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Emissions Trading

EU ETS Experience & Lessons for New Zealand

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0 Abstract

This paper outlines the application of emissions trading as a mechanism to reduce greenhouse gas emissions.

It highlights the current policy options for the introduction of emissions trading in New Zealand, both in the short term on a narrow industry focus and for broad based trading at a later stage.

The design parameters of an emissions trading scheme (ETS) are explored with particular focus on the EU ETS design and the appropriateness of adopting its design parameters for New Zealand.

The importance of ETS design is highlighted through an evaluation of the performance of the EU ETS, operational since the beginning of 2005.

Lastly, the paper draws some conclusions on ETS design for New Zealand.

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1 Introduction

Internationally, climate change policy design is increasingly moving towards the use of market mechanisms and more specifically the "cap and trade" form of emissions trading.

The New Zealand Government in its announcements of July 4th 2006 confirmed that it too is looking at emissions trading as an option both in the near term (2008-12) and longer term (post 2012).

The European Union introduced an emissions trading scheme, the EU ETS, in January 2005. This is the largest regulated emissions trading scheme in the world and is often cited as the example to follow for domestic policy design.

This paper considers some of the key design parameters of emissions trading systems, evaluating the EU ETS for the New Zealand situation. It also reviews the performance of the EU ETS to date and assesses how this performance could have translated into the NZ economy had a similar design been implemented here.

Lastly, the paper makes recommendations on the way forward for emissions trading implementation in New Zealand.

2 What is Emissions Trading?

Emissions trading is a market-based instrument used for environmental protection. It has been adopted as one of the primary tools for international cooperation to reduce greenhouse gas emissions under the Kyoto Protocol.

Tradable rights for pollution control were first proposed in 1968 and several trading programmes have been implemented in a number of countries and regions to reduce emissions of SO_x, NO_x, CO_2 and other gases.

2.1 Where is it used?

Emissions Trading Schemes (ETS) are increasingly becoming the preferred greenhouse gas policy instrument. Examples are:

- on a regulated basis:
  - worldwide - the Kyoto Protocol
  - regional - The EU ETS
  - domestic - UK-ETS
- on a voluntary basis:
  - Chicago Climate Exchange (CCX)
  - Japan Voluntary Emissions Trading Scheme (JVETS)

Domestic regulated emissions trading is being considered in both Australia and New Zealand.

2.2 How does it work?

By giving an economic value to each unit of emissions reduced, emissions trading creates an incentive to find ways to lower the cost of emission control technologies and to implement measures that reduce emissions.

There are three basic types of emissions trading programmes:

- ‘cap and trade’
- ‘baseline and credit’ and
- ‘offset’.

Cap and Trade

In a cap and trade programme, the regulator establishes an overall limit on emissions - the ‘emissions cap’. This is the total amount of greenhouse gas emissions that the participants in the programme are allowed to emit in a given period (e.g. emission of a number of tonnes greenhouse gases per year). Allowances equal to all of the emissions permitted under the cap are then distributed. There are two types of distribution: free or by auction. Once the allowances are distributed, they may be traded freely.

Baseline and Credit

The participants in a baseline and credit (or ‘averaging’) programme have to ‘earn’ credits before they can begin trading. An emissions baseline is first defined for each participant by the regulator. Each participant then makes reductions and monitors or calculates its actual emissions using specified procedures. At the end of the compliance period, the regulatory authority compares the baseline calculation with the actual emissions from the source during the period. Participants whose actual emissions are lower than their baseline receive ‘credits’ equal to the difference. Credits can then be traded freely. A participant whose actual emissions exceed its baseline must purchase credits equal to its excess emissions to achieve compliance.

Offset

Offset programmes are used to compensate for (i.e. offset) the additional emissions from a new source or expansion of an existing one. Under such schemes those responsible for the new or expanding source purchase credits equal to emission reductions achieved by existing sources. The requirement to offset is mandatory for the new or expanding source but the decision by existing sources to reduce is voluntary. In effect, the existing sources are given a free allocation equivalent to the baseline from which their emissions reductions are calculated. For the new and expanding sources, the baseline is any emissions they are not required to offset; if they are required to offset all of the increase in their emissions the baseline is zero.

3 Emissions Trading Prospects for New Zealand

Emissions trading has been evaluated as a policy option for New Zealand since the mid 1990's. It was contemplated that the broad based carbon tax that was to have been introduced in 2007 could migrate into an emissions trading scheme. The prospects of emissions trading have grown stronger.

In June 2005, following the significant shift in New Zealand's forecast Kyoto net position to a deficit position, a cross ministry Climate Change Policy Review[1] was initiated.

On the 21st of December 2005, it was announced that the proposed carbon tax would not go ahead. The government would instead consider other ways to ensure New Zealand meets its commitments[2]. This decision was justified on the basis that "the proposed carbon tax would not cut emissions enough to justify its introduction". It is also noted that the government's confidence and supply partners had expressed opposition to the tax.

The Climate Change Policy Review had given a clear recommendation that the government should not develop a New Zealand Emissions Trading Scheme (NZ ETS) to apply before 2012. Emissions trading was however included as one of the options to be evaluated as an "*alternative measure to the carbon tax*"[3].

