijing, and the encouragement of the US and Japan to establish their own US ETS and JA ETS respectively. With leadership, policy evolves.

4. Japan

It is in Japan's interest to be part of a scheme that (a) globalises the solution and provides access to low cost abatement options, and (b) provides a global price signal that allows Japanese innovation and industry to capitalise on the business opportunities provided by a low carbon economy. This will apply initially in the transport and solar cell sectors, but will expand to include a range of energy efficiency and carbon capture and sequestration technologies. A Japanese emissions trading scheme – JA ETS – modelled on EU ETS and informed also by developments in the US – and linked to each of these, provides the best mechanism for advancing both of these agendas. The experience with the voluntary scheme, and its expansion from 30 to over 100 companies, provides an experiental base that will be useful in making the transition to a national capped scheme, linked to EU ETS and US ETS.

5. China and India

There is a gradual understanding emerging in China and India at the policy level that they are at serious risk from large losses resulting from climate change. Over the next decade, this will gradually translate into a public consciousness that - notwithstanding the fact that their per capita emissions are relatively low – they have a lot to lose if the climate change challenge is not successfully addressed. There will be a psychological 'tipping point' as China emerges as the largest global GHG emitter, and as India also emerges as a leading global source. The prosperity of both countries depends crucially on free access to major export markets, and potential restrictions on trade, or even the possible prospect of same, will impose substantial costs. Because trade with China and India is also of major benefit to the US, EU and Japan, it is unlikely that border taxes, as proposed by Stiglitz, will become a reality, as it would lead to counter measures with potentially large losses to all involved; nevertheless, some trade-related pressure will be in prospect if these countries are not seen to take effective action. Because emissions trading is the most logical and most cost effective instrument, a linked cap and trade scheme – incentivised with generous caps – is likely to be the policy instrument of choice.

If they do join in the effort post-2017, other major emitters – Canada, Mexico, South Korea, Indonesia, Australia –- that are in the US, Europe and Japanese

sphere of influence will be induced to join by a combination of carrots and sticks. Russia may be an outlier in this context, because its trade is mainly in fossil fuels and is not as readily susceptible to trade related pressures. The Kyoto trading club will comprise 12 members, and will be the key forum – perhaps analogous to the G8 today in the economic arena – for making effective climate change policy a reality.

But all of this can only happen if EU ETS is followed from 2012 by US ETS and JA ETS…