

24<sup>th</sup> February 2010

Professor Frances Ruane,  
The Economic and Social Research Institute,  
Whitaker Square,  
Sir John Rogerson's Quay,  
Dublin 2,  
Ireland

Dear Professor Ruane

It may have come to your attention that we (Eunomia) issued a Press Release on February 3<sup>rd</sup> and that within that Press Release, we stated that we would write to you regarding a report which was written by your colleagues. This is an unusual step for us. We have our detractors, and we have healthy arguments with many organisations. However, in this particular case, the errors were, in our view, such as to warrant our issuing the release we mentioned.

We note that your colleagues have insisted that although they will correct errors, they have also suggested, according to the media, that correcting these errors will not alter their conclusions. We suggest that such a decision might be premature. Unless it is known what the mistakes are, and the combined effects of these, how could they presume to know that their conclusions would be unaffected?

Consequently, what we have done here is as follows:

1. We set out the key conclusions which the report draws. We concentrate upon the comments on the international review, though we note in passing that the waste generation projections are extraordinarily unlikely to be as ESRI has predicted;
2. We then respond to these, identifying some of the errors made and the internal contradictions within the report itself, but also highlighting how our work might be affected by some of the comments made; and
3. We then suggest why it is not possible to sustain the conclusions drawn in the initial report once the mistakes are acknowledged.

We are no strangers to controversy in this area. However, we have rarely, if ever, found our work criticised by such an error strewn report. This was made the more surprising by the self-confident language with which the flawed criticism was made.

We note, in passing, that we are largely in agreement with the principles set out in Section 6 of the report. We also note, in passing, that we have by no means highlighted all errors in the report. This is not a 'full' review of the ESRI report.

I apologise for what may seem like tardiness in my response. However, I have been pre-occupied with various assignments and could not have completed this sooner. For the avoidance of doubt, no one has supported this response financially (or in any other way).

Please let me know if there are any matters which are unclear. We look forward to seeing the revised report.

Yours sincerely

Dr Dominic Hogg

## Response to ESRI report from Eunomia

In what follows, we refer to the report prepared by ESRI as ‘the ESRI report’. We refer to our own review for DoEHLG as ‘the international review’.

### Key Observations Regarding the International Review

In summing up its criticism of the review, the ESRI report notes that:

*In sum, despite while the international review sets forth some sensible general principles for guiding policy and makes some welcome recommendations with respect to household waste collection, producer responsibility and refundable compliance bonds for C&D, the international review must be considered a failure in respect of its proposals for setting residual waste levies, per capita targets for reduction in residual waste and guidance in the appropriate mix of waste technologies.*

The underlined extracts highlight the three key areas which we concentrate upon in the first instance below. More broadly, ESRI’s conclusions regarding the international review amount to the following:

1. That the basis for the levy on residual waste is not clear from the underlying research;
2. That the levy rates proposed are flawed because they include externalities which are already internalised and because no account is taken of disamenity;
3. That the review did not pronounce on the mix of technologies required;
4. That the targets for residual waste are not credible, apparently because of the timescale allowed;
5. That the review does not ensure that Ireland meets its Landfill Directive targets; and
6. That the review does not provide a roadmap.

### THAT THE BASIS FOR THE LEVY ON RESIDUAL WASTE IS NOT CLEAR FROM THE UNDERLYING RESEARCH

The ESRI report states:

*A central recommendation is setting of the residual waste levy for landfill, incineration and MBT, in terms of € per tonne. Here the international review fails completely to explain how its proposed levy structure was derived from the underlying research. Furthermore, an explanation is not at all obvious from that underlying research.*

Perhaps one of the more amusing mistakes which the ESRI report makes is that it assumed that the chemical symbol for arsenic, ‘As’, was actually to be read as the word ‘as’. This is all the more laughable since the symbol As appears in a table along with other chemical symbols, such as NH<sub>3</sub>, Pb, Ni, Hg etc. in the Main Report and in other tables.

The ESRI report does not even countenance the possibility that ‘As’ might be a chemical symbol standing for arsenic, even though its own review of air quality highlights arsenic as a pollutant of potential concern. The fact

that the authors are so unfamiliar with fairly basic chemical symbols is somewhat disconcerting. To our knowledge, no one else has found this so perplexing or taxing a concept.

It is difficult not to smile when reading the following:

*However, in the case of incineration there is some ambiguity as to what exactly is being proposed by the international review. It appears at first glance that various non-GHG emissions are to be taxed separately, with for example NH<sub>3</sub> priced at €9.15 per kg and so on. However, at the bottom of the list is written 'As €99.00', which could be interpreted as the summation of these non-GHG taxes on incineration. However, as we shall see below, it would appear this should be €9.99, so that the levy for incineration is €35.90 per tonne (i.e., €26.00 + €9.90). The reason for the uncertainty is that no attempt is made either in the summary report or in the relevant annex to set out the derivation and reasoning behind the levy structure recommended by Eunomia.*

Despite the assertion that the derivation or reasoning is not clear, what seems very clear from Table 63-1 in Annex 63 is that 'As' is an 'Emission'. Again, the list of omissions from the analysis includes (Section 63.1.2) 'air emissions other than the following', with As at the bottom of that list.

Furthermore, the ESRI report goes on to state that:

*The international review's proposed residual waste levy structure is set out in Box 8.4. Although the previous discussion raised considerable doubts about methodology used to estimate the externalities that are the basis for the residual waste levy, it may nevertheless be the case that the international review's decision rule for selecting the schedule of residual waste levies could be applied to externalities appropriately measured. However, what is striking about the international review is that there is no justification or decision rule for the recommended tariff schedule of residual waste levies. This applies both to the international review's summary report (Eunomia et al., 2009, p. 47) and the discussion of externalities in the supporting material (Eunomia et al., 2009, Annex 63). This is an extraordinary omission, given the importance of the residual waste levy to waste management policy.*

The ESRI report seems to have looked in the wrong place. The main discussion about the design of the levy is in Annex 56, notably 56.2.1. which is the Section entitled 'A Waste Levy'. This sits within a group of Annexes entitled 'Policies for Residual Waste', and specifically within this section Annex 56, which is entitled 'Proposed Policy Changes'. The Summary Report could only be that – a summary – and given the enormous amount of material in the Annexes, and the breadth of material the Summary Report needed to cover, we could not fully describe the justification for each policy in the Summary Report. The Summary Report does, however, mention the Annex in referring to the levies:

*Although, by that time, it might be expected that additional capacity for residual waste treatment may be available, on both cost (see Annex 64) and environmental grounds (see **Error! Reference source not found.** and **Error! Reference source not found.**, also Annex 63), and particularly if a revised landfill levy internalises externalities as proposed below (see Annex 56), then it would seem right to seek to increase efforts to achieve the 2013 targets through stepping up efforts in respect of source separation of dry recyclables, and putrescible / organic wastes where these wastes are treated through anaerobic digestion.*

Whilst we feel it might be reasonable to argue that we might not have made the link from the externality assessment to the levy structure 100% clear (perhaps we did not signpost Annex 56 sufficiently), ESRI itself makes some mistakes which we do not think we can be held responsible for. The first relates to the assumption that the levy on arsenic related externalities is not a levy on arsenic related externalities at all. Hence, the ESRI report states:

*It is not clear why in the case of incineration Table 6-2 includes a whole series of non-GHG pollutant related taxes which seem to add up to €9.90*

This statement is based – as highlighted above – on the misinterpretation of the arsenic based externalities. In Annex 56, it is quite clear that the levy has been designed with the explicit intent of enabling operators to choose the level of abatement under the externality-based levy on non-greenhouse gas air emissions:

*The analysis above highlights the fact that the externalities from incineration are significantly affected by the performance in terms of the air emissions other than greenhouse gases. The difference is €6 per tonne where low unit damage costs are used in the analysis, or €21 per tonne where high unit damage costs are used. The magnitude of this difference is sufficient to warrant consideration as to how the levy could be designed to incentivise a reduction in these externalities.*

*The design of the Norwegian incinerator tax provides a useful pointer (see **Error! Reference source not found.**). There, the tax focuses on emissions of each pollutant. These have to be monitored anyway by the facility. Hence, it ought to be possible to tax the source of the externality, the first best solution in this case. We propose, therefore, that the incineration levy might be adapted in its structure. A more efficient levy would be:*

- *a per tonne levy for waste treatment, reflecting the climate change damages from carbon dioxide releases (there is rather limited potential to abate these emissions); and*
- *a levy based upon emissions of key pollutants.*

*Structured in this way, the levy affords the operators to abate emissions to an efficient level.*

It is worth contrasting this with what ESRI has proposed. The ESRI report takes the view that a license internalizes all the externalities from various facilities (a point which we return to below). Their view is that the externalities from licensed facilities can be ignored on the basis that:

*IPPC licenses issued by the EPA to incinerators, power generation plants, cement works, aluminium smelters and so on are designed to ensure that the operation of these facilities will not cause environmental pollution.*

No one believes this. Indeed, the review of studies within the ESRI report which are used to derive estimates of the externalities of air emissions are themselves based upon modeling of the effects of air pollution from facilities operated under licenses.

ESRI seems to be flatly contradicting its own 'economic approach' to waste management. The ESRI approach amounts to saying that regulation alone is fine (at least for anything other than a landfill – see below). The International Review, on the other hand, proposes a levy which ought to give rise to efficient levels of abatement (subject to minimum standards laid down in the Incineration Directive being met) and internalizes

the externality (the two – efficient levels of abatement at a given plant, and internalising externalities - are not the same thing, as ESRI seems to believe). In short, the proposal from the review constitutes an improvement, in terms of economic efficiency, relative to what is proposed by ESRI.

The fact that the authors do not read Annex 56 appears to have led them to overlook another important aspect of the levy's design:

*As regards the MBT processes, the impacts are affected by the type of treatment and the fate of the materials. Some of the externalities are associated with the pre-treatment step, others are associated with the management of residues. It may make sense to structure the levy as follows:*

- *A per tonne levy on the process itself;*
- *A per tonne levy for landfilling of waste at conventional landfills; and*
- *A lower levy rate for landfilling of waste at landfills designed so as to minimise the unoxidised methane escaping from the landfill (through use of, for example, passive oxidation layers). The specification of this type of landfill cell would need to take place under the auspices of the EPA, but it would allow for additional environmental benefits to be gained from the overall treatment process.<sup>1</sup>*

*As will become clear below, we expect that the latter landfill type would become more common over time.*

This leads the authors to conclude:

*It appears that the international review has selected the lowest priced total externality option for each of landfill, incineration and MBT (Table 8-2, in bold). It is not clear on what basis the lowest priced option was selected. If the option selected is the actual choice made by providers of landfill, incineration and MBT, then this might be an appropriate way of structuring the levy. However, there is nothing to indicate whether or not this is the case. The recommended levies in Table 6-2 are to be phased in over the period 2010 to 2012, although the rate of increase differs across each of the three residual waste treatment methods for no apparent reason.*

The arsenic issue is what leads ESRI to conclude that the levy has chosen a low value for incineration. In fact, there is no specific levy for incineration as this will be determined in part by what is efficient for the operator. The operator is left to determine the level of abatement, and hence the magnitude of the levy applied on non-GHG air pollutants.