The option of emissions trading was further elaborated on in the government's policy announcements of July 4th 2006[4]. In the associated cabinet paper[5] the alternatives to the carbon tax work is described:

> *"This work programme covers large direct emitters of greenhouse gases in both the electricity generation and industrial sectors. The work links with the analytical work supporting the strategic framework and goal as providing an appropriate, durable price signal is important for influencing investment decisions, particularly in regard to long-lived assets. It includes assessing in detail three policy measures: a narrow-based tax on emissions; carbon emissions trading based on either an absolute cap or baseline/credit trading; and new (possibly voluntary) arrangements to replace Negotiated Greenhouse Agreements."*

Further detail is provided in the report "Climate Change Solutions: Whole of Government Work Programmes" [6] where stated cabinet decisions to be made include[7]:

> *"Cabinet Decision 1: Whether New Zealand should prepare its economy to face a price for carbon through a broad price-based measure at some time post-2012;*

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[1] Public version released 21/12/2005 - http://www.climatechange.govt.nz/resources/reports/policy-review-05/index.html
[2] Hon David Parker, 21/12/2005
[3] Cabinet paper: Climate Change – Review of Policy and Next Steps: CBC (05) 394 and Cabinet minutes: CBC Min (05) 20/10.
[4] Hon David Parker - Climate Change Work Programmes, 4 July 2006 http://www.beehive.govt.nz/ViewDocument.aspx?DocumentID=26353
[5] Climate Change Policy: the Way Ahead CAB (06) 18/8
[6] http://www.climatechange.govt.nz/resources/reports/climate-change-solutions-jun06/index.html
[7] Underline emphasis added by authors

Cabinet Decision 2: The scope of sectoral climate change objectives for large direct emitters within the context of New Zealand's broader climate change policy goals and the New Zealand Energy Strategy from 2008-2012 and post-2012;

Cabinet Decision 3: The type of transitional policy measure(s) (eg, a carbon tax, ***emissions trading regime****, voluntary agreement scheme, regulation under the RMA, or other measures) that should be applied to large direct emitters pre-2012 to prepare them to participate in the post-2012 climate change policy regime*

Cabinet Decision 4: The detailed design features of the transitional policy measure(s) (eg, a carbon tax, ***emissions trading regime****, voluntary agreement scheme, regulation under the RMA, or other measures) for large direct emitters;*

Cabinet Decision 5: The detailed design features of the longer-term policy measure for introducing the price of emissions into the New Zealand economy (eg, ***economy-wide emissions trading post-2012****, or other price-based measures)."*

It is clear from the above that emission trading could be introduced in New Zealand in two stages:

- 2008-12 Narrow based on the energy sector (large direct emitters / electricity generation)
- 2012 Economy wide

To date consultation with industry on the pros and cons of emission trading has been at "a high level" with no substantive definition of the design parameters. The next section of this paper identifies relevant parameters and assesses a few of them in the context of the EU ETS.

4 ETS Design parameters

When designing an emissions trading scheme consideration must be given to a wide range of parameters. The following list has been drawn from international sources including:

- The EU ETS (in operation)
- Consultation on the proposed state driven Australian National Emissions Trading System[8].
- Consultation on the proposed US Market Based Greenhouse Gas Regulatory System[9]

Table 1: ETS Design Parameters

Parameter	Definition
Gases	Which greenhouse gases are included?
Sectors Covered	Which sectors / sub-sectors are covered?
Point of Obligation	At what point in the raw fuel to final emissions supply chain is the obligation placed?
Emissions Cap (target)	How is the overall cap on emissions set?
Permit Allocation	How are "permits/allowances" allocated?
Credit for Early Action	Is this recognised and how?
Competitiveness	How are "competitiveness at risk" or "trade exposed" sectors dealt with?
International Linkage	Is the scheme linked to international schemes and how?
Offsets	Are offsets allowed and how are these defined?
Banking	Can tradable permits be banked and carried forward to meet future liability?
Penalty	What penalties are there for non-compliance?

This list is by no means exhaustive and the combination of choices of parameters and their interrelationship lead to an almost infinite range of possible ETS design outcomes.

[8] A National Emissions Trading Scheme – Background paper for Consultation http://www.emissionstrading.nsw.gov.au/background.pdf

[9] "Design Elements of a Mandatory Market-Based Greenhouse Gas Regulatory System" Issued by Sen. Pete V. Domenici and Sen. Jeff Bingaman February 2006 http://www.pewclimate.org/policy_center/analyses/sec/index.cfm

5 Linking: The Driver for a Uniform Approach

One of the key drivers for designers of emission trading schemes is the desire to link any domestic scheme to international markets. This desire is driven by the benefits of greater market size and liquidity.

For New Zealand, an additional driver raised in the 2005 Review of Climate Change Policies,[10] is the difficulty of predicting with confidence the appropriate cap on the number of allowances that should be allowed within an NZ ETS. Linking with other trading schemes could mitigate the risk of an inappropriate cap leading to extreme emission unit prices.

The EU ETS already has a linking directive in place for Kyoto compliant emission units to be traded on a fungible basis with EU allowances, namely:

- Clean Development Mechanism Certified Emission Reductions (CDM CERs) in the period 2005-12; and
- Joint Implementation Emission Reduction Units (JI ERUs) in the period 2008-12.

Furthermore Article 25 of the EU Emissions Directive states:-

> *"Agreements should be concluded with third countries listed in Annex B to the Kyoto Protocol which have ratified the Protocol to provide for the mutual recognition of allowances between Community scheme and other greenhouse gas emissions trading schemes in accordance with the rules set out in Article 300 of the Treaty."*

The Directive also states that the Commission should examine whether it could be possible to conclude agreements with countries listed in Annex B to the Kyoto Protocol which have yet to ratify it (i.e. the USA and Australia), to provide for recognition of allowances between the Community scheme and mandatory greenhouse gas emission trading schemes capping absolute emissions established within those countries.

To successfully link schemes, there are a number of critical design issues that each market needs to consider and harmonise:- [11]

- Coverage of the scheme (gases, sectors, upstream/downstream, direct/indirect emissions, opt-in/opt-out provisions)
- Definition of trading units; metric tonnes versus short tons as used in US Regional Greenhouse Gas Initiative (RGGI) that would need to be harmonised or an exchange rate agreed.
- Recognition of trading units; differences across schemes in the recognition of certificates, such as those from sinks, domestic off-sets and Assigned Amount Units (AAUs), that will directly affect the volume and value of the allowances, and therefore supply and demand balance is never fixed due to recognition of different trading units.
- Absolute vs. relative targets; the EU established absolute targets, however other schemes proposed (e.g. Canada) are based on emission intensity targets.
- Allocation methodology; harmonisation of the sectors participating in a linked ETS along with alignment of the methodology used for each sector. For example historical, forecast and benchmarked allocations per sector across a defined group of sectors.

