

AN EXPENSIVE WAY TO COMBAT GLOBAL WARMING: REFORM NEEDED IN THE EU EMISSIONS TRADING REGIME

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1. Introduction

The commitment by the EU to take real action to combat global warming represents a major political achievement. This agreement to implement the Kyoto protocol has been made in the face of the limited support, or even opposition, of other major powers.¹ The Kyoto protocol involves a country by country commitment to limit emissions of greenhouse gases. The single most important policy instrument to bring this about is the scheme of emissions trading covering all EU members, which was agreed in December 2002 and is to commence in January next year.

The extensive economic evidence available indicates that the actual cost of the EU taking the lead in undertaking action to tackle global warming will, in fact, be small. Nonetheless, there remains the danger that any difficulties encountered in implementing the agreed policy could revitalise the “do nothing” lobby.

This article shows that there are serious defects in the way the EU plans to tackle the problem of global warming.² These defects will significantly raise the cost of meeting the objective of reducing emissions in the period 2005-2007. Rather than abandoning the

¹ It requires either Russia or the US to sign the protocol before it can come into force. No other combination of countries would have sufficient population to carry the weighted voting system required to make it legally binding. At present there is little prospect of either of these powers signing the protocol.

² Some of these defects have already been identified elsewhere, for example in an International Energy Agency publication, Reinaud (2003).

policy objective of reducing greenhouse gas emissions, this article argues that the EU should reform its key policy instrument, emissions trading, in time for the second commitment period of 2008-2012. It also argues for some significant changes in the Irish government's plans for implementing the policy domestically over the 2005-7 period. Reform would simultaneously ensure that the costs suffered by the European economy would be minimal³ and that the desired reduction in emissions would actually be achieved.

EU Ministers for the Environment, while showing admirable zeal in tackling the problem of global warming through the introduction of emissions trading, have shown scant regard for the economic and social effects of their chosen policy. Instead of designing the scheme in the interests of European taxpayers, they were unduly influenced by the strong lobbying of the large European firms that are major energy consumers. The economic "price" for getting political agreement was very high. While some of the large energy using firms face genuine difficulties that need to be addressed in any emissions trading scheme, the bulk of these firms will receive windfall gains as a direct result of the way the policy is being implemented. A consequence of this is that the trading scheme will impose a much greater economic and social cost on the EU than is necessary in order to achieve the crucial reduction in emissions of greenhouse gases. The situation will be aggravated in Ireland if some aspects of the government's proposed implementation scheme go ahead as announced.

What is required is a rethink of the current trading scheme by the governments of the EU in time for the 2008-2012 trading period. This rethink needs to pay attention to the Lisbon Agenda commitment to enhance, rather than damage, the competitiveness of the EU. It also needs to pay proper attention to the concerns of European consumers and it needs to make provision for those "fuel poor" who are likely to suffer most from the rise in energy prices that is a necessary consequence of the trading scheme.

This article first outlines the EU approach to reducing greenhouse gas emissions in line with the provisions of the Kyoto protocol. It then describes some key aspects of the Irish government's proposals for implementing the plan. The fundamental defects in the EU scheme are then analysed. While the Irish government is significantly constrained in how it implements the scheme, the current proposals need to be modified if the costs for the economy of implementation are to be minimised.

2. EU Emissions Trading Regime

Each EU member has agreed to limit its emissions of greenhouse gases for the period 2008-2012 relative to emissions in 1990 – an 8 per cent overall reduction for the EU with a 13 per cent increase for Ireland (because of its lower standard of living in 1990). A key instrument in achieving this reduction in emissions is the scheme of emissions permits, which will apply to a range of energy-intensive

³ As discussed later, a number of studies suggest that the individual economies might actually be better off as a result of a shifting of taxation from labour to energy.

sectors, such as electricity generation, cement, steel, and certain chemicals plants.

The government's proposals on how it intends to implement the regime in Ireland must be submitted to the EU Commission by 31 March, 2004. The EU Commission will then consider whether the draft plans submitted to them by all the EU members conform to the requirements of the directive on emissions trading and that they also conform to the EU laws covering the operation of the Single Market. The EU Commission will announce their decisions on the individual plans by the end of June 2004. From the beginning of next year the new emissions trading regime, as implemented by the agreed national plans, will enter into force in the EU, capping emissions of greenhouse gases.