The fact that the levy structure includes levies for 'landfilling of stabilized biowaste, standard landfill' and "landfilling of stabilized biowaste, standard landfill' would – for anyone who really understood the subject

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<sup>1</sup> When stabilised waste is landfilled, then to the extent that it is properly stabilised in line with an appropriate threshold value, the aim is not so much to capture gas for energy generation. Rather, the objective is to deal with the much reduced fluxes of methane in such a way that they are not emitted to the atmosphere as methane, and passive oxidation at the landfill surface offers the potential to achieve this as long as the methane fluxes through the surface are sufficiently low (allowing oxidation through the surface).

matter – lead them to conclude that, in conjunction with the above from Annex 53, that the levy on a complete MBT treatment (i.e. the treatment of a tonne of waste sent to an MBT facility) would include

1. a levy on the pre-treatment process itself; and
2. levies on waste landfilled depending upon the stability of the waste and the receiving landfill; and
3. levies on any material subsequently sent for incineration; and
4. A levy on waste sent to cement kilns (set at zero, though see below for further comment).

Again, this seeks to reflect the externality estimates and is a pragmatic application of the levy designed to reward environmentally superior treatment options.

For the landfill, it is fair to say that the review could have made clearer the rationale for the choice of the landfill with 50% gas capture as the basis for the levy. The fact that the 50% capture case is the central assumption is, however, made clear in Section 63.2.1.2:

*We have assumed a landfill gas capture of 50% as our central assumption. Results obtained assuming 20% of the landfill gas is captured are also presented for sensitivity analysis.*

Ideally, of course, the levy would reflect the level of gas capture achieved. In practice, however, this is not possible since the measurement of uncaptured (fugitive) methane is extraordinarily difficult. We took the view that 20% gas capture was likely to be lower than will be achieved at landfill sites in future. It is at the lower end of values which we have reviewed.

### **Summary – Point 1**

In short, whilst there might be some substance to the view that ‘the basis for the levy on residual waste is not clear from the underlying research’. It could be argued that we should take some responsibility for not making the link from externalities to the levy structure 100% clear. However, we think that a large part of the responsibility lies with ESRI, and their misinterpretation of aspects of the levy, possibly not assisted by the fact that they appear not to have read relevant sections of the whole report. The problems of understanding appear to lie in the following:

1. ESRI did not appreciate that ‘As’ is the chemical symbol for arsenic (it was interpreted, for reasons which we find difficult to explain, as the word ‘as’, supposedly indicating the sum of the externalities associated with other air pollutants);
2. ESRI did not appreciate that Annex 63 provided the analysis of externalities, but Annex 56 was the main area where the levy structure was discussed. The main discussion about the design of the levy is in Annex 56, notably 56.2.1. which is the Section entitled ‘A Waste Levy’. This sits within a group of Annexes entitled ‘Policies for Residual Waste’, and specifically within this section Annex 56, which is entitled ‘Proposed Policy Changes’. Although the Summary report referred to this, arguably, it might have made this clearer; and
3. ESRI did not appreciate that levies for the treatment for a tonne of waste via MBT might be composed of a) a pre-treatment levy, and b) levies which depended upon how the outputs from MBT were dealt with (how the process was configured).

The second point is, we think, quite important. If a review of a study is to be quite so strident in its criticism, it seems reasonable to expect that it would ‘cover the bases’, and first and foremost among that would be

expected to be a full reading of the report and associated annexes. Without doing this, levying such criticism might be deemed premature.

## **THAT THE LEVY RATES PROPOSED ARE FLAWED BECAUSE THEY INCLUDE EXTERNALITIES WHICH ARE ALREADY INTERNALISED AND BECAUSE NO ACCOUNT IS TAKEN OF DISAMENITY**

### **Disamenity**

The ESRI report states:

*The point of internalising externalities as the international review quite rightly points out is that once these external damages or benefits are incorporated into the price then appropriate decisions are made by public and private agents concerning which waste management technology to use. Hence, it is important that the methodology behind international review's estimates of the externalities from landfill, incineration and MBT is well grounded and defensible. Unfortunately this is not the case. No account is taken of disamenities caused to households because of the presence of a waste facility. In estimating the externality attention should only be paid to unpriced externalities. If an externality, such as pre-combustion emissions from diesel, is already priced through the carbon tax - which was announced in the budget on 9 December 2009, or through the ETS for CO2 emissions, it should not be included in the residual waste levy. This is not only double regulation, but also double counting. The international review does not take this into account and hence its levies cannot be relied upon as sending the correct price signals for selecting between alternative waste management technologies.*

On the first of the substantive points in the above paragraph, the statement that 'No account is taken of disamenities caused to households because of the presence of a waste facility' is somewhat disingenuous. ESRI knows full well that we reviewed relevant literature in this regard. Indeed, we reviewed much the same literature as they have in our own Section 61.3.5.1. We concluded our review stating:

*It is clear that both the COWI and Eunomia studies derived figures which were dependent upon the transferability of a relationship derived for landfills to the incinerator context. Neither study used the disamenity estimate derived in their ultimate analysis. It seems possible, however, that disamenity values could be considerable for these facilities.*

*To our knowledge, no studies of disamenity have been carried out at other waste treatment facilities (than landfill and incineration)*

We went on to state, in Annex 63, in outlining omissions from our externality assessment:

➤ *Disamenity (including odour, nuisance)*

*The argument that there is insufficient data available to incorporate disamenity in a cost-benefit study comparing landfill with incineration is losing credibility. None of the impacts assessed can be said to have been estimated with a high level of certainty. The standard of proof for disamenity should not, arguably, have to be any higher. However, in comparing a wider range of treatments, we have chosen to omit disamenity from the analysis. Our view is that if disamenity was to be included, incinerators*

*located in dense urban areas would fare worst, and well-managed biological treatment facilities (including quality odour treatment) in rural areas would fare best;*

This decision merely reflects the fact that, as mentioned above, an analysis which was complete would have to consider not only 'landfill' and 'incineration', but also 'MBT' facilities, compost facilities, anaerobic digestion facilities, 'landfills receiving stabilized waste' (because the odour issue will have been largely dealt with through the pre-treatment phase, the disamenity might be different), as well as, arguably, cement kilns (though it could be argued that these are not directly relevant to waste management). It should be noted that ESRI itself refers to work carried out by ourselves for Greenstar. We felt that in the study carried out for DoEHLG, the basis for including disamenity was too weak, given the (clearly) delicate nature of the matter being considered. It is clearly wrong, therefore, to state that we did not '*take these into account*', and nor would it be true to state that we have no experience of this matter (I personally peer reviewed, on behalf of the team which carried out the work, the Cambridge Econometrics study which is referred to by ESRI). We decided not to include them on the basis of the lack of a robust basis for the estimates.

Another difficulty with disamenity estimates is that they are – as ESRI recognizes – likely to consist of a substantial fixed element, and in some cases, this might be amenable to influence by planning conditions. The marginal externalities from disamenity might not be especially high (they may be zero, or close to zero) in many cases.<sup>2</sup>

ESRI makes an interesting attempt to estimate disamenity effects, noting along the way

*The research in disamenity externalities is gradually improving (Bartelings et al. 2005, Cambridge Econometrics, 2003). However, whilst secondary literature flourishes there have been few major original studies since 2003, and none has ever been carried out in an Irish context. All major studies on waste externalities highlight the danger in transferring disamenity values across studies (Cambridge Econometrics 2003, Eunomia 2007, COWI 2000). But observed local resistance to landfill and the evidence of hedonic pricing studies suggest that its disamenities are significant. Therefore, with due caution and by highlighting all serious reservations, this report will attempt to place a value on the disamenity impact of landfill in Ireland.*

It seems clear from this that ESRI is no more confident in the robustness of the estimates than we are, but whereas they choose to include disamenity, we chose not to do so.

The disamenity values obtained by ESRI do, however, depend very heavily upon the choice of study chosen from which to base the analysis. Where incineration is concerned, ESRI tries to make a case for rejecting the Kiel and McClain study, clearly knowing that it would deliver a high disamenity value for incineration:

*The Dutch study, Bartelings et al. (2005), used Kiel and McClain. Adjusted into Euros, and using some very specific geographic information on housing levels to make their figures more realistic, they found that starting at 5.5 km from the site, the house price drops by approximately €9,500 (2005 prices) with every kilometre approaching the incinerator. DEFRA (2004b) (the major study of the externalities of landfilling and incineration) also interpret Kiel and McClain. By adjusting for inflation and currency they calculate a value of £21/tonne of waste incinerated (2003£). However, they do not recommend using*

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<sup>2</sup> I made this point in work for the Quarry Products Association in the context of the development of the UK aggregates tax. The same point was elaborated upon further for the EPA by the late Professor David Pearce.

this value as Kiel and McClain's data is too old and too remote (from the US). The Kiel and McClain (1995) work should rightly be considered out-of-date and applying it to Ireland will not yield plausible results.

The Defra study is very familiar to us. It took place following a review of waste policy carried out by the Cabinet Office, and in which I had some involvement. This committed Defra to review the case for an incineration tax. Despite the analysis suggesting that externalities from landfill were lower than those from incineration, even omitting the disamenity effect, Defra chose not to implement a tax on incineration equivalent to that on landfill. It would be as well to point out to ESRI, as much as it was to Defra at the time, that the alternatives to landfill are not limited to 'incineration', or for that matter, any other residual waste management process.

It appears to us, however, that ESRI has not accurately reflected the reasoning given in the Defra report. The reason given for not considering this value was as follows (the paragraph can be found in our review in Annex 61, Sn 61.3.5.1).