[10] Review of Climate Change Policies, NZ Ministry for the Environment, 2 November 2005
[11] Reference source; Wuppertal Institut, Germany, Wolfgang Sterk

- Stringency of targets; the targets need to be well defined, stringent and transparently validated across the linked ETS markets to build integrity and liquidity.
- Trading and compliance period; the need for well established compliance periods with sufficient market reporting rules.
- Compliance framework and penalties; linked schemes require harmonisation across penalty price caps for linking to be effective.
- Monitoring, reporting, verification; there has been criticism in the first round of EU ETS market on reporting where national governments have reported information in an un-controlled format impacting on price and behaviour of certain market participants. Strict standards and independent verification are key to the integrity and development of linked emissions trading schemes.

There is general consensus from Kyoto compliant and non-compliant countries that harmonisation and linking makes environmental and commercial sense.

Linking may however constrain the design of an appropriate domestic emissions trading scheme.

6 EU ETS Design and its Suitability for New Zealand

The EU ETS is the largest regulated emissions trading scheme in the world and is often cited as the example to follow for domestic policy design. It is the centrepiece of the EU's efforts to meet its Kyoto commitments and is by far the largest carbon market in terms of value and volumes.

Table 2 : Volumes transacted and corresponding values on the main carbon allowances markets[12]

	2004	2005		1st Q06	
	Volume ($MtCO_2$)	Volume ($MtCO_2$)	Value (MUS$)	Volume ($MtCO_2$)	Value (MUS$)
EU ETS[16]	8.49	322.01	8,220.16	202.51	6,552.24
NSW	5.02	6.11	57.16	5.51	86.55
CCX	2.24	1.45	2.83	1.25	2.71
UK ETS	0.53	0.30	1.31	na	na
TOTAL	**16.28**	**329.87**	**8,281.46**	**209.26**	**6,641.50**

It has been stated by one influential commentator that:

> *"Like it or not, the EU ETS is now the Centerpiece of Kyoto, and hence of efforts to tackle the climate problem."* *Professor Michael Grubb, Chief Economist of Carbon Trust*

The statistics of what the EU ETS covers are at first reading impressive:

- 45% of total EU CO_2 emissions are covered
- 2.2 billion allowances per annum over
- 11,500 installations in 21 countries

Hence it is no wonder that other jurisdictions, including New Zealand are looking at the EU ETS as a reference case. But how appropriate would the design of the EU ETS be if it were transferred directly to the New Zealand economy?

In the next section, 4 design parameters as they relate to the EU ETS are assessed:

- Gases covered
- Sectors covered
- Allocation methods
- International competitiveness

[12] Source: State and Trends of the Carbon Market 2006; The World Bank and IETA

6.1 Gases Covered

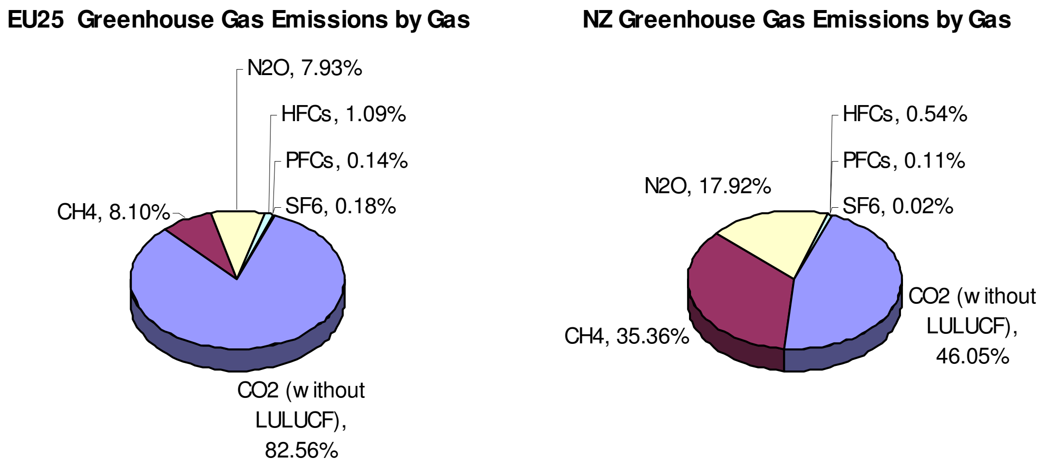
The EU ETS covers only CO_2 emissions. The Linking Directive does allow for non CO_2 projects based Kyoto compliant emission units to be traded on a fungible basis with EU Allowances.

However, the regulated cap on emissions and allocated allowances are solely for CO_2 emissions with no signs of this being expanded in the second trading period 2008-12.

In the context of the EU, this narrow focus on CO_2 is understandable as this gas represents over 82% of the EU's emissions.

By comparison CO_2 represents only 46% of New Zealand's emissions. This is presented in Figure 1 below:

Figure 1: NZ and EU-25 2003 Greenhouse Gas Emissions by Gas[13]



As stated previously the amount of the EU's CO_2 emissions covered through the EU ETS is 45%. If the same percentage were applied to New Zealand's CO_2 emissions an ETS would cover less than 21% of the nation's total greenhouse gas emissions.

[13] NZ & EU emissions from National Inventory Reports to UNFCCC Secretariat

6.2 Sectors Covered

Although the EU ETS covers over 11,500 installations, it is still a narrow-based trading scheme when the sectors included are assessed.

The EU ETS restricts the number of industrial installations by utilising product output and rated energy size thresholds as cut offs for inclusion. The sectors covered are:

- combustion installations
- oil refineries,
- coke ovens,
- metal ore and steel installations,
- cement kilns,
- glass manufacturing,
- ceramics manufacturing, and
- paper, pulp and board mills.