The EU scheme of tradable emissions quotas or permits evolved over the last decade following on the rejection by governments of an EU Commission proposal of the early 1990s for a harmonised carbon/energy tax. While the European Parliament in 2002 wisely sought to have a significant portion of the quotas or permits allocated by auction, the agreement reached by the governments in late 2002 involves a requirement that at least 95 per cent of the quotas be allocated free to firms involved in trading. This procedure of free allocation is commonly referred to as "grandparenting". The requirement that the allocation be free rather than auctioned will seriously aggravate the cost to the Irish and other EU economies of implementing the scheme. This is because no revenue will be available to the governments of the EU to offset the negative competitiveness effects of the rise in energy prices that the trading regime entails. If the original EU Commission proposal for a tax had been followed, or if the bulk of the quotas were auctioned, the economic cost of reducing emissions could have been greatly reduced. The original EU Commission proposals (for a tax) and the EU Parliament's own preferred amendments to the scheme (to increase the amount auctioned) have shown greater wisdom than have the collective ministers for the environment of the EU who designed the policy that is actually being implemented today.

Each EU government is drawing up its own National Allocation Plan to allocate emissions quotas to all domestic firms in the relevant sectors for the period 2005-2007. Over the next three years a similar plan will be prepared for each member state for the period 2008-2012. Because the national plans for 2005-2007 are only being submitted to Brussels at the end of March 2004 this leaves little time to perfect them. Both the UK and the Irish draft plans have now been published, though draft plans are still awaited for a number of existing EU member states.

Under the new regime, firms in the sectors covered by emissions trading will have to ensure that they maintain their emissions within the required limits or potentially face heavy penalties. If emissions are less than required, firms can sell their spare quota or permits on the EU market; where quota is inadequate additional permits must be acquired on the EU market. All the permits allocated to firms will be freely tradable throughout

the EU. If firms find it difficult to reduce emissions they will have to buy permits if they do not have enough. However, where the cost of abatement is low the firms will be able to sell surplus permits, providing a strong incentive to make the necessary investment.

The emissions trading regime, if properly implemented, could serve to advance the EU's environmental objectives, while not imposing a significant cost on the bulk of EU producers and consumers. In principle, a trading scheme, or a carbon tax, by raising the cost of polluting, should persuade those who can reduce their emissions at least cost to do so, minimising the burden for the economy as a whole.⁴ In the case of a scheme of tradable permits, if the permits were auctioned then the governments of the EU would have the revenue to reduce distorting taxes elsewhere in the economy and to compensate the poorest losers. Such a regime would have minimised the costs to society. However, the EU scheme only covers certain sectors, heightening the administrative cost of implementing the scheme.⁵ The EU regulations oblige EU governments to give out at least 95 per cent of the permits for free to companies in key energy intensive sectors so that governments will receive no additional revenue to reduce other taxes or to compensate disadvantaged households who might carry a disproportionate share of the cost. By promising repeated rounds of free permits for polluting firms the EU scheme greatly reduces the incentive for the dirtiest firms to reduce emissions, raising the potential cost of achieving the necessary reduction in emissions for the economy as a whole.

For the 2005-2007 period the best that could have been hoped for was that the Irish National Allocation Plan, in implementing the trading scheme, would minimise the potential domestic economic cost. The overall methodology for allocating the permits or quotas has been developed in a special report prepared by consultants (ICF and Byrne O'Cleirigh, 2004).⁶ This methodology looks coherent and should generally provide a sound basis for decision making. However, in publishing the report the government announced a number of modifications to ICF/BOC methodology. Generally these modifications, if implemented, will serve to reduce the beneficial effect of the new regime on the environment and to increase the costs for the economy as a whole.

⁴ Technically, it would ensure that the marginal abatement cost is equal for all economic agents.

⁵ As discussed later, if the regime applied to all sectors of the economy then all energy related emissions could be checked by vetting energy importers or primary producers. As these are limited in number, and already subject to vetting by excise tax authorities, the additional costs of implementation and auditing would be small. Instead, the new regime applies to around 15,000 plants dispersed across the EU, each of which has to be separately audited.

⁶ The ESRI supplied the consultants with estimates of the potential macro-economic impact of the regime.