*'When this [the disamenity from the incinerator] is compared to the average disamenity cost of landfill from the Defra study of between £551,000 to £789,000 when converted to £2003 prices using house price index changes, the results of Kiel and McClain seem disproportionately large. For this, and also given the fact that the study is from the US, this estimate is not recommended for use in the UK context'.*

We went on to note the contrast with the Dutch study, also referred to by ESRI:

*This is very different to the view taken in a recent Dutch study:<sup>3</sup>*

*Given these findings, we assume that the disamenity effects differ between landfilling and incineration. First, the reduction in house prices seems to be more pronounced with incineration. This may be due to the fact that incineration is mainly disliked because of the perception of air pollution. In the Netherlands, since the negative publicity of the emissions of the highly toxic dioxins in the early 1990s, people are more reluctant to live near an incinerator. Even if the legal standards are met, the fear will not disappear immediately. Second, due to the importance of air emissions and the height of the stack, the impact area of an incinerator is significantly larger than the area affected by a landfill site. Therefore, the area of affected houses around the landfill site is limited to a buffer of 1 kilometre around the site. The impact area of incinerators in the Netherlands is assumed to reach as far as 5 kilometres from the actual site.*

So, the Defra study rejected these values not because the study was considered 'old', nor because it was 'too remote'. It was rejected because it was not from the UK, but probably more importantly because the values were unpalatably high to the authors (or Defra). The (more recent) Dutch study saw no reason not to use this as the basis for an estimate in the context of the Netherlands.

ESRI justifies basing its estimates of disamenity upon a French study instead:

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<sup>3</sup> H. Bartelings, P. van Beukering, O. Kuik, V. Linderhof, F. Oosterhuis, L. Brander and A. Wagtendonk (2005) *Effectiveness of Landfill Taxation*, R-05/05, Report Commissioned by Ministerie von VROM, November 24, 2005.

*But Walton (2006) found – and Eshet et al. (2005) acknowledges – that the HP [hedonic pricing] results and CV [contingent valuation] results are generally consistent. Thus, this French study can be considered as a basis for finding disamenity values in an Irish context.*

It is not clear why France is better than the US as a basis for this type of valuation. The authors do not give a reason. Given this, and given that the US study is not universally rejected as a basis for disamenity calculations, it would be interesting for ESRI to re-calculate the disamenity using the US study as the basis for the relationship between distance and house prices. If nothing else, such an analysis might serve to verify (or not) the statement in the above paragraph that *'the HP [hedonic pricing] results and CV [contingent valuation] results are generally consistent.'* It is relatively straightforward to find out, after all.

ESRI is somewhat guilty of putting words into the mouths of the authors of the Defra study. In doing so, they justify the use of a study which was likely to deliver lower disamenity values for incineration than other studies.

### **Which Externalities Should be Included in the Levy?**

What does it mean to internalize an externality?

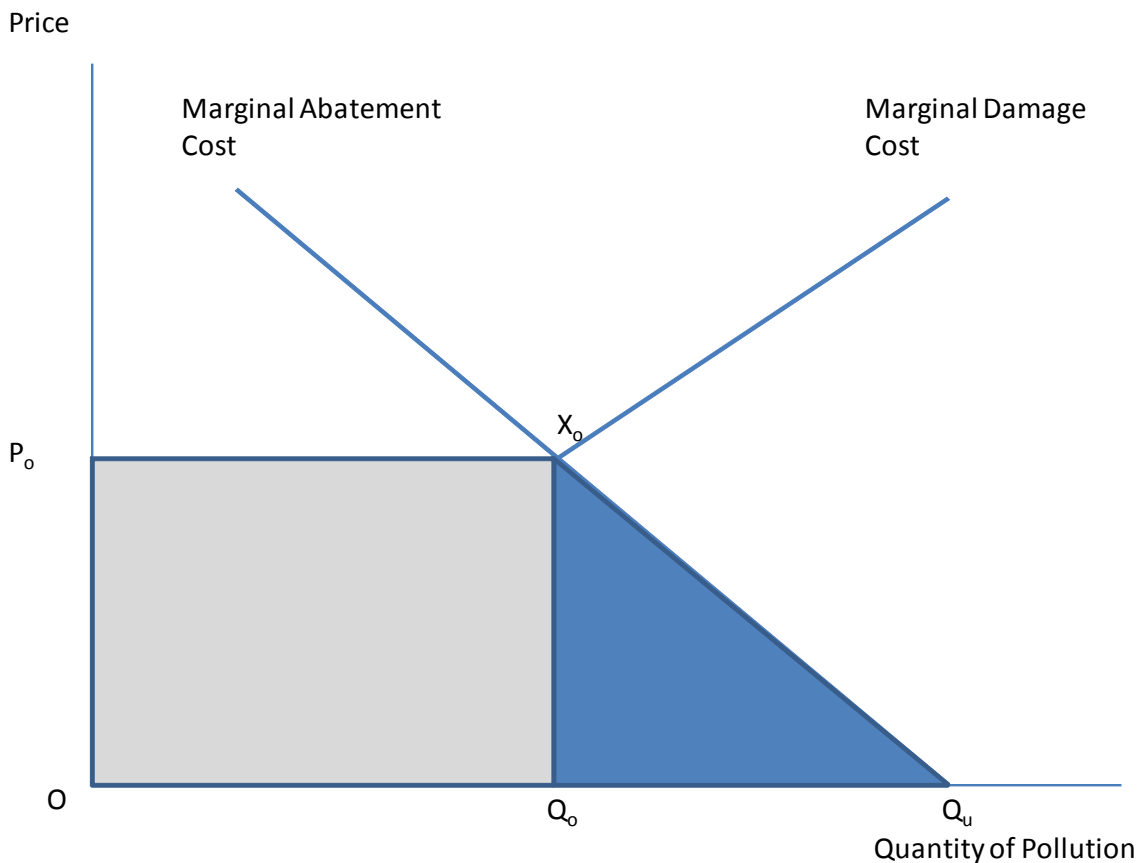
The most basic environmental economics textbooks will agree that the first best solution to addressing environmental externalities is to internalize them in prices either through using taxes, or through using other market mechanisms such as allowance trading. There is a difference between these two mechanisms, however. The differences

Consider the case of a tax on emissions of carbon dioxide, for example. Firms are expected to respond to the tax by abating emissions up to the point where it is more expensive to carry out further abatement than to pay the tax. Note that this does not eliminate the environmental damages. Under the tax system, firms themselves pay for the abatement equipment, but they also pay taxes on the unabated emissions. The tax does (at least) two things. It signals to firms the value they will derive from additional abatement, and it also increases the price of the good or service they offer in line with a) any additional cost of abatement incurred and b) the tax revenue surrendered to (usually) Government. Emissions stand to be abated through (again, at least) two mechanisms:

1. The firms' response to the tax; and
2. The change in demand for the good or service concerned.

The situation for the firms subject to the tax is shown in Figure 1.

Figure 1: Effect of Optimal Tax ( $P_o$ ) on Firm's Costs



Note that the internalization effect has two components:

1. Paying for abatement up to the point where the marginal damage costs and the marginal costs of abatement are equalised (triangle  $X_oQ_oQ_u$ ); and
2. Paying the emissions tax on the unabated emissions ( $X_oQ_oOP_o$ .)

The ESRI report contends the following:

- a) That GHG emissions from waste management are already internalised through the inclusion of 'waste' in the EU Emissions Trading Scheme;
- b) That the fact that facilities operate under a license implies that they must not be subject to any other form of policy instrument (the 'never-articulated-argument' regarding double regulation);
- c) The fact that a Carbon Tax has been announced on 9 December 2009 implies that fuel used at facilities should be ignored.

We address each of these below before summarizing the changes which might be made both in our study and that of ESRI.

*GHG emissions from waste management are already internalised through the inclusion of 'waste' in the EU Emissions Trading Scheme (EU-ETS)*

ESRI has already admitted that it was incorrect to make this assertion. However, what has not been recognized is that even if waste *was* included in the EU-ETS, that would not constitute 'internalisation of the externalities' associated with the processes covered by the EU-ETS. There are two reasons for this:

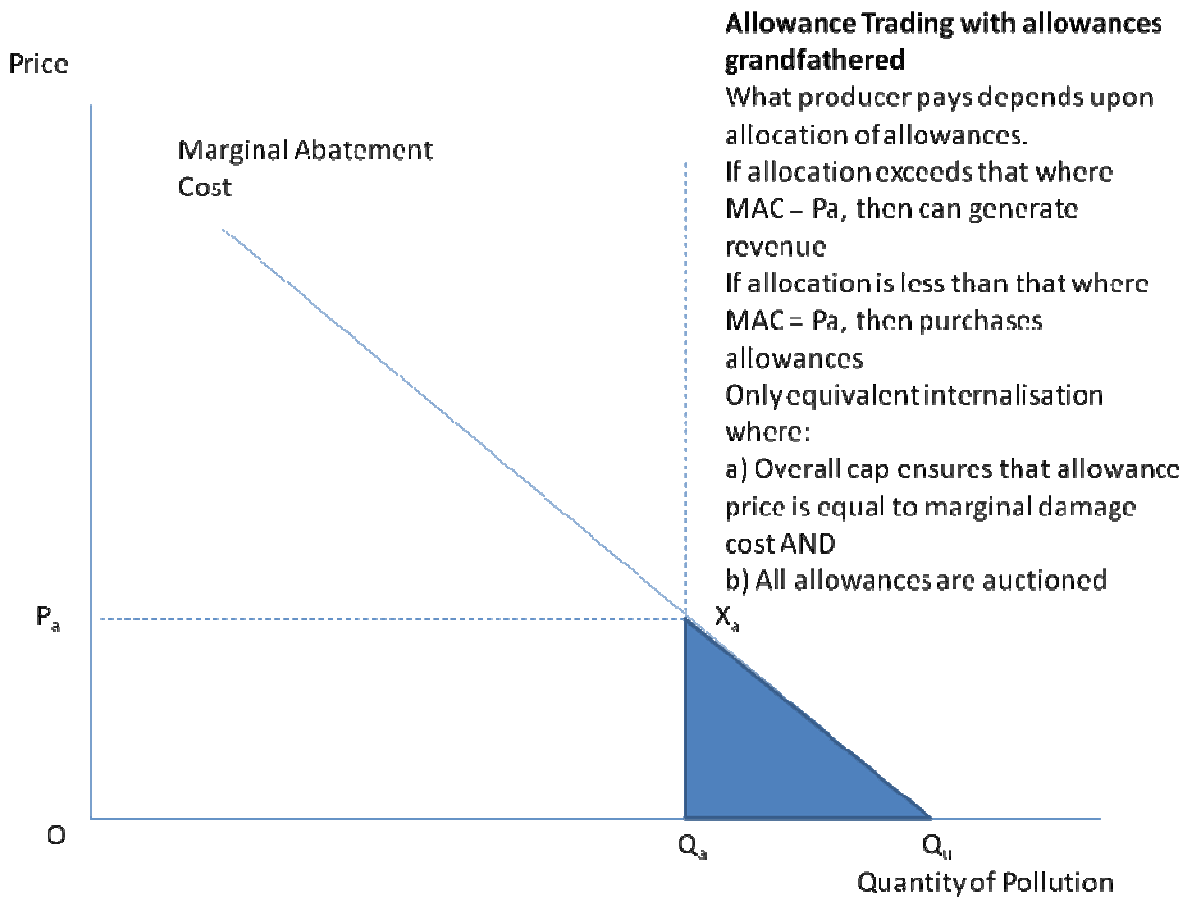
1. The cap which is set under the EU-ETS is not necessarily set at a level which ensures that the price of traded allowances (EUAs) reflects the externality generated by the emission. A widely held view is that the current cap is too high, so that the traded price of EUAs is well below the level of the damages caused, though it is clear that there is considerable uncertainty surrounding what this value may actually be; and
2. Critically, the allocation of allowances under the EU-ETS (through National Allocation Plans) is based upon grandfathering. Even if it was the case that the cap under the EU-ETS led to a traded price for EUAs equal to the externality associated with GHG emissions, all emissions below the cap would remain subject to no internalization (though there would be some transfers between firms who are buyers and sellers of allowances) unless the allowances were auctioned.