Details are provided in Table 3 below:

Table 3: Activities covered by the EU ETS

Energy activities • Combustion installations with a rated thermal input exceeding 20 MW (except hazardous or municipal waste installations). • Mineral oil refineries • Coke ovens
Production and processing of ferrous metals • Metal ore (including sulphide ore) roasting or sintering installations. • Installations for the production of pig iron or steel (primary or secondary fusion) including continuous casting, with a capacity exceeding 2.5 tonnes per hour
Mineral industry • Installations for the production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or lime in rotary kilns with a production capacity exceeding 50 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day. • Installations for the manufacture of glass including glass fibre with a melting capacity exceeding 20 tonnes per day. • Installations for the manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day, and/or with a kiln capacity exceeding 4 m^3 and with a setting density per kiln exceeding 300 kg/m^3.
Other activities Industrial plants for the production of: • (a) pulp from timber or other fibrous materials • (b) paper and board with a production capacity exceeding 20 tonnes per day

The low threshold of a mere 20 MW rated thermal input for combustion installations has led to the inclusion of many small installations. For example a typical 20 MW gas fired cogeneration plant operating for 330 days per year, would represent only 39.6 kt CO_2 per annum of emissions[14].

A recent review has highlighted that:

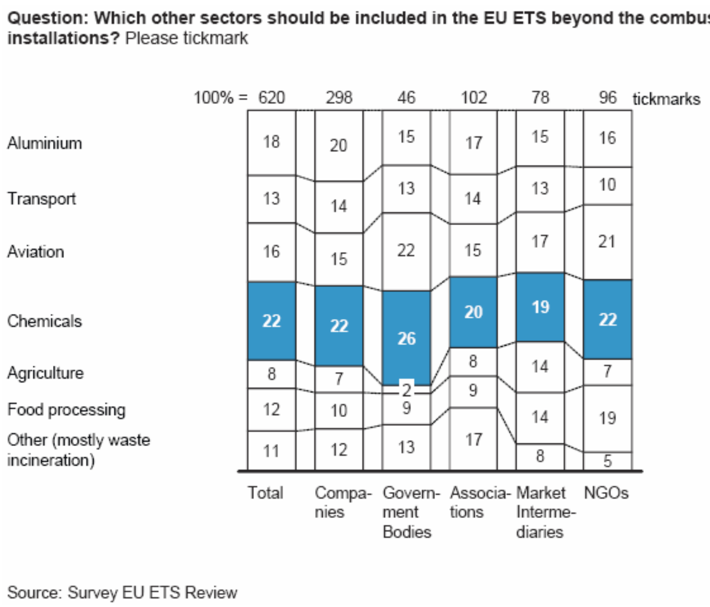
> *"almost one third of the covered combustion installations have a rated thermal input between 20 and 50 MW yet these installations are responsible for only 2% of overall emissions"*[15]

An example raised in the UK media has been the inclusion of National Health Service (NHS) hospital boilers leading to the NHS spending £1.3m on additional EUAs.

Transportation and building energy use are the largest sectors not included in the EU ETS[16].

When presented with the opportunity to include other sectors beyond the combustion installations in the EU ETS, government bodies and other stakeholders give priority to the inclusion of chemicals, aviation and aluminium. This is highlighted in Figure 2 below [17].

<u>Figure 2: Stakeholder views on which sectors should be included in the EU ETS</u>



Applying the current EU ETS coverage rules to the New Zealand economy would almost certainly create what most would consider to be perverse outcomes:

- Auckland hospital would be included - it has a boiler rated at 30MW.
- Some of the industries previously included in the government's NGA programme would not feature.
- There would be potential distortions within industry sectors e.g. wood processing where some sites exceed the thresholds but others do not.

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[14] Based on an emission Factor of 250kg CO_2/MWh – source: Concept Consulting report to Climate Change Office, August 2003.
[15] EEA Technical Report No 2/2006 Application of the emissions trading directive by EU Member States.
[16] http://www.pewclimate.org/docUploads/EU-ETS%20White%20Paper.pdf.
[17] Review of EU Emissions Trading Scheme – Survey Highlights (McKinsey & Ecofys)

- The majority of CO_2 emissions relating to buildings and transport would not feature.

6.3 Allocation Methods

The allocation of allowances to emitters by the regulator is often contentious. There are two common ways to allocate units, free or by auction.

The EU ETS Directive specified that the main method of allocation should be free of charge (Directive 2003/87/ECCOM/2003/0830 final[18]).

Even with that principle of free allocation locked in, there are still substantial variations in allocation approach. For example, the German National Allocation Plan (NAP) foresaw 58 different combinations of allocation rules! [19]

Typically a "baseline" is established and then a "multiplier" is applied to that baseline to determine the final allocation.

Baseline * Multiplier = Allocation

The baseline used is commonly determined from:

- Historical Emissions;
- Forecast Emissions; or
- Benchmarked Emissions.

The multiplier presents the regulator with the opportunity to adjust the stringency of the emissions trading scheme, either uniformly or on a party by party basis.

Setting the Baseline

Historical Emissions

Establishing a baseline based on historical emissions (commonly referred to as "grandparenting" or "grandfathering") has been used in the Kyoto Protocol.

Grandparenting has also been used in domestic and regional regulated emissions trading schemes, including the UK-ETS and the EU-ETS.

A key parameter is which year (or averaging of years) should be used as the baseline. Typically a lack of verified historical emissions data leads regulators to focus on recent years. This in turn disadvantages those firms that took early action as their emissions in recent years will be lower than those of "slow to act" competitors.

An example is the UK where:

> *"…installations were allocated a proportion of the sector total, which was calculated on the basis of each installations' verified historic emissions data for 1998-2003, after excluding the lowest year's emissions."*[20]

Forecast Emissions

In its purest form, historical baseline allocation takes no account of future production levels.

In the EU ETS Phase 1 National Allocation Plans (NAP), only Germany applied this strict approach.