Table 1: Potential Value of Permits Allocated to Certain Sectors for 2005-2007

	€million
Cement	240
ESB	700
Electricity – Other	150
Total Value of Permits Allocated	1,350

The first modification by the government is to increase the overall allocation of permits to the trading sector from 22.148 million a year for three years to 22.5 million tonnes of carbon dioxide. Instead of giving the sectors covered by trading 97 per cent of what they need, the government is proposing to give them 98.6 per cent of their requirements. The higher allocation to the trading sectors means that the rest of the economy will have to work harder, at higher cost, to meet Ireland's obligations to reduce emissions, increasing the risk that Ireland may fail to meet its target on reducing emissions.

While the ICF/BOC study used an estimated price for permits of €10 a tonne of carbon dioxide we have used an estimated cost of €20 a tonne of carbon dioxide because we anticipate lower than expected liquidity, for reasons discussed later in this article. The actual allocations were given in the recently published Irish draft National Allocation Plan. As shown in Table 1, the potential value on the EU market (at €20 a tonne) of the permits allocated for the three years to the ESB is of the order of €700 million. For the other power producers it is €150 million and for the cement industry €240 million.⁷ At €20 a tonne the allocation of permits would amount to a transfer of wealth of €1,350 million spread over three years.⁸

The consultants also recommended that where a plant closes they should be allowed to sell their quota. However, the government instead proposes to introduce a "use it or lose it" provision, similar to that proposed by the UK government. While this might, on the face of it, seem fair, as discussed below, it greatly reduces the incentive for dirty plants to close, offsetting the potential beneficial environmental effects of the regime.

While the permits will be allocated for free, the nature of the competitive markets for electricity (and certain other key sectors covered by the scheme such as cement) means that in the long run the output price will rise by the full amount of the cost of the permits consumed in the production of electricity. This is acknowledged in the ICF/BOC consultants' report for Ireland and in the UK government's draft National Allocation Plan for the UK.

For example, each operator of an electricity plant in the EU faces the choice of producing electricity, paying for fuel and using up valuable permits, or else throttling back production and selling the permits saved on the EU market. In a liberalised competitive market, to make it worthwhile producing, the operator must at least

⁷ Obviously if the price of carbon dioxide assumed in the ICF/BOC report of €10 a tonne turned out to be correct the value of these permits would be half what is shown in Table 1.

⁸ As discussed later, for a minority of firms in sectors subject to competition from outside the EU this transfer will not benefit the shareholders but will serve to maintain the firms' international competitiveness.

get the price of the fuel used in generating electricity plus the value of the permit used up. Hence the output price must rise by enough to pay for the permit used in production (which could otherwise have been sold).

The result will be a major windfall gain for shareholders in the relevant companies – they will receive the permits for free and also get compensation for permits used up in production through higher prices for their output. The gain to shareholders will occur at the expense of the higher prices paid by consumers. Table 1 illustrates the possible magnitude of the gains.

One important area where governments can choose their own implementation strategy concerns how they treat new entrants. They can either hold back permits to allocate to new entrants or require new entrants to buy their permits on the open market. The ICF/BOC consultants recommended that no allocation be made to new entrants in Ireland. They put forward some good reasons for this. However, as the UK Plan will make provision for limited allocations for new entrants it would be problematic for the Irish authorities not to follow suit.

If allowances were available for free North of the border while none were available in the South this could result in all new electricity generation or any new cement plants on this island being located in the North (see Appendix 1). In addition, failure to treat new entrants on an equal footing with incumbents would seriously impair competition, possibly requiring intervention by the EU Commission. As a result, in the draft plan published recently, provision is made for free permits for new entrants in Ireland.

Given that such new entrants will also receive higher prices for their output, fully compensating for the cost of quota used in production, the free quota amounts to a very substantial subsidy to new capital investment. For a new combined cycle gas turbine (CCGT) electricity generator the subsidy over the period 2005-2012 could amount to at least 50 per cent of the capital cost of new plant (see Appendix 1). While providing an incentive for new less polluting plant to enter the market and compete against older dirtier plant, this provision will seriously disadvantage investors in renewable electricity relative to new fossil fuel generators. While the rise in the price of electricity will provide an additional incentive for renewables, they will not receive any capital subsidy in the form of a free allocation of quota. This may require further support mechanisms to offset this distortion.⁹

Finally, the government, instead of auctioning the maximum permitted amount of permits – 5 per cent of the total – propose reserving an even smaller amount for a potential auction. As discussed below, the EU requirement that at least 95 per cent of permits are to be allocated for free has very serious economic consequences. As a result, it is disappointing to see the Irish government taking a minimalist approach on auctioning.