This latter point highlights a key distinction between 'ensuring that, at the margin, emissions have a price' and 'internalising the externalities associated with emissions'. The two are not the same thing. ESRI appear to have equated the two. The situations would converge in the case where, instead of issuing allowances free of charge to existing users, all allowances were auctioned.

The case where the cap is insufficiently restrictive is shown in Figure 2. The case where the implied cap generates an equivalent price for emissions is shown in It can be seen that, relative to the situation described in Figure 1, the level of internalization of costs is much reduced (the area shaded dark is much smaller, and the light shaded area has disappeared altogether). Consequently, the price of goods and services produced under this regime is unlikely to change to the extent that it would if a levy was introduced at the level  $P_0$  (as in Figure 1). Consequently, demand for the goods and services would be in excess of what is, strictly speaking, economically efficient. One important which arises from this is that the aim of a waste levy is not to 'achieve the efficient abatement of NOx to a known level', but to internalize externalities such that the level of demand for services offered in the market is at the efficient level. This can only happen if these externalities are properly internalized. Grandfather allowance trading schemes do not achieve this.

Figure 3 shows again why this is not the case, even where the cap is set at such a level that the allowance price is equivalent to the optimal tax.

**Figure 2: Impact of Allowance Trading (allowances grandfathered, cap set at low level) on Firms' Costs**



To conclude on this matter:

1. Waste is not included within the EU-ETS. This has been discussed. Primary movers in the discussion have been, perhaps unsurprisingly, cement kilns (which are included). However, at present, waste is still excluded. If it was included, given that the 'waste' chapter of the IPPC reporting process majors on 'methane from landfill', it is virtually inconceivable that landfill methane emissions would not be covered, raising questions as to why ESRI included these in their levy rates, but not GHGs from MBT / incineration given their mistaken assumption; and
2. Even if it was included in the EU-ETS, the nature of the mechanism would certainly not imply full internalization of environmental damages caused, principally because of the way the cap is set, and the way in which allowances are allocated at the outset.

In this latter regard, we note that ESRI, in describing its allowance trading scheme, suggests:

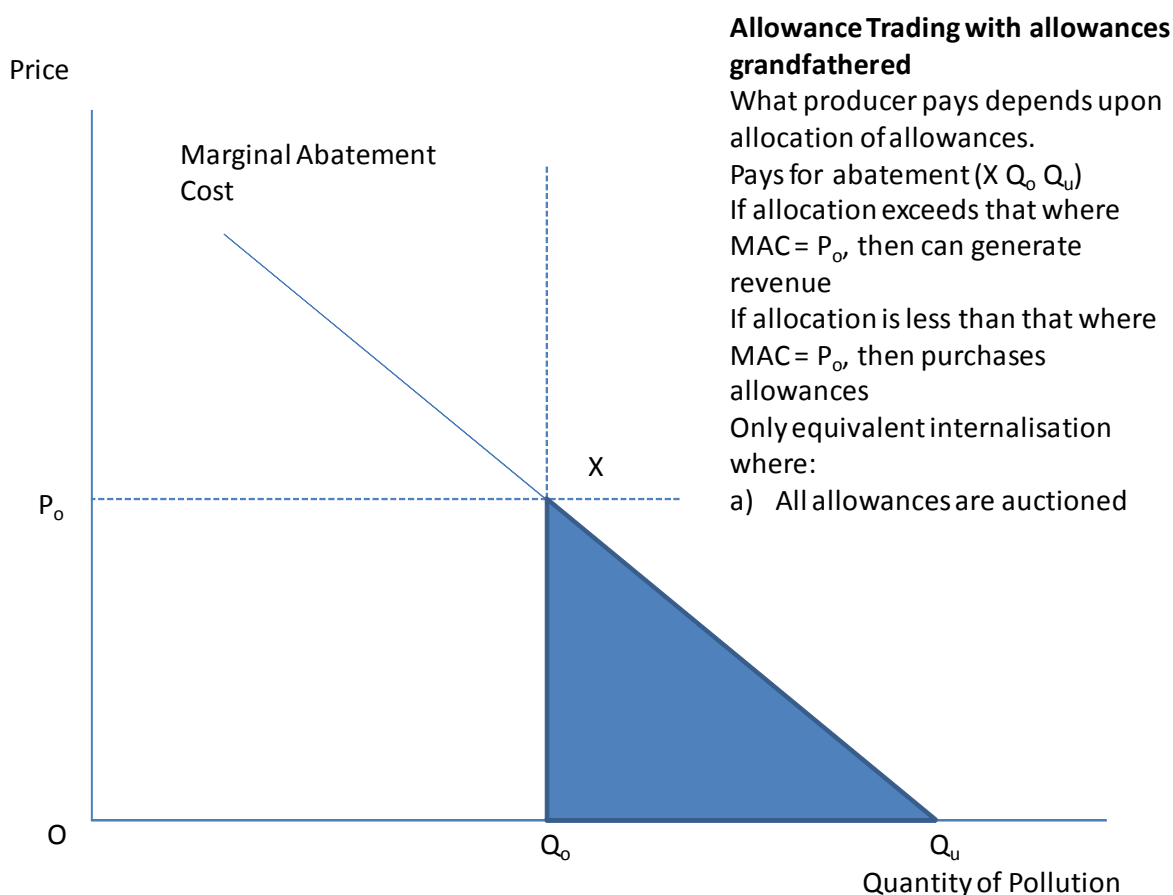
*Initial allocation would be pro-rated based on 2009 levels of waste disposal, so that firms could not engage in any strategic behaviour to effect the allocation. Subsequently the proportion of the permits that would be auctioned off would increase so that by 2016 it would reach 100%.*

Presumably, there is a reason for moving to auctioning. ESRI themselves make the point in another way (just to confirm our point, and why it is wrong to assume that the EU-ETS internalizes all GHG damages):

*Economists often argue that the permits should be auctioned off and the funds accruing to the State. This is not just on equity grounds, but also - at least under the ETS36 - free allocation of permits based on existing levels of CO2 has lead to inefficiencies.*

Q.E.D.?

**Figure 3: Impact of Allowance Trading (allowances grandfathered, cap set at level ensuring allowance price equates to that of optimal tax) on Firm Costs**



*That the fact that facilities operate under a license implies that they must not be subject to any other form of policy instrument (the 'never-articulated-argument' regarding double regulation)*

Every country in Europe which already has a tax on landfill (including Ireland) or on incineration implements the tax against the backdrop of facilities being required to operate under the terms of a license. The framework

legislation for waste management in Europe demands this. The logic of the ESRI position would be that there is no place for any market based instruments for any waste treatment because all facilities operate under licenses.

In one paragraph, in a study espousing an economic approach to waste management, the ESRI report basically condemns any market based environmental policy to the bin:

*This type of command and control regulation sets the level of pollution that is designed, implicitly at least, to be the right or correct or socially acceptable level. It has been selected instead of imposing a levy or tax reflecting the level of externality. There is often a considerable range of values for a given externality, so it is understandable why command and control regulation is preferred.*

If the existence of 'a range of values for a given externality' is a reason to prefer command and control regulation, the role of environmental economics for policy purposes is largely doomed (why include the disamenity externalities, given that ESRI itself states: '*there have been few major original studies since 2003, and none has ever been carried out in an Irish context. All major studies on waste externalities highlight the danger in transferring disamenity values across studies.*') Quite apart from this, the paragraph above raises questions as to how regulators might 'implicitly at least' have any clue at all as to whether their regulatory standards are anywhere close to being 'socially acceptable'.