[18] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52003DC0830:EN:HTML
[19] http://shop.ceps.be/downfree.php?item_id=1288 - Centre for European Policy Studies (CEPS)– Reviewing the EU-ETS (Pt I).
[20] http://www.defra.gov.uk/environment/climatechange/trading/eu/pdf/operatorsguide.pdf

The most common approach was to project absolute emissions either as an outright projection or based on historical emissions updated for the forecast production level.

The temptation with forecast emission baseline setting is for the firm to inflate its estimate, knowing that it will likely be cut back when the multiplier is applied.

Benchmarked Emissions

In benchmarked baseline setting, an independent benchmark of the emission intensity of a firm or sector is selected, which when multiplied by the production level provides the baseline quantity.

Options in establishing the benchmark are:

- Best Available Technology (BAT) – commonly applied for new installations;
- Average Sectoral Emissions – advocated by some industries; or
- Site specific benchmarks – e.g. NZ NGA WBP benchmarking.

The EU Emissions Trading Directive does allow for benchmarking, however its application to date has been limited. An evaluation of the use of benchmarking was made by the Centre for European Policy Studies, (CEPS) which stated that:

> *"There have been many member states that used benchmarks in their phase I NAPs. Some member states (e.g. Germany, Denmark and Finland) have used benchmarks for allocation to new entrants, and some (e.g. Sweden, Netherlands, Italy) used benchmarks for some installations and /or fixed energy efficiency rates for energy production installations. While such approaches are covered by the Directive, the problem is that the metrics differ between member states. For instance, some member states base allocation on installed capacity and projected utilisation rates, some on projected output and others still on BAT. Hence, a first step towards progress on benchmarks would be coordination across member states to avoid inconsistencies."*[21]

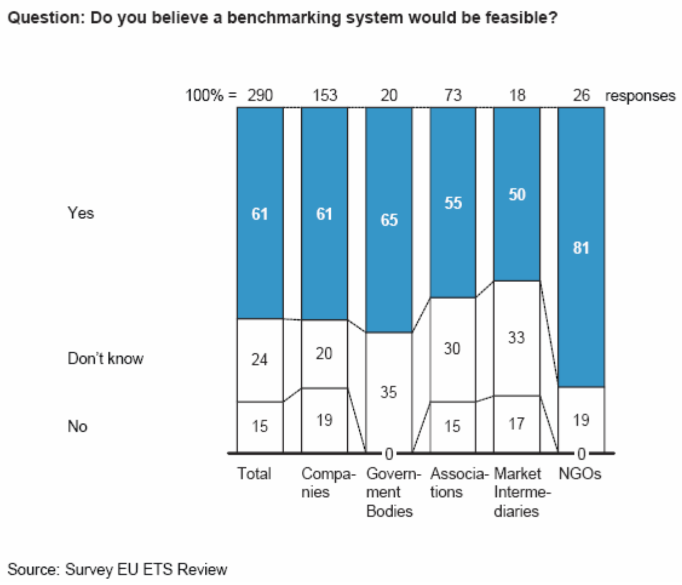
In the case of The Netherlands, an adaptation of the prior pathway commitments under its Benchmarking Covenant was applied (the Dutch benchmarking approach was a significant input into New Zealand's NGA World's Best Practice target setting approach).

Support for increased use of benchmarking in the EU ETS is relatively strong[22] as can be seen in Figure 3 below:

[21] CEPS Taskforce Report No. 56 July 2005.

[22] Review of EU Emissions Trading Scheme – Survey Highlights (McKinsey & Ecofys)

Figure 3: Stakeholder views on the use of benchmarking in the EU ETS



Setting the Multiplier

As stated previously, the multiplier is the regulator's tool to adjust the stringency of any emissions trading scheme and hence the price of traded units.

In setting the multiplier, the regulator will typically take into account the following parameters:

- External requirements that the regulator has to meet e.g. country Kyoto obligations;
- Sectoral competitiveness issues – including the ability of the sector to pass through the cost of any trading liabilities to customers (refer International Competitiveness below); and
- Political drivers leading to policy makers being "directed" to favour some industries to the detriment of others.

In order to prevent a price collapse, the regulator will always seek to set the multiplier low enough to ensure the market is kept "short". The difficulty for the regulator is that significant excess allocation may have been built into the allocation through inappropriate baseline setting.

6.4 International Competitiveness

In the absence of a world-wide trading scheme with equal stringency of targets, there is a risk of emissions trading schemes leading to a displacement of emissions intense industry to locations with less stringent measures. The terms Competitiveness-at-Risk (NZ NGA policy) or Trade-Exposed (Australian terminology) have been used for firms in this position.

For the EU ETS the EU Emission Trading Directive recognised issues of "Competition from outside the Union".[23]

"Competition from outside the Union

[23] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52003DC0830:EN:HTML

The plan may contain information on the manner in which the existence of competition from countries or entities outside the Union will be taken into account.

The existence of competition should only be taken into account in the national allocation plan by a modification of the quantity of allowances per activity."

An example of this approach is the UK allocation[24] where it was stated that:

"The power stations sector received a lower allocation in Phase I, given they are more insulated from international competition than other sectors".

The EU ETS approach is endorsed by the Pew Center:[25]

"sectoral tailoring (of allocations) may be necessary to address concerns about global competitiveness. Allowance allocation may be a particularly effective way of accounting for the relative price insensitivity of different sectors.

For vulnerable stationary sources that face intense competition that could lead to offshoring (and even higher GHG emissions), allowances can be provided to help ease the transition of capital stock to newer, more efficient technologies and cleaner fuels."

6.5 Conclusion on Adopting EU ETS Design Parameters for NZ

While the EU ETS is a useful reference case it would not be appropriate for New Zealand to merely adopt its design.

- The emissions profiles and economies differ to the extent that the narrowly focussed EU scheme, if adopted in its current form, would become even narrower and less effective in New Zealand.
- However, the allocation of emissions allowances needs to take into account the international competitiveness of New Zealand industry and the option of using benchmarking is quite appropriate.