⁹ The optimal way to treat renewables would probably be to rely on emissions trading with the auctioning of all the permits. This would level the playing field for the cost of capital. Renewables would then benefit from the higher electricity price without having to compete against subsidised fossil fuel generation.

The trading regime only covers a few sectors that are heavy energy users. If the competitiveness effects of achieving the required reduction in emissions are to be minimised and the social costs addressed, it is essential that a carbon tax be introduced simultaneous with the introduction of emissions trading from the beginning of next year. The need to introduce a carbon tax is independent of what other countries do. A carbon tax represents the least cost method of reducing carbon emissions in those sectors not included in the trading scheme (Bergin *et al.*, 2004). In the long run the tax rate should approximate the cost of carbon permits under the trading scheme. This would ensure that the burden of adjustment is carried equally by all sectors of the economy in a manner that will minimise the economic costs.

The tax should only apply to sectors that are not covered by emissions trading. It should also not apply to electricity. This is because the price of electricity will, as outlined above, already reflect the cost of carbon dioxide emissions. To apply a tax on top of this would mean that electricity users would end up carrying a disproportionate share of the cost of compliance, raising the overall cost to the economy.

Problems may arise in the interface between the two policy instruments: taxation and emissions trading. There may be firms that were not large enough to qualify for the permit trading, entitling them to free permits. When subject to a tax they would then be disadvantaged if there were any competitors who were in the trading scheme. Probably the best way of dealing with this would be to allow the small number of firms likely to be involved to opt into the trading scheme.

4. Defects in EU Scheme

The EU emissions trading scheme is the product of a very long process of lobbying and debate. While the initial proposals of the EU Commission had a coherent economic basis, the scheme, as now implemented in law, will impose significantly higher economic costs on the EU economy than are necessary to meet the environmental objectives it sets out to address. It will also adversely affect competition in the sectors affected. The EU scheme will also involve substantial transfers of resources from the bulk of companies and citizens in the EU to the shareholders in many of the 15,000 plants covered by the scheme. In the case of the UK and Ireland the costs are likely to fall disproportionately on poor households because they spend a much higher than average proportion of their income on energy (Scott, 2004 and Smith, 1992).

The key problems with the EU scheme are: the decision to give the permits for free to the relevant companies (referred to as “grandparenting” them) rather than to auction them; the decision to have multiple rounds of grandparenting – 90 per cent of permits will be given for free in the second period 2008-2012; the failure to ensure sufficient harmonisation of the scheme across different countries to minimise the negative effects on the single market; finally, the choice of a scheme of tradable permits with application

to a limited number of sectors, rather than a scheme applicable to all sectors (or else a carbon tax applying to all sectors), involves a significantly greater regulatory burden.

Economic theory suggests that a once-off allocation of quota, while having undesirable distributional effects, will still provide appropriate incentives to firms to reallocate resources efficiently to meet the environmental objective. Having received the allocation firms could then choose either to use the quota themselves and to continue in production, or else to close and sell off the quota. This would provide an incentive for the environmentally less efficient firms to close, helping achieve the reduction in emissions at least cost.

However, the scheme as implemented by the EU moves away from this ideal by providing for at least a second round of allocations, where the allocations may be based on historic emissions.¹⁰ This means that existing “dirty” firms that stay in business will receive another “free gift” from government in the form of permits for the period 2008-2012 (See Appendix 1). The current proposals of both the UK and the Irish governments, by including a “use it or lose it” provision, where firms would forego the free allowances if they shut, further incentivises dirty firms to remain in business, at least to the end of the relevant trading period.

The prospect of a second round of allocations, with reduced incentive for “dirty” firms to close, will initially result in a lower than planned reduction in emissions in the key sectors. The very plants that are expected to close throughout the EU will only receive windfall gains in the form of free allowances in the future if they remain open. As the forecasts for reductions in emissions for the EU rely on such “dirty” firms closing, their failure to close will make the reduction in emissions more difficult, increasing the price of emissions permits throughout the EU. The result could be much higher prices for permits on the EU market, with consequential higher prices for consumers, including higher prices for energy for firms not covered by the trading scheme. The value of the windfall gain to shareholders in the firms engaged in trading could also be enhanced by this higher price.