The reason for ESRI adopting this position is never meaningfully stated in the report. The term 'double regulation' is used in the main text. In Annex A, the decision not to include externalities from air pollutants is set aside for the following 'reason':

*Omitted, regulated through emission limits in waste licence.*

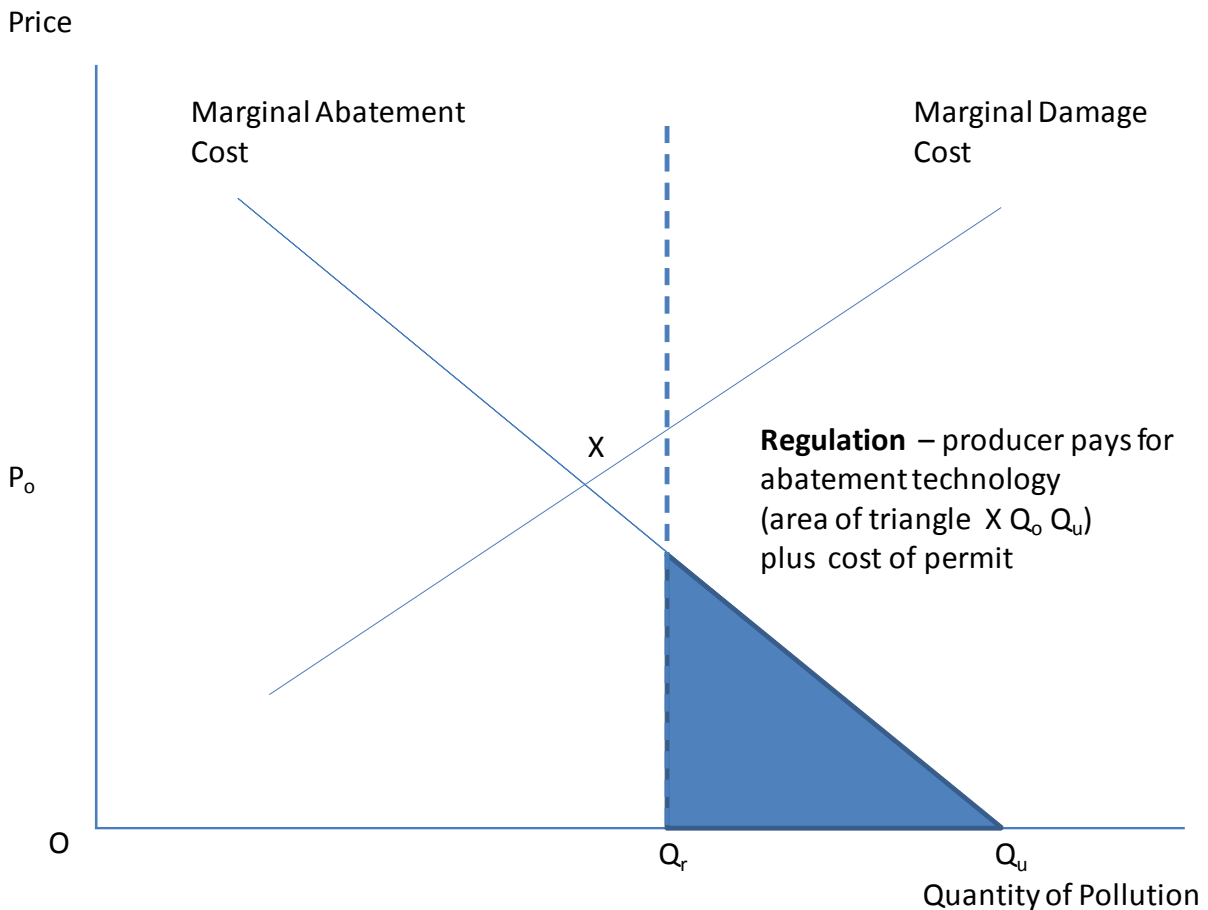
This is despite the fact that the authors' own review of air pollution externalities in the same Annex shows significantly non-zero externalities being estimated by studies which have based their modeling around facilities which are also covered by licenses. It clearly cannot be the case, then, that ESRI believes that operation under a license indicates the elimination of the regulated externalities.

Or can it? For in the Main Text, as highlighted above, ESRI states:

*IPPC licenses issued by the EPA to incinerators, power generation plants, cement works, aluminium smelters and so on are designed to ensure that the operation of these facilities will not cause environmental pollution.*

This is so obviously incorrect that ESRI needs to revise its view. The existence of a license does not internalize externalities, let alone eliminate them. The situation is depicted in Figure 4.

**Figure 4: Impact on Firms of Regulation**

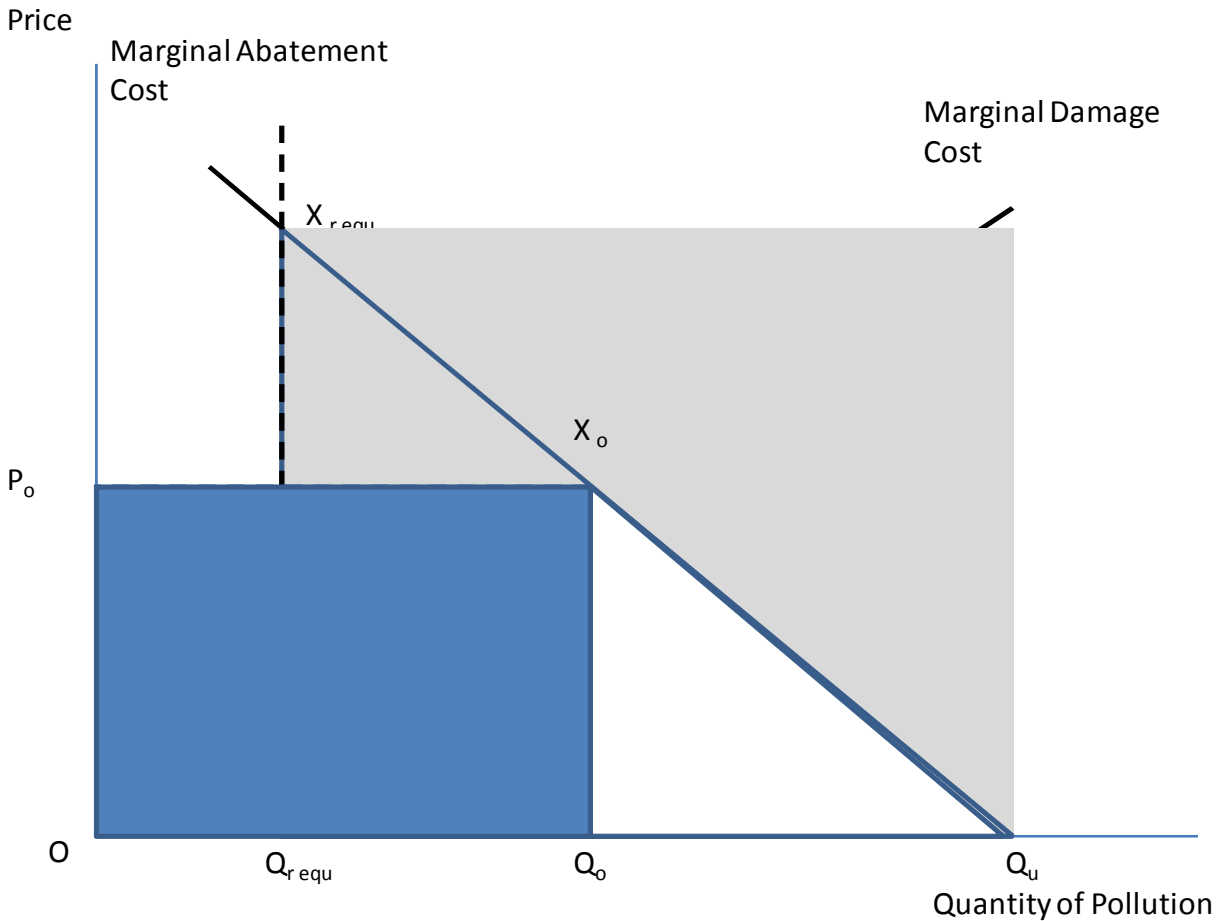


To give some idea of the difference in the extent of internalization, consider the following:

1. A license to operate a major facility might cost less than €20,000. The annual fee may be similar;
2. If an incinerator generates externalities of €11.14 per tonne, then for a 200,000 tonne incinerator, the externalities are more than 100 times the cost of the license.

The extent to which damages can be said to be internalized is extremely limited. Indeed, the conditions under which firms are exposed – through regulation – to costs equivalent to those which would be experienced under an optimal tax are quite restrictive. This is illustrated diagrammatically in Figure 5. Obviously, at this level of regulation, the level of abatement exceeds what might be considered to be the efficient level.

Figure 5: Conditions for Equalisation of Costs to Firms from Regulation and Optimal Tax



Ideally, given that the license for e.g. incineration has to set limit values for air emissions (through the Incineration Directive), the design of a levy would leave operators free to determine the efficient level of abatement for themselves, subject to these minimum standards (in the Directive) being met. This is what the levy proposed in the international review actually seeks to achieve.

The failure of ESRI to consider this possibility is all the more surprising since the ESRI report is meant to support an economic approach to waste management. The logical extension of ESRI's view is that since licenses have to exist, there can be no other policies to influence externalities (possibly because ESRI really is operating under the misguided view that an IPPC license ensures 'that the operation will not cause environmental pollution'). That is not, and never was, the purpose of such a license.

ESRI does, as highlighted above, seek to value disamenities. It seems reasonable to ask why they even bothered to do this given that facilities have to operate under planning consents. It would not seem too big a stretch in the ESRI illogic to arrive at the view that just as licenses eliminate all environmental pollution associated with a facility, so a planning consent achieves the same for disamenity.

The lack of consistency in application of the principle is no more obvious, however, than in ESRI's treatment of landfill. We are not apologists for landfill. However, ESRI's distaste for 'double regulation' does not stop it from subjecting landfills to no less than four regulations (at least in its own mind):

1. A license;
2. The EU ETS;
3. The landfill levy
4. A 'fleshed out' system of landfill allowances.

It is worth commenting on a couple aspects of this.

ESRI's calculation of the externalities from landfill includes the externalities from methane even though they were laboring under the misapprehension that waste was included under the EU-ETS. Given that it is almost impossible to imagine a situation where, if waste was included under the EU-ETS as ESRI clearly believed, methane emissions from landfills would somehow not be covered, ESRI is clearly guilty of double counting the externalities of methane from landfill. In other words, it commits the very mistake that the international review team is accused of making.

The Main Report actually refers to licenses as the basis for regulating methane. The justification for including methane externalities within the levy (despite the many 'reasons' given by ESRI for omitting them) is as follows:

*Although waste licenses set permissible levels for licensed facilities, via landfill gas concentration limits, this gas is such an important contributor to global warming that a differentiated levy should be imposed across all the waste treatment options that are considered here.*

Why did similar logic not apply to the air emissions from incineration? The methane externalities from landfill are calculated as €33.60 per tonne. The figure for air pollution is €11.16 per tonne of waste incinerated. What is it about the number '€33.60' that demands its inclusion when the figure €11.16 for air quality externalities from incineration is excluded? The rationale is ridiculous. If an externality is internalized, it is internalized. It makes no sense to state that it has not been because it is an important contributor to global warming. If it was internalized, its importance would – obviously – be taken into account in that mechanism (else the mechanism is not worth much).