[24] An Operator's Guide To The EU Emissions Trading Scheme (Defra - UK)
[25] http://www.pewclimate.org/policy_center/analyses/sec/index.cfm

7 EU ETS Performance to Date

The EU ETS has hit the world headlines with both good and bad news stories. The good have focused on the establishment of the world's biggest greenhouse gas market, while the bad have been focused on severe price drops and windfall gains for electricity generators.

In this section we delve into more detail on bad story issues to demonstrate some key points for the development of emissions trading in New Zealand.

7.1 The EU ETS Price Collapse

In May 2006, in the period of one week the price of EU ETS allowances (EUAs) fell from a high of €31 to a low of €9 (refer Figure 4).

Figure 4: The EU ETS Price Collapse EUA2006 price (€)

The price collapse occurred when the market moved from what was forecast to be a "short position" to the realisation that the market was "long". The signal for this adjustment in the market was the progressive release of EU members' 2005 emissions data for installations covered by the EU ETS. In many cases the data revealed that countries had granted more allowances than actual emissions.

The EU's formal release of data on May 15 2006 showed that of the 21 countries that reported in time, 15 countries had been "over allocated" i.e. the average of their 2005-7 allocation was greater than the actual emissions for 2005 (refer Table 4 below).

Table 4: EU ETS Emissions for 2005 (source EU)[26]

Member State	CO_2 emissions for 2005 in tonnes	Annual average allocation in 2005 to 2007 in tonnes	Delta tonnes	Delta %
	[A]	[B]	[C]=[A]-[B]	[D%]= [C]/[A]*100
Austria	33,372,841	32,674,905	- 697,936	-2.1%
Belgium	55,354,096	59,853,575	4,499,479	8.1%
Czech Republic	82,453,727	96,907,832	14,454,105	17.5%
Denmark	26,090,910	31,039,618	4,948,708	19.0%
Estonia	12,621,824	18,763,471	6,141,647	48.7%
Finland	33,072,638	44,587,032	11,514,394	34.8%
France	131,147,905	150,500,685	19,352,780	14.8%
Germany	473,715,872	495,073,574	21,357,702	4.5%
Greece	71,033,294	71,135,034	101,740	0.1%
Hungary	25,714,574	30,236,166	4,521,592	17.6%
Ireland	22,397,678	19,238,190	- 3,159,488	-14.1%
Italy	215,415,641	207,518,860	- 7,896,781	-3.7%
Latvia	2,854,424	4,054,431	1,200,007	42.0%
Lithuania	6,603,869	11,468,181	4,864,312	73.7%
Netherlands	80,351,292	86,439,031	6,087,739	7.6%
Portugal	36,413,004	36,898,516	485,512	1.3%
Slovak Republic	25,237,739	30,364,848	5,127,109	20.3%
Slovenia	8,720,550	8,691,990	- 28,560	-0.3%
Spain	181,063,141	162,111,391	- 18,951,750	-10.5%
Sweden	19,306,761	22,530,831	3,224,070	16.7%
United Kingdom	242,396,039	209,387,854	- 33,008,185	-13.6%
Total	**1,785,337,819**	**1,829,476,015**	**44,138,196**	**2.5%**

Although the aggregate "over allocation" was only 2.5%, this still represents some 44 million excess allowances and so the impact on the market was severe.

Market volatility was also affected by release of data prior to the official publication of data.

This over allocation will remain in place through to the end of 2007 as new allocations are only implemented at the commencement of the new, Phase II, trading period; 2008-12. As a result, the trade in CDM projects has been reduced as sellers are now holding back on the sale of CERs pending a tighter, and hence higher, priced market in Phase II.

Why Did it Happen?

While some commentators' state that it is evidence of the market working well in that actual emissions took a downward path to levels below those expected, others have claimed the allocation process was too generous.

There was always a risk that firms would escalate their estimated emissions to "100% of utilisation plus some" when lobbying for allocation.

Another aspect, raised by the European cement industry body *Cembureau* among others, is that there should be provision for an ex-post adjustment of the allocation. At present, the EU-ETS is constrained to an ex-ante allocation. That is, the allocation of allowances is made at the start of the trading period with no adjustment at the end (ex-post) for actual production levels. Hence for businesses facing international competition, the situation may arise where it pays to hold back on production and sell allowances rather than meet export or domestic markets.

> *"In a nutshell the EU ETS, as currently designed has the same effect as a cap on the production and encourages carbon leakage"* *Claude Lorea, technical director Cembureau.*

[26] Data released 15 May 2006. Poland has subsequently reported its emissions and an "over allocation" of 28.7 million tonnes. Cyprus, Malta and Luxembourg are yet to report.

Cembureau advocate the use of a CO_2 efficiency-based allocation combined with ex-post adjustment for actual production levels:

*Ex-ante allocation = CO_2/unit output * forecast output*

*Ex post adjustment = CO_2/unit output * (actual output – forecast output)*

Although the German government introduced ex-post adjustment in its National Allocation Plan for Phase I, this approach has to date been rejected by the European Commission, some would say for pure economic theory reasons in the face of the need for pragmatism.

Looking Ahead?

Draft NAPs for Phase II of the EU ETS are now being submitted with most nations tightening their allocations.

The good news is that with the collation of verified emissions data for 2005, there is now a valid starting point from which to make a judgement on the appropriate allocation level.

There is still much debate however on allocation methodologies, particularly in the electricity generation sector.