A second very serious cost arising from the failure to auction the quotas or permits is that the loss of potential revenue from an auction means that EU governments, will not have the resources to cut other taxes. As a result, the distortions arising from the imposition of the regime will not be offset by a reduction in distortions elsewhere in the economy. Economic theory (Goulder, Parry, Williams and Burtraw, 1999) and a series of empirical studies for the US (by the Congressional Budget Office, 2000), for Ireland (Bergin, Fitz Gerald and Kearney, 2004) and for Belgium (Bossier *et al.*, 2000) show that this is likely to be an important additional cost, aggravating the negative effect on the competitiveness of the EU economy in general, and of the Irish economy in particular. Bergin, Fitz Gerald and Kearney (2004), estimate that the additional cost of

¹⁰ While it is open to governments to choose some other basis for allocation (e.g. projected emissions or benchmarking) the UK and Irish governments have generally used past emissions.

“grandparenting” compared to auctioning the permits, if applied to the economy as a whole, would amount to between 0.3 per cent of GNP and 0.5 per cent of GNP in the medium term.¹¹ While the current scheme applies only to the most energy intensive sectors, it is clear that it will have a significant negative effect on GNP.

While auctioning of quotas or permits would have dealt with many of these problems there are a number of sectors covered by the scheme where special provision is likely to be necessary. These are the sectors which are very energy intensive and which also face serious direct competition from outside the EU – for example, steel and alumina production. If these sectors had to pay for their permits in an auction many of them could relocate outside the EU, resulting in no net reduction in worldwide emissions and significant losses to the EU economy. However, the special needs of these sectors have been allowed to drive policy within the EU. Other more targeted instruments could be used to achieve the required effect without the serious costs entailed in the current EU scheme.

In addition to the problems outlined above, implementation of the trading scheme will involve substantial compliance and verification costs. As the proposed allocation plan for the UK recognises, this could be good for the City of London, which would help operate the EU market in permits. However, the benefits for the financial sector and the City of London will simply reflect a significant transactions cost burden that will ultimately be paid by the consumers of Europe as a result of the costs in actually operating the market. The verification of the scheme will also involve a firm by firm audit to ensure compliance, further adding to costs. Compared to an across the board carbon tax, or an emission scheme imposed on producers or importers of primary energy (“upstream”), the costs of compliance of the current scheme applied at the level of individual firms will be significant. This is because of the need to verify each plant’s behaviour. For this reason the Consultation Group on Greenhouse Gas Emissions Trading, set up by the Department of the Environment, recommended in 1999 against operating a trading scheme at the level of such “downstream” firms, preferring an “upstream” scheme involving very few firms that currently pay excise tax on most of their imports and which would have made use of the existing excise tax administration.

Finally, as discussed in McCarthy (2003), good policy should be designed to minimise the incentive for corruption. The current scheme of emissions trading involves granting huge gains to individuals or companies through the allocation of emissions quotas and, therefore, has certain dangers. The Irish and UK governments, by adopting a consistent methodology in their plans, applied rigorously across all sectors, guard against this danger. By ruling out exceptional treatment for any individual plant, the process can be kept transparent, ruling out such dangers. However, if a similar approach is not adopted in all other countries, this could leave open

¹¹ By contrast, the analysis suggests that if the revenue from an auction were recycled through cutting social insurance contributions there would even be a small positive effect on GNP.

the possibility of corruption. If, instead, permits were auctioned, the process would become completely transparent.

5. Conclusions

It is inevitable that any policy aimed at curbing emissions of greenhouse gases will have some direct cost and that consumers will see a rise in prices, encouraging fuel switching and promoting greater energy efficiency. Without such an incentive to reduce emissions the scheme would be pointless. However, as Bergin, Fitz Gerald and Kearney (2004), show, if the potential revenue from auctioning permits were available to the state to reduce other taxes, the overall effect on the economy could actually be beneficial. The EU scheme, as currently implemented, will result in the costs faced by consumers being much higher than necessary. What is now required is a National Allocation Plan that does minimum damage for the period 2005-2007 and a major redesign of the EU scheme for the period 2008-2012 by the EU governments and the EU Commission.

The final Irish allocation plan should probably make some provision for new entrants so as not to cause distortions *vis à vis* the UK. This has been included in the government's initial proposals. There should be a commitment from the beginning to auctioning the maximum allowable proportion of the permits – 5 per cent. This is not part of the government's current proposals. There should be no “use it or lose it” provision, even though owners of dirty plant will receive a bigger windfall gain in the short term. The benefit to society from omitting such a provision will come from the capping of transfers to these dirty plants and from lower emissions and a lower price for carbon dioxide in the longer term.