The landfill allowance scheme is not fleshed out. Indeed, it is a completely naïve recommendation, assuming as it does that the quantity of waste produced by each waste producer is known, and that therefore, some form of grandfathering of allowances can be carried out. The UK system – I authored the background paper upon which the initial consultation document for the system was based – took 5 years to design in conditions which were far more straightforward than is the case in Ireland. There, the wastes were those collected by local authorities, and local authorities either carried out the collection themselves, or were contracting out the service. In Ireland, it is not clear who the relevant addressee of the allowance trading scheme would be, still less how the biodegradable content of waste would be tracked as it made its passage from the producer to the landfill.<sup>4</sup> Our own Annex 55 gives some insights into the UK system.

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<sup>4</sup> Now that the UK has been told by the European Commission to revise its definition of 'municipal waste', the existing scheme will be consulted upon. One option, as we understand it, will be that the scheme is simply disbanded. It would,

Finally, I would like to ask a question.

Why did the ESRI report bother to calculate the air pollution externalities from incineration at all if the authors really were of the view that they should not be included in the analysis? Why, I keep asking myself, was the calculation undertaken (wasted effort) if the view really had always been that the air pollution externalities were already dealt with by licenses? Why the review of studies on the externalities of air pollution if they were never going to provide anything useful?

One cannot help but think – if only because one would like to believe that ESRI professors are not genuinely stupid – that the calculation was done, but that because the results were unacceptable to the client, a ‘rationale’ had to be concocted to magic the unpalatable numbers away. Then again, it is not clear which is better or worse – the private admission of stupidity, or the institutional admission of massaging the numbers in favour of the client’s view. In my conversations with Professor Gorecki and with Professor Fitzgerald, both were adamantly clinging to the view that air pollution externalities did not need to be included because of the existence of a license. Professor Gorecki suggested we should agree to disagree, but this is akin to agreeing to disagree with someone who thinks that one plus one equals fifty.

*The fact that a Carbon Tax has been announced on 9 December 2009 implies that fuel used at facilities should be ignored.*

ESRI is being slightly uncharitable here for the simple reason that the Carbon Tax was announced after the study was completed. Even so, for similar reasons to that already discussed, this Tax does not necessarily fully internalise the damages associated with GHGs. Indeed, the rate €15 per tonne of carbon (which appears to be, in fact, not €15 per tonne of carbon, but €15 per tonne of carbon dioxide, equivalent to €55 per tonne of carbon) implies a tax on incineration of €0.49 per tonne.

In the scheme of things, therefore, when the externality calculations are carried out correctly (i.e. with GHGs and air emissions from the process accounted for correctly), this change is trivial. This is (obviously to the informed observer) because the process energy inputs tend to be a minor part of the overall emissions balance of the facilities concerned (if it were otherwise, the discussion regarding the merits or otherwise of different technologies would presumably be more focused upon their process energy use – no study in the literature pronounces that this might be a decisive factor in the analysis, and for good reasons).

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in any case, be very difficult in the UK to extend the existing scheme to businesses (whose waste will be included in the revised definition of ‘municipal waste’).

**Table 1: Carbon Tax to be Applied**

Fuel Type	Unit	Current Price €	Carbon Tax @ €15 (VAT incl.)	% change in price	Revenue Yield In a Full Year (VAT incl.) €m
Petrol	Litre	1.19	4.2 cents	3.5%	75
Auto-diesel	Litre	1.10	4.9 cents	4.4%	92
Kerosene	1,000 Litres	516	€43.14	8.4%	47
Marked Gas Oil	1,000 Litres	539	€46.87	8.7%	43
LPG	1,000 Litres	720	€27.97	3.9%	4
Fuel Oil	1,000 Litres	600	€52.15	8.7%	1
Natural Gas	13,750 kwh <sub>1</sub>	800	€47.86	6.0%	47
Peat Briquettes	Bale	3.85	39 cents	10.1%	6
Coal	40kg	16.20	€1.79	11.1%	15

Source: Annexes to the Summary of 2010 Budget Measures, Annex E

<http://www.budget.gov.ie/Budgets/2010/Documents/Annexes%20to%20the%20Summary%20of%20Budget%20Measures%20Final.pdf>

The more general principle – that the levy should focus only on those externalities already internalised – is a sound one. Indeed, we recognised this in the review. In Annex 56, we wrote, albeit mainly with an eye to the incentives provided through the REFIT scheme:

*It is worth pointing out, however, that to the extent that other policies internalise benefits associated with energy generation, then the uninternalised externalities which a waste levy should consider will, other things being equal, increase for those facilities upon which policy bestows a benefit. In other words, the level of the levy should consider the effects of other policies to the extent that they internalise benefits associated with the treatment. As stated above, however, the way in which REFIT will support municipal waste treatment facilities is not clear, though an estimation of benefits received by landfill operators is easier to discern.*

### Summary of Externalities – What Should or Should Not be Included Within the Levy?

It is worth exploring, then, the extent to which externalities from waste are, or are not, internalised by existing policies. In doing so, it is important to consider how one should value the externalities associated with GHGs.

The ESRI report assumes that the value of traded allowances in the EU-ETS equates to ‘internalisation of the externalities’ of climate change emissions. In a well-functioning market, the value of the traded allowances (EUAs) represents the marginal abatement costs for the sectors included under the EU-ETS to keep emissions at the level of the cap established within the scheme. This does not necessarily bear any relation to the externalities of emissions of carbon dioxide, but is more a reflection of the level at which the cap on emissions is set (and the rules regarding how the cap is to be applied). In the Annexes to the Review, we wrote:

*For carbon dioxide, the 2009 value as outlined in an ESRI Working paper outlining a methodology for the incorporating of GHG emission costs into economic appraisal in Ireland is used, although we do have a number of concerns about the approach, and whether it genuinely represents a social cost of carbon.<sup>5</sup>*

In the footnote, we noted concerns regarding the ESRI Working Paper (*Tol and Lyons (2008) Incorporating GHG Emission Costs in the Economic Appraisal of Projects Supported by State Development Agencies. ESRI Working Paper No. 247*) on the matter:

*Our concerns about the applicability of this approach include whether the futures market, which has been subject to some considerable volatility, provides a reasonable indication of the social cost. While this market would represent the opportunity cost of having to import additional allowances, which could reasonably be considered a private cost, it does not necessarily follow that this equates to the social cost. Of the two variants, the model-based price at least accords with an IPPC concentration scenario, while the assumption of holding the price at the latest available futures price does not seem to us to be a credible way of representing the social cost of carbon out to 2030 (and beyond). Furthermore, there is no indication as to whether the carbon prices shown in Table 3 of the paper are in real or nominal terms.*

It is strange to us that a report which claims to adopt an 'economic approach' to the waste sector, and which takes, in many respects, such an orthodox approach to the matter in question, then reverts to use of a 'valuation of externalities' which in fact bears little or no relation to them. The sequence of values for different years highlights this (why do the environmental damages associated with climate change emissions leap upwards in 2015?).<sup>6</sup> They DO represent a degree of internalisation of externalities to the extent that these are covered under the scope of the EU-ETS.

As such it can be seen that in Table 2 below, we suggest that even where a policy addresses GHGs (whether it be the Carbon tax or the EU-ETS), the correct approach would be to estimate the externalities associated with the emissions and then subtract from this value the extent to which the policy could be said to internalise GHG-related damages.

We set out in Table 2 below the approach under the ESRI report and that of the International Review and propose, in the final column, what we believe to be the correct approach. We also indicate how our figures might have to change as a result.

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<sup>6</sup> Closer inspection of ESRI's source of climate change 'externality' estimates is a document designed for appraisal of capital projects. It seems reasonable to question whether it might be appropriate for policy appraisal.

**Table 2: Assumptions Concerning Effect of Policies on Internalisation of Externalities**

<b>Externality</b>	<b>ESRI view</b>	<b>Eunomia view</b>	<b>Correct approach</b>
GHGs from process energy use other than electricity	Internalised (Carbon Tax) – not included in levy	Not internalised – included in levy	Internalised to the extent that the Carbon Tax, announced after the international review, internalises externalities. There is not full internalisation of the damages unless one believes that the damages from GHGs are less than, or equal to, €15 per tonne CO <sub>2</sub> . The correct approach would be to estimate the GHG-related damages, and then to subtract the element which is already internalised. <b>Eunomia need to change (ESRI would have to also)</b>
Non-GHG emissions from process energy use other than electricity	Not discussed - not included in levy	Not internalised – included in levy	Not internalised – should be included in the levy <b>(ESRI would need to change)</b>
GHGs from process electricity use	Internalised by EU-ETS - not included in levy	Not internalised – included in levy	If the EU-ETS is deemed to function as an internalisation mechanisms for the electricity sector, then the damages are partially internalised (to the extent to which allowance values reflect the damages associated with GHGs). The extent to which this really occurs is likely limited by the grandfathering of allowances <b>Eunomia need to change (ESRI would also)</b>

Externality	ESRI view	Eunomia view	Correct approach
Non-GHG emissions from process energy use	Not discussed – not included in levy	Not internalised – included in levy	Not internalised – should be included in the levy <b>(ESRI would need to revise)</b>
GHG emissions from the process itself (i.e. not from input energy use)	Internalised because of the supposed inclusion of waste under the EU-ETS - not included in levy except for methane. ESRI applies a different 'rule' for landfill (and other) methane emissions which are assumed not to be internalised despite their own views on licenses, and their view regarding the inclusion of waste under the EU-ETS	Not internalised – included in levy	Not internalised – <b>(ESRI would need to revise)</b>
Non-GHG air emissions from the process itself (i.e. not from input energy use)	Internalised through licenses - not included in levy. In the Main Text, it is argued that the damages are zero as licenses supposedly eliminate any pollution. In the Annex, the externalities are calculated and are significant (far more significant than disamenity, which is included) but the assumption is that air quality damages are internalised by the license	Not internalised – included in levy	Not internalised <b>(ESRI would need to revise)</b>
Benefits from recycling	Not included - not included in levy. The main text argues that the working of the EU-ETS makes it difficult to understand this. The Annex makes no reference to the	Not internalised – included in levy	Not currently internalised – should be included in the levy (this situation might change for the GHG element if a) allowances are auctioned under the EU ETS and b)