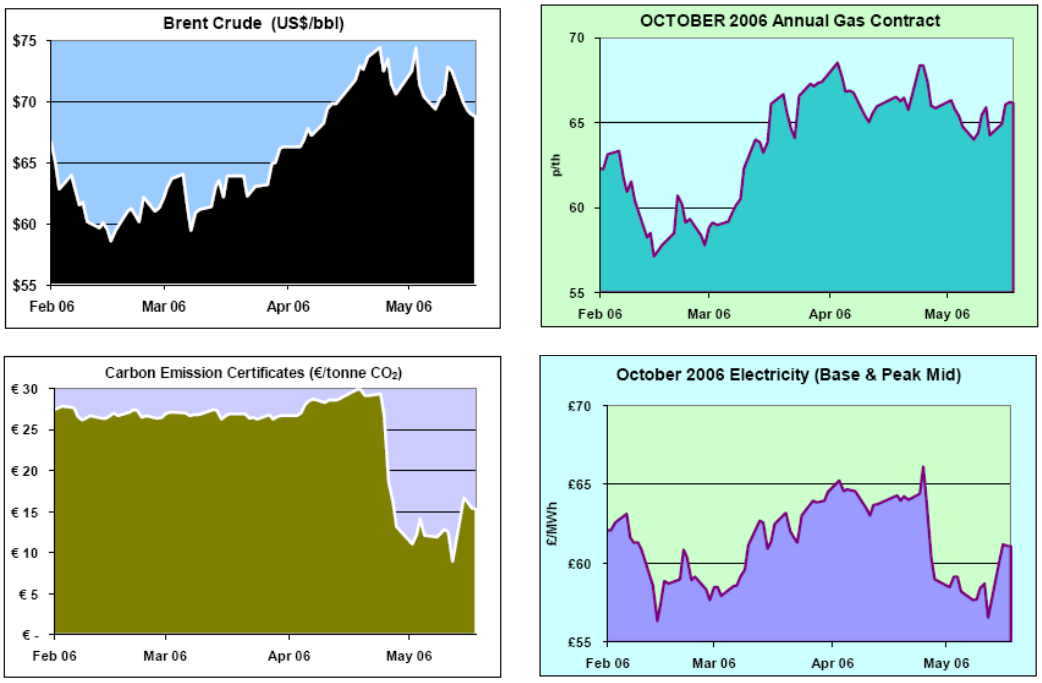
7.2 The EU ETS Impact on the Electricity Market

This section outlines the impact on electricity markets from the introduction of emissions trading.

Unlike the New Zealand market, the European power, gas and coal markets are actively traded with established cross-commodity trading teams supporting prompt (spot) and forward markets. These markets are also inter-connected cross-border with the oil market directly impacting on gas and electricity prices. It was a natural step for emissions trading to be picked up by experienced and well resourced trading organisations.

Within 18 months of the EU ETS's official introduction in January 2005, carbon pricing has had a material impact on the economics of power generation in Europe. The UK and Central Europe rely on fossil fuel generation which dictates marginal pricing across the various power markets. Therefore energy companies price carbon into their generation scheduling strategy (refer Figure 5).

Figure 5: The Relationships between Oil, Gas, Carbon and Electricity prices



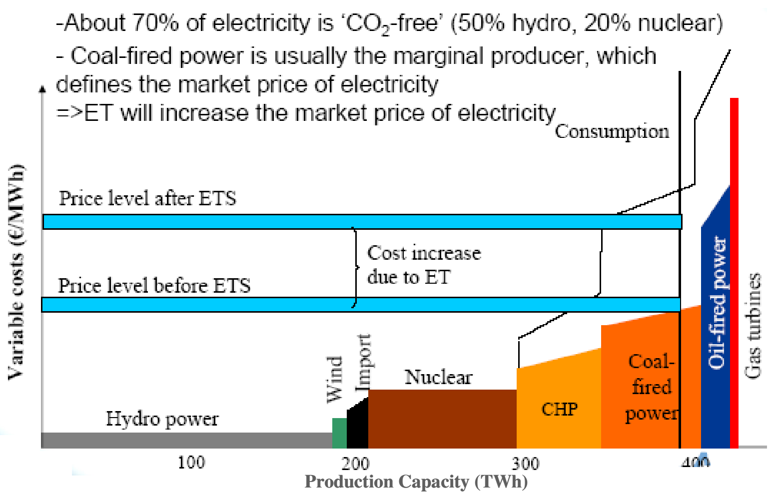
Source: Power Efficiency UK Publication June 2006

The cost of carbon, like that of fuel, is now taken into account when determining power station profitability.

Many of the European national electricity markets are similar to New Zealand, where the marginal generation cost to meet the overall market demand establishes the power settlement price for any given delivery period (some power markets are evaluating demand side bidding and bilateral markets to counter market power and promote greater competition amongst generators).

Under a marginal pricing mechanism, the price of carbon impacts on the merit order of plant and is included in establishing the marginal settlement price across the power market. Figure 6 shows an example of how this impacts on the Nordic electricity market .[27]

Figure 6: The Impact of Emissions Trading on the Nordic Electricity Prices



[27] Source; VTT Technical Research Centre of Finland – Tiina Koljonen & Veiko Kekkonen

Windfall Profits

The introduction of a 'mark-to-market' methodology has required each power company to value its trading portfolio on its value in the market there and then. This means that the power companies must factor in the price of carbon to the generation cost irrespective of whether the carbon allowance was allocated, or whether they have to purchase the allowances.

Therefore, under a free allocation method the additional costing for the carbon price is false, as the generator has not had to pay for any, or a substantial portion of their allowances.

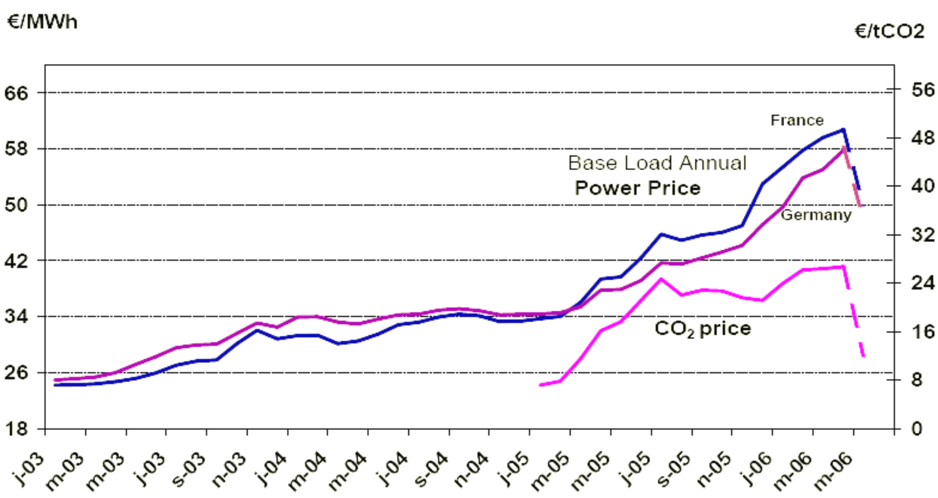
Although generators will have had to buy allowances where their emissions exceed their allocation cap, they have made large windfall profits through the combination of:

- most of the allowances being allocated at no or little cost;
- potentially over generous allocation;
- 'mark to market' accounting policy; and
- electricity market design, that established marginal pricing with a carbon price factored in.

These windfall profits have been strongly criticised by governments and the electricity intensive industry (who are in many cases exposed to international competition).

Alcan, an aluminium producer, through an analysis of electricity prices following the EU ETS price collapse of May 2006, highlighted that between 50-70% of the carbon price is being passed directly through to customers by generators (refer Figure 7).

Figure 7: Power Price Development in France and Germany[28]



The magnitude of the windfall profits has been significant. For example:

- Dutch electricity producers: €300-€600 million per annum (half the value of the country's emission allowances);[29]
- UK electricity producers: estimated to be £800m/year over Phase I.[30]

[28] Source Alcan
[29] Source Electricity Policy Research Group, University of Cambridge UK as reported by Point Carbon
[30] IPA Energy Consulting: Implications of the EU Emissions Trading Scheme for the UK Power Generation Sector to Department of Trade and Industry (DTI)

The extent of the concern politically is perhaps best exhibited by the Finnish government's proposal to impose a windfall tax on their hydro and nuclear power plants built prior to climate change agreements[31].

The aim of the EU ETS mechanism is to discriminate against the most carbon intensive fuel sources to have the most carbon efficient generation sources running first (all other costs being equal). If the initial allocation and market design issues are overcome, then correct price signals will be given to financially incentivise investment in renewable plant and mothballing of carbon inefficient plant, meeting the underlying objective of the emissions trading scheme.

7.3 EU ETS Performance Issues in a New Zealand Context

Translating the EU ETS experience to New Zealand situation highlights the importance of careful integration of the electricity market with any emissions trading scheme.

How to avoid Windfall Profits

As discussed previously, the marginal generation cost establishes the power settlement price for the overall demand for any given delivery period. Even though New Zealand's generation is heavily weighted to hydro generation, our thermal generation assets are required to meet day-to-day demand profile and therefore invariably set the marginal electricity price for much of the day. Unless there are changes to market design, the introduction of an EU ETS type scheme would result in similar windfall profit issues.

In the EU ETS, power intensive industries have called for modifications to the market price setting mechanism to ensure there is competition in the sector. This could be done through priority scheduling of renewable energy and disaggregation of the carbon component from the energy component. The aim of this unbundling would be to ensure that the cost of emissions is charged only in a manner proportionate to the production of electricity from sources with CO_2 emissions.

To achieve this unbundling, the energy cost would need to be broken out from regulated monopoly charges, and lines charges from the emission allowances. This mechanism requires an intermediary such as a Transmission System Operator to administer the system, and may be difficult to implement once emissions trading begins .

Changes to the electricity market to mitigate windfall profits to generators should therefore be made prior to ETS implementation in New Zealand.

How to reduce Volatility

Depending on the allocation methodology, the introduction of an emissions trading scheme in New Zealand that incorporates the electricity generation sector may increase power price volatility.

New Zealand's thermal generation load, and hence its CO_2 emissions, is highly dependent on hydro generation. All other things being equal, the application of ex-ante allocation as per the EU ETS would likely lead to a marked increase in pricing volatility between wet and dry years.

As an example:

If the allocation were as follows:

[31] Source Point Carbon – Carbon market Europe 30 June 2006

- Thermal generation sector receives an allocation based on the historical thermal electricity generation, taking an averaging approach and eliminating outliers.
- Allocations per installation are then set.

The impacts on electricity price would then be:

- In a dry year, thermal generation emissions will exceed the historical average levels, resulting in thermal generators being short of allowances. They will therefore have to purchase more allowances (creating upwards pressure on allowance prices) and (wherever possible) will pass this additional cost through to customers.
- In a wet year, thermal generation emissions will be below historical average levels, resulting in thermal generators being long in allowances. They can therefore sell the allowances (creating downwards pressure on allowance prices). They have the option of passing this income on to customers or retaining the trading earnings.
- The outcome of the above is an increased electricity pricing spread between wet and dry years.

However, with ex-post adjustment the variability of the weather causing significant shifts in thermal generation demand can be segregated out:

- At the end of a trading period the total thermal generation load is assessed and the allocations to each of the installations is adjusted, with the benefit of the hindsight of knowing the hydro conditions for that period.
- The end outcome is that thermal generators do not receive windfall gains from over allocation in wet years, while still securing an appropriate quantity of allowances when demand for thermal generation is high in dry years.

7.4 The EU ETS Lessons to be Learnt

Phase I of the EU ETS was always termed a "learning period". It is clear that after 18 months the learning is not yet over. A multitude of solutions are being proposed to address unforeseen outcomes / shortcomings of which only a few have been highlighted in this paper.

This is not to denigrate the EU ETS – it is merely a reflection of the complexity of emissions trading.

8 Conclusion

Emissions trading is certainly an option for New Zealand – it sets a price on greenhouse gas emissions and implemented correctly incentivises emissions reductions at least cost.

We should not however blindly follow precedents in the EU ETS design. Although these may be at first sight attractive through easing linking between international trading schemes and hastening implementation, we must take time to properly evaluate an emissions trading scheme that is matched to New Zealand circumstances.

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