For the period 2008-2012 the badly designed EU trading scheme needs to be replaced, by the auctioning of all the quotas.¹² The only exceptions should be for plant in sectors that are carbon intensive AND which face real competition from outside the EU.¹³ Such a reform would ensure the necessary reduction in EU emissions and it would limit (or even eliminate) the losses to the EU economy from the ill-conceived policy currently being implemented. Now that the true economic costs of the botched EU scheme are becoming apparent, the Irish government should press the EU Commission to begin the process of reviewing the current emissions trading regime at an early date. The rules need to be changed to require auctioning of the vast bulk of permits for the second allocation period of 2008-2012. An early change in the rules for the second period would greatly enhance the environmental and economic benefits of the 2005-2007 regime. Inefficient firms would no longer hold on for future rounds of emissions but would close when their costs rise above those of cleaner plant.

The windfall gains which will accrue to a small number of firms, which do not face major competition from outside the EU,

¹² An alternative would be a common rate of carbon tax across the EU, which would minimise the transactions and compliance costs.

¹³ Such firms could also be compensated in other ways than by an allocation of free permits.

are inevitable. In the case of electricity the appropriate response in Ireland will be for the government to require the ESB to pay an additional dividend to the state equal to the market value of the allowances granted for free. This dividend would amount to over half of the value of all the allowances being allocated. The government could then use this revenue to reduce taxes or social insurance contributions and to compensate the losers on low incomes. If the price of the permits were €20 a tonne of carbon dioxide, the dividend to the government would amount to a total of around €700 million over the three years 2005-2007. This would help fund reductions in taxation elsewhere, improving competitiveness, and it would also provide funding to compensate the most disadvantaged who are adversely affected by the climate change strategy.

Such an approach to the treatment of the windfall gains would be more beneficial for the competitiveness of the economy than if the regulator attempts to recoup some of the windfall gain and uses them to artificially hold electricity prices down. Such a regulatory approach would only serve to reduce the desirable environmental effects of the scheme. It would also send the wrong signals to investors in the electricity sector, suggesting an arbitrary approach to the regulation of that sector. This could be damaging in terms of encouraging future investment.

If the price of electricity does not rise to reflect the cost of carbon used in generating it, then electricity consumers will be given the wrong price signal and they will not make an effort to reduce demand. As a result, more of the burden of adjustment would have to be carried by the carbon tax. This could result in three different prices for carbon in the economy: the price facing those involved in emissions trading; a reduced rate applying to consumers of electricity; and, to ensure compliance with the Kyoto protocol, the necessity of an even higher rate of carbon tax applying to fuels (excluding electricity) for all those outside the emissions trading scheme.

In the case of private sector operators in the sectors that will receive a windfall gain (e.g. electricity and cement), there is little that can be done under present EU rules. A windfall profits tax could bring its own distortions and would not be desirable. However, for the 2008-2012 period it will be important to press the EU to require all permits to be auctioned, capturing the benefit of the value of the permits for the taxpayers of the EU.

If the costs to the economy are to be minimised it is important that a carbon tax be introduced covering all the rest of the economy not covered by the emissions trading scheme. If such a tax were not introduced, either Ireland would fail to meet its binding targets on reducing emissions, or else an excessive burden would be placed on those sectors covered by the trading scheme. While the tax may be phased in gradually from the beginning of next year, the aim should be that in the long run it roughly equal the price of permits traded on the EU market. This would ensure that the burden was shared equally across the economy and that those who can reduce emissions at least cost are incentivised to do so.

The bulk of the revenue from the tax should be used to reduce other taxes and to compensate losers on low incomes.¹⁴ The government have announced that if special allowances under the so called “Clean Development Mechanism” (CDM) or “Joint Implementation” (JI) schemes¹⁵ can be bought at a price below that of permits and below the rate of carbon tax, then it could be beneficial to acquire a limited number of such allowances to ensure Ireland’s compliance with EU obligations on emissions reduction. However, it seems very unlikely that this will be an important source of permits in the initial period to 2007. It is only from 2008 to 2012 that it is likely to be significant and hopefully by then the EU scheme will have undergone a major reform. In addition, it would be more appropriate for the private sector to undertake the purchase of these allowances, rather than the government raising taxes and using that revenue to acquire the allowances themselves.

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¹⁴ Because the state will have foregone most of the revenue by not auctioning the permits, a larger share of the tax revenue will be needed to compensate poor losers, leaving less resources to reduce other taxes in order to moderate the negative competitiveness effects.