Externality	ESRI view	Eunomia view	Correct approach
	benefits of recycling and how these should be dealt with other than through referencing work by AEA technology, which clearly demonstrates the very important contribution from material recycling to the net GHG balance of MBT (and, it so happens, incineration plants)		depending upon the principle location of the sources of primary materials and the destination for secondary ones). In practice, much of the recyclable material is sent to UK, but this is certainly not always its final reprocessing destination <b>(ESRI would need to revise)</b>
Avoided GHG from energy recovery	Assumed internalised through ETS - not included in levy	Not internalised – included in levy	The electricity generating sector is included in the EU-ETS. If the EU-ETS is deemed to function as an internalisation mechanism for the electricity sector, then the avoided damages from electricity generation are partially internalised. The extent to which this really occurs is likely limited by the grandfathering of allowances <b>Eunomia need to revise (ESRI would also)</b>
Avoided non-GHGs from energy recovery	Not mentioned - not included in levy	Not internalised – included in levy	Not internalised <b>(ESRI would need to revise)</b>
Avoided GHG from SRF utilisation cement kilns	Assumed covered by ETS - not included in levy	Not internalised – included in levy	The cement production sector is included in the EU-ETS. If the EU-ETS is deemed to function as an internalisation mechanism for the sector, then the avoided damages from electricity generation are partially internalised and the levy rate should be reduced by the level of this partial internalisation <b>Eunomia need to revise</b>

Externality	ESRI view	Eunomia view	Correct approach
			<b>(ESRI has no figures for this)</b>
Avoided non-GHG emissions from SRF utilisation in cement kilns	Assumed internalised by license – not included in levy	Not internalised – included in levy	Not internalised <b>(ESRI has no figures for this)</b>
Disamenity	Included though with caveats, but drawing upon study delivering lowest figure for incineration	Reviewed, but omitted on basis that suitable studies for all facilities are not available	Would ideally be included, but basis for assessment across all facilities does not exist <b>A judgement call as to whether to include or not</b>

The above Table is striking in that it suggests that the ESRI approach has effectively assumed away all externalities apart from methane and disamenity. The implied effect of the ESRI approach is that the uninternalised externalities associated with incineration and MBT are the same whether the facility treats waste or not! This is because the only factor that really comes into play is the disamenity which, as ESRI states, is relatively fixed. It would be nice to imagine that this was actually true.

As regards changes to our figures, as discussed above, the level of internalisation implied by the Carbon Tax is trivial in the overall scheme of things. In the most significant case, the externalities are reduced by less than €0.50 per tonne of waste.

That leaves the question of the internalisation achieved by the EU-ETS. To the extent that the environmental costs of the use of electricity, and the benefits of electricity (and heat) recovery are assumed to be internalised through the EU-ETS (and the Carbon Tax), then the calculated externalities associated for the following facilities would need to be increased:

1. Landfill of untreated waste (on account of the energy generated);
2. Incineration (on account of energy generated); and
3. Combustion of SRF at cement kilns.

The levy on the MBT process itself would be barely changed as this is deemed applicable to the pre-treatment process itself, which in the configurations modelled, uses some electricity and a very small amount of diesel, but which generates no energy.<sup>7</sup> The effect on landfills accepting waste meeting the pre-treatment standard would be very low as the gas generation would not contribute to effective energy recovery.

Our estimates suggest, therefore, that the effect of recognising the effects of the Carbon Tax and the internalisation achieved through the EU-ETS lead to the following changes in the values we have previously estimated. Note that the extreme assumption used here is that electricity costs fully internalise, at the margin, the price of allowances traded under the EU-ETS. It is not clear that this would necessarily be the case, this reflecting the case where all allowances are being auctioned:

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<sup>7</sup> Some MBT configurations generated energy from an anaerobic digestion phase within the process. We chose not to model this in the Review since these options are technically more challenging and more costly than the solutions modelled.

1. Landfill:
  - Process energy use other than electricity – lowers levy by €0.05 per tonne of waste
  - Electricity use and generation – increases levy by €0.85 per tonne for untreated waste sent to landfill
  - Net effect – levy increases by circa €0.80 per tonne of waste**
2. Incineration:
  - Process energy use other than electricity – lowers levy by €0.50 per tonne of waste
  - Electricity use and generation – increases levy by €3.56 per tonne of waste
  - Net effect – levy increases by circa €3.06 per tonne of waste**
3. MBT pre-treatment step:
  - Process energy use other than electricity – lowers levy by €0.05 per tonne of waste
  - Electricity use and generation – lowers levy by €0.45
  - Net effect – levy falls by circa €0.50 per tonne of waste**
4. Combustion of SRF at cement kilns:
  - Net effect – (based upon substitution by SRF of coal) - levy increases by circa €14.50 per tonne of SRF.**

It can be seen that the only major changes relate to SRF combustion at kilns. This could be increased by €14.50 per tonne to reflect the assumption made regarding the level of internalisation of the benefits from GHG reductions associated with SRF use. The second most significant change is for incineration, where the levy could be increased by a further €3.06 per tonne. Both of these *increases* reflect the fact that benefits which had previously been attributed to the displacement of GHGs from fossil derived sources of energy are already internalised by the EU-ETS.<sup>8</sup> However, it should be considered whether or not the prices of electricity fully internalise the *marginal* costs of EU allowances. If all allowances were auctioned, it might be safe to assume this was the case. As long as they are not, this assumption might be more questionable.

One problem with talking such a ‘theoretically pure’ approach to the setting of externality-based taxes relates to the issue – touched upon by ESRI – of the stability of policy. Suppose that the scope of the ETS in the next Phase continues to exclude ‘waste’. Suppose also that the cap is tightened and all allowances were auctioned so that the value of allowances increases to, for example, €39 per tonne, the value ESRI suggest should be used as the basis for externality calculations post 2012. In real terms, the externality will be internalised to an extent approximately 2.5 times the current extreme level suggested above.

Does it really help the waste sector to propose at that stage that the level of the levies on cement kilns and incineration should be increased by a further €21.75 and €4.50 per tonne, respectively (1.5 times the current effect of internalisation of GHG emissions) at that point, or, as seems more likely, an as yet undetermined level? And what should happen as fluctuations in the price of EU allowances occurs? How frequently would changes to the levy occur? Should the levies move up and down as allowance prices move up and down? Theoretically, the answer is yes. In practice this is unlikely to be possible.

In our view, therefore, policy-makers need to adopt a pragmatic approach to setting the levies. No externality calculation will be perfect. Rather few levies are set through any reference to externality estimates (exceptions being the UK landfill tax in its early years, the UK aggregates tax, and the Danish packaging tax). The levy rates should be ‘roughly right’, and they should offer some opportunity for better performers to reduce their exposure to the levy, subject to the administrative burdens being acceptable. We would suggest, therefore, that a more correctly structured levy would have a higher rate for incineration and cement kilns in line with what is suggested above, and then consider periodic revisions after 2 years, and then every 5 years, with changes to the values made with not less than 3 years’ lead-in time.

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<sup>8</sup> These have been at the 2010 real terms CO<sub>2</sub> price from ESRI’s Table A.1 (i.e. €13.6 per tonne) since these reflect current futures prices for EUAs.

It goes without saying that the changes which would be required for ESRI to correct their figures would lead to significant changes. The GHG emissions would have to be included. They would also have to be included using correct figures for CO<sub>2</sub> emissions. The damages from air pollution would also need to be included.

The numbers used in the calculation would also need to be corrected. For landfills, the emissions of methane over the first 20 years in the ESRI report amount to around 80kg per tonne of waste. ESRI does not state what they believe the capture rate of methane to be in their modelling – though they make the mistake of assuming that a 100% capture rate for methane is one of the 2 most likely scenarios for landfills in Ireland (this is the implied performance of Scenario A as considered in the ESRI Appendix). In our experience, no one believes this happens (in Ireland or anywhere else). The modelled scenario assumes that around 80kg of methane, equivalent to 60kg of carbon, is emitted in the first 20 years of site operation. Most municipal waste consists of around 250kg of carbon, of which, typically, half (125kg) is carbon of biogenic origin. ESRI assumes that only half of the degraded carbon gives rise to methane. That implies that over the 20 year period modelled, 120kg of carbon has been degraded, and 60kg of this has been lost as methane to the atmosphere. This would only be likely if there was zero gas capture at the site, and if the waste was either (or both) of a) rapidly degradable (no lignin), or b) containing a high proportion of degradable carbon within it in the first place.

For incineration, the emissions of carbon dioxide are wrongly transposed from a report for Defra by Enviro et al. The figure ESRI used is 100kg per tonne of waste. The figure in the Enviro report is 1000kg of CO<sub>2</sub> per tonne of waste incinerated (the figure in Table A.13 is around 0.86 tonnes per tonne of waste and might at least have triggered some form of consistency check).

ESRI goes on to multiply this by a damage cost of €13.4 per tonne of waste incinerated. They arrive at a figure of €1.34 for the CO<sub>2</sub> related externalities. Of course, if they had used the correct figure for the emissions, this figure would have been €13.40 per tonne. The levy, however, seeks to influence behaviour in the medium- to long-term. Hence, it is questionable whether the values for the levy should be set using the CO<sub>2</sub> price in ESRI's Annex A.1 for the year 2010. Table A.1 in the report highlights the changes in 'valuation figure' over time that ESRI propose for CO<sub>2</sub>. Because these figures bear no relation to damage costs (but reflect best guesses of what the value of EU allowances might be in future years), and because the EU-ETS enters another Phase from 2013, the figures rise (bizarrely, some would argue) in real terms to €31.7 per tonne CO<sub>2</sub> in 2013 before falling back. Since no incinerators are operating today, and since most waste which is currently planned for incineration will be so dealt with in years from 2012, then to use the 'early years' CO<sub>2</sub> price cannot in any reasonable sense be justified. If ESRI had carried out even their own calculation using the right numbers, then the CO<sub>2</sub> based externalities would be of the order €30 per tonne from carbon dioxide alone for the early years of incinerators' operation. This is a disappointing series of errors, though no doubt it produced a result which ESRI's client would have liked to see.

The externalities from the emissions other than greenhouse gases also need to be considered. The ESRI report looks at a range of sources for the assessment of externalities related to air pollution. It goes on to estimate the externalities from the air pollutants using damage costs chosen by ESRI from their review. They calculate values for the emissions of €11.16 in 2000 terms. They choose not to update these values to reflect current values. One of the reasons is presumably because they state that these are '*omitted, regulated through emission limits in waste licence*'. It's not entirely clear what economics textbooks ESRI was reading when it formulated the 'economic approach' they purport to espouse in this review, but we cannot think of any which would suggest that air emissions generate no externalities simply because the emissions result from a facility

which is regulated by a permit. Indeed, the damage costs which ESRI review are – in most cases - the result of studies which review the unit damage costs from pollutants emitted by facilities which are themselves regulated by licenses. The assumption that these are ‘internalised’ by regulation is ridiculous. It is surprising that an organisation with ESRI’s reputation could possibly subscribe to such a view.