¹⁵ These schemes involve funding projects in developing countries or countries like Russia which will significantly reduce carbon emissions. However, before such savings can be counted an elaborate audit has to be done. Undertaking such an audit in developing countries will be an onerous task.

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Appendix 1

Impact of Emissions Trading on Investment in Electricity

NEW INVESTMENT

This example considers the effects of different domestic allocation policies on new plants in two neighbouring jurisdictions. Here we term the two jurisdictions “North” and “South”. However, it could equally apply to the island of Ireland, to the case of Denmark and Germany or to France and Spain. Because the current proposed plans of the UK and Irish governments appear to be rather similar, the potential problem identified in this example may not apply to the case of the island of Ireland market. However, as shown here, quite small differences in allocation policy can significantly alter the relative cost of capital.¹⁶

At the margin, electricity generators North and South are likely to charge on a marginal cost basis. This will mean that the price of electricity will rise to include the cost of the permit used to generate the electricity as well as the cost of the fuel. This is likely to happen whether or not the generators receive the permits for free. Because firms can reduce their output and sell the permits saved, each permit used in production is one unit less to be sold on the EU market representing a loss of potential revenue to the owners of the generating station.¹⁷ With an EU market in permits, the price would be the same North and South and there should be no distortion of marginal decisions by plants already located in the two jurisdictions.

However, the situation is different for new plant. If the National Allocation Plan is to be consistent with competition policy, then new entrants must be treated in a consistent way with existing plant. Any difference in allocation between the two jurisdictions, North and South would constitute a *de facto* subsidy to capital in the jurisdiction with the more generous allocation.

Here an example is worked out to assess the likely magnitude of this subsidy. The assumptions and calculations are described in the attached Table A1. In this case it is assumed that the allocation in the South is equal to 80 per cent of the permits required to operate, whereas in the North the allocation is equal to likely needs. The example is worked out on the basis that the cost of a permit is equivalent to €20 per tonne of carbon dioxide. (The ICF/BOC study assumed a price of €10 a tonne.) It is also assumed that the allocation process is the same for the two periods 2005-2007 and 2008-2012. No allowance is made for the possibility that such a regime would continue beyond 2012 or that it might be reformed at an earlier date, as suggested in this article. Also, in calculating the subsidy for each year, the annual values of the allowances are not discounted to produce a net present value.

¹⁶ In this example changes in technology are excluded.

¹⁷ They cannot close and sell all of the permits. The difference between closure and a major reduction in production is not clearly defined.

Table A1: Assumptions for a New Gas Fired CCGT

	Units	South	North	Difference
Capacity	MW	400	400	
Capital Cost	€m	260.9	260.9	
Carbon Dioxide, tonnes		1,127,994	1,127,994	
Carbon Dioxide, Cost per tonne €		20	20	
Permits allocated, as per cent of requirements		80	100	20
No. of years – for which permits allocated		8	8	
Total Subsidy, €M		144	180	36
Subsidy as per cent of Capital cost		55.3	69.2	13.9

As shown in Table A1, the undiscounted value of the permits for the eight years would amount to just over 55 per cent of the capital cost of the plant in the South and just over 69 per cent of the capital cost of the same plant located in the North. The difference in the subsidy between the two jurisdictions would be almost 14 per cent of the assumed capital cost of around €260 million. This would constitute quite a strong incentive to locate North of the Border.

EXISTING PLANT

In this second example we consider an existing coal fired plant in the UK (or elsewhere in the EU)¹⁸ and compare it to a gas fired combined cycle gas turbine (CCGT) plant. This example is intended to show how the defects identified in the EU trading scheme pose difficulties for the EU as a whole, not just for Ireland or the UK, through giving the wrong signals to plants with high levels of emissions.

Coal plants with similar characteristics to those shown in Table A2 are operating today under a regime where there is no cost attached to carbon emissions. However, with a carbon price of €20 a tonne, as discussed below, such stations would inevitably close if they had to buy permits.

Table A2: Economics of Existing Electricity Generating Stations, €

		Coal		Gas CCGT	
Thermal efficiency	Per cent	37	37	55	55
Carbon Price	Per tonne of CO2	0	20	0	20
Fuel Cost	Per MWh	14.59	14.59	19.60	19.60
Variable operating and maintenance	Per MWh	3.33	3.33	1.50	1.50
Cost of emissions	Per MWh	0.00	18.40	0.00	7.31
Short Run Marginal Cost	Per MWh	17.92	36.32	21.10	28.41
Market Price	Per MWh	21.10	28.41	21.10	28.41
Profit (Loss)	Per MWh	3.18	-7.91	0.00	0.00

¹⁸ The numbers and issues involved would be rather different for the Irish coal fired plant at Moneypoint.

In Table A2 the economics of two stylised electricity generating plants are compared. The numbers used in these examples are based on a recent IEA report (Reinaud, 2003) which uses appropriate data for 2003 for calibration purposes. The plants are assumed to be already in production so no capital cost is included in the calculations.¹⁹

In the examples it is assumed that the price on the electricity market is set by the gas fired plant. With no cost for carbon emissions, the short-run marginal cost for the gas plant of €21.10 per MWh would set the market price for electricity. Under these circumstances the coal plant, with a production cost of €17.92 per MWh, would make a significant profit – around €3.2 per MWh. However, at a carbon price of €20 per tonne of CO₂ it would make a loss of around €7.9 per MWh and it would go out of business if it had to buy all of its permits. The result would be a reduction in emissions as the output of the dirty coal plant would be replaced by a cleaner plant.

However, with the “use it or lose it” provision, proposed by the Irish and UK governments, the coal plant would continue to produce electricity so long as it had free permits. If it closed it could not sell unused permits on the market but would have to surrender them to the Irish or UK governments.²⁰ The free permits, which could not be sold on, would have a zero opportunity cost for the firm so that it would still be economic to produce electricity up to the point where all the permits were used.

With a second round of allocations of permits to come for the period 2008-2012 the situation changes dramatically. If the new round of allocations were also going to be based on historical emissions it would very likely pay the existing coal plant to stay in business, if necessary buying emissions to raise the historical output base on which the new emissions permits for 2008-2012 would be based. As it is expected that the cost penalty for emissions will rise over time, these permits for the second period are likely to be even more valuable than permits for the period 2005-2007.

A number of simplifying assumptions are made to estimate the economics for the coal plant of maintaining output by buying permits for the 2005-2007 period:

- It is assumed that the price of emitting carbon does not rise between the two periods (a conservative assumption).
- It is assumed that the coal plant is allocated 80 per cent of its needs for 2005-2007 and that it would be awarded permits for 2008-2012 amounting to 80 per cent of its production in the 2005-2007 period.

Under these circumstances, by continuing full production in the current period, losing €7.9 per MWh of marginal production, it would earn the right to additional permits for the 2008-2012 period

¹⁹ From an economic point of view capital costs are sunk costs because the plants are already built and they would have no resale value for use in another location.

²⁰ While it can not close and hold on to its permits, it could undertake a limited reduction in output. However, because operating costs are not very flexible, using coal plant for short periods is likely to be uneconomic.

equal to 80 per cent of the requirements of this additional loss making production. As these permits would be worth around €18.4 each (Table A2) and would be available for 5 years it would pay the firm to continue in full production in spite of the short-run losses. The cost of three years production, including buying permits to allow it to produce in full, would be €23.7 per MWh.²¹ This would earn new permits for the period 2008-2012 equal to 80 per cent of the requirements of marginal production in the 2005-2007 period – permits for 4 of the 5 years. These permits would be valued at €18.4 per year for the equivalent of 4 years (80 per cent of five years) – total value of €74 per MWh. This would be more than three times the loss made in the 2005-2007 period necessary to earn the additional permits for 2008-2012.

This stylised example illustrates how the probability of a second round of free permits will prevent most existing “dirty” plant from closing. If a rational scheme were introduced where all permits were auctioned, then the dirtier coal plants would begin to close in Europe at around €20 a tonne of carbon dioxide (Reinaud, 2003).²² However, under the current EU scheme there seems little prospect of this happening. This means that the forecasts of the EU and of individual governments, including the UK government, for closure of plant with high emissions will not be easily realised. Hence, given that emissions are capped by the trading scheme, there is a prospect that the price of emissions permits will rise much higher than anticipated on the EU market, with serious consequences for the EU economy.

²¹ To simplify matters we have not applied any discount to the results. Given the magnitudes involved it would make no difference to the conclusions.

²² The analysis in Bergin, Fitz Gerald and Kearney (2004) indicates that it would still be efficient to keep the Irish Moneypoint coal station open at a price of €20 per tonne of carbon dioxide.