The ESRI report argues that ‘little work has been done on establishing the key externalities likely to be associated with the formation of an MBT facility’. In fact, we have conducted four relevant studies, if one includes the review itself. It might have been of some concern to ESRI that most of the expertise in this area resides with our review team. Perhaps it is for that reason that they chose to use a source of data which is essentially incomplete and actually refers to something that is not an MBT process at all. The Annex to the International Review considers ‘whole processes’. The ESRI report does not.

The ESRI report is incredibly confused in its discussion of MBT. Immediately after stating that

*‘throughout this discussion, MBT is defined as “the treatment of residual municipal waste through a combination of manual & mechanical processing and biological stabilisation, in order to stabilise and reduce the volume of waste which requires disposal”*

the report goes on to discuss different MBT variants. The emissions it reports bear no relation to the process they describe. They take data from a Defra report, which in turn relied, for its air emissions data from MBT facilities, not on any specific MBT facility but on data from the BREF document for waste treatment which relates not to MBT facilities but to the highest end of the range of emissions reported from anaerobic digestion plant.<sup>9</sup> The Table in the source document is entitled ‘Examples of gaseous emissions from anaerobic plants’.<sup>10</sup>

The ESRI report also includes a footnote which states:

*‘For a general European context: waste treated via MBT is sent to landfill in Austria, to incineration in Germany and used as (low grade) compost in France, Italy and Spain (COWI, 2004).’*

This is wrong. In both Germany and Austria, the legislation encourages a degree of splitting of waste into ‘high calorific’ and ‘low calorific’ fractions, the former being treated through incineration or RDF combustion facilities, the latter being landfilled. In Italy, the use of MBT outputs is not primarily as ‘low grade compost’.

In short, ESRI’s review of MBT includes no data from MBT plants whatsoever. There is simply no point in discussing the analysis that is based upon this erroneous data. By comparison, the review Annex is based upon modelling based upon ten years of gathering data from facilities operating in the UK, Italy, Germany and Austria. The review includes analysis of different – relatively common – configurations, and covers the emissions from the whole system (including those from landfilling, and the use of SRF).

We do not see anything in the ESRI Report which gives any confidence concerning the ESRI assessment of the externalities of MBT when ESRI clearly has no clue what the emissions should be from which to base such an analysis.

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<sup>9</sup> The Table in the BREF document cites our own work. We are, therefore, quite well aware of the nature of the facilities to which the figures apply.

<sup>10</sup> p. 147 of the waste treatment BREF, to be found at [ftp://ftp.irc.es/pub/eippcb/doc/wt\\_bref\\_0806.pdf](ftp://ftp.irc.es/pub/eippcb/doc/wt_bref_0806.pdf)

### **Summary on Waste Levy Rates**

In summary, ESRI is a country mile from producing credible estimates of their own regarding a waste levy. Our estimates are broadly correct, and whilst some adjustments could be considered if one adopted the extreme interpretation regarding the extent of internalisation achieved by the EU-ETS (the level which would be achieved under a system auctioning all allowances), any other adjustments which might be considered 'necessary' should be set in context of the level of accuracy which could be attributed to any estimate. The aim has to be to inform and guide policy in the setting of a waste levy which strikes a balance between being environmentally informed, yet pragmatic in design.

## THE REVIEW DID NOT PRONOUNCE ON THE MIX OF TECHNOLOGIES REQUIRED

ESRI states:

*Turning now to the strategic or longer term issues. In the discussion in Section 7.3 above of the Section 60 policy direction to cap incineration and other matters it was argued that there was merit in considering the implementation of the Section 60 policy direction in conjunction with the international review which was to deal with the issue of mix of technologies. This proved a vain hope. The international review did not provide any guide to the mix of technologies. It is completely silent on the issue of the merits of MBT over incineration, except to say that some countries seem comfortable with high usage of incineration while the practical problems of switching from incineration to the MBT, such as stranded assets if a 30% regional cap on incineration were introduced, are not addressed.*

It is strange that ESRI are so insistent – most of all in a study which claims to take an economic approach – that a study on ‘policy’ should come out with some preference in terms of technology. We cannot understand how a preference for one or other technology would be consistent with the economic approach espoused by ESRI. In most economics textbooks, the argument put forward is one in favour of ‘getting prices right’, addressing other market failures, and allowing the market to deliver the appropriate outcomes. Because the International Review – consistent with an economic approach – takes the view that this is an appropriate approach, we did not feel the need to specify a preference in terms of technology. The levy internalises externalities. To the extent that it does so, why should policy seek to express an explicit preference?

What is more confusing about the ESRI criticism is that they themselves argue in favour of the very same technological agnosticism:

*We are neutral concerning the technological mix for dealing with residual waste management in terms of an a priori preference for landfill, incineration and/or MBT. There is no reason to prefer one technology over another, except on the basis of the private costs and benefits and the proposed residual waste levy that is set out above.*

We agree!!! Or at least, largely so, since we would suggest that the strategic context in which the choice of technology is being made also has a bearing upon those decisions, particularly if these are not so readily incorporated within the cost / benefit calculus.

The approach of the review is that we believe the policies we have recommended – the levy, in particular – are sufficient. We see no reason for a national policy to state an explicit preference for one technology or another. In that respect, we are strongly aligned with ESRI’s principles (though they jettison these in making their criticism). At the end of Annex 56, we made the point:

*It is widely held that Government policy is to favour thermal treatment over other forms of residual waste treatment. There is, it would appear, no clear and unequivocal reason to support thermal treatment over other forms of residual waste treatment, and in any case, to the extent that the levy proposed above simply seeks to internalise externalities, the levy itself effectively removes the rationale*

*for any such explicit discrimination – the aim of the levy is to allow the market to determine which facility is most appropriate.*

We suggested:

*In the light of the above, Government may wish to consider issuing a statement to the effect that as regards residual waste, the levy is intended to internalise environmental costs. With these estimated externalities internalised through the levy, other factors would be used to determine the pattern of residual waste treatment used, including other policy instruments and their effects. Indeed, it is not clear what is to be gained by Government stating a preference for one or other approach to dealing with residual waste if the levy comes into force, with the key issue then being to ensure that policy seeks to minimise the quantity of waste which is managed as ‘residual waste’.*

This last point is, of course, very important. The whole of ESRI’s focus is on the levy, and what it implies for the decisions regarding incineration and MBT. Through assuming that virtually all externalities could be ignored, ESRI’s levy is rendered more or less impotent in the effect it exerts upon waste prevention, re-use and recycling. Indeed, it is not at all clear that ESRI appreciates the basic economics of waste management (or anything else, for that matter), and the fundamental fact that the price for residual waste treatment / disposal is a key financial driver in moving waste management up the hierarchy.

Perhaps it might, with hindsight, have been better to make all of this clearer in the Summary report. However, the Summary was seeking to condense an enormous amount of material into a summary, and it concentrated on what policies were required. The clear absence of a policy which explicitly states a preference for one or other residual waste technology other should be taken for what it is and though this is entirely consistent with an economic approach, apparently, ESRI feel that ‘policy’ should come out with something about ‘technology’ other than a levy to internalise externalities. We fail to see why this would be necessary under the economic approach which ESRI claims to be espousing, and whilst they criticise us for not coming out in favour of one or other approach, at the same time, it is their preferred approach.

What was it, in fact, that we did wrong?

## THAT THE TARGETS FOR RESIDUAL WASTE ARE NOT CREDIBLE

The ESRI Report states:

*A major reduction in the volume of household waste will have important implications for residual waste treatment capacity. The international review recommends that the level of residual household waste per capita is to be halved over a 13 year period from 300 kg to 150 kg. England and Wales are cited as having similar targets, but they are taking 20 and 16/17 years, respectively. No explanation is provided as to why Ireland will be able to achieve these targets so much quicker and what the additional costs are of such a rapid reduction. Thus the target is not credible.*

The first sentence is illuminating – is ESRI really suggesting that reducing residual waste would be a bad thing? Would it be wrong to reduce the amount of waste, or increase the amount recycled / re-used? Should the aim of waste policy be to ensure that there is sufficient residual waste to feed whatever facilities are built for such purpose?

We have been here before. We are used to the more backward elements of the waste industry suggesting that targets are ‘unachievable’, ‘impossible’, ‘not credible’ etc., etc. No doubt this was the response when the recycling targets for municipal waste were set for Ireland back in 1997 – yet these were achieved well in advance of the 2013 date that was set. It was also the case when we argued for higher recycling rates in the UK back in 1999-2001 when strategy targets were set for the different countries of the UK. Our work for the Welsh Government proposed 40% recycling rates for 2010 reserving the right to move to 60% thereafter. The Welsh Assembly Government adopted these targets and has now set a target of 70% recycling. In England, we have long argued for rates in excess of 50%. After some time, Defra has now established 50% as its national target having – like Ireland – met its erstwhile ‘challenging’ recycling targets in half the time it originally allowed. Scotland has considered a 70% target and its strategy is in the final phases of development.

The fact remains that the target is eminently achievable and it will be all the more achievable the more clear it becomes that the targets are there to be met. Hence, we explicitly sought to ensure that the target was backed by an incentive to encourage local authorities to develop the necessary services to deliver the required results.

ESRI might well feel these are ‘challenging’, the common term used for those worried by such targets, if only because their projections for waste growth are so obviously wildly out of kilter with what any sensible commentator would suggest. It is unfortunate that the model in which these. Indeed, we are keen to make clear that ESRI is wrong to state that we gave any serious thought to using their projections. They state:

*However, this statement is not entirely consistent with the fact that there are two quite different sets of forecasts are included in the report and are used for different purposes. In Annex 63 Eunomia estimates the growth of household and non-household municipal waste (Eunomia et al., 2009, Annex 63, Table 63-35, p. 1032) up to 2016, while in the RIA released at the same time as the international review uses the forecasts that are provided by the ESRI/EPA ISus model,57 which are based on the same methodology we have discussed in Section 5 above. The forecast waste growth rates used in the Annex 63 analysis are very low by historical standards (1-2% per annum) and do not seem to be based on an*

*analysis of the likely growth in the number of Irish households or other recognised drivers of waste arisings.*

We did not use the ISus model. Those who carried out the RIA may have done so, but that RIA was not carried out by us. The ISus model – let us be frank – gives truly horrific projections for waste growth. It may have been an interesting intellectual exercise but we can confidently assert that these projections will be shown to be wrong. The point in the paragraph above that the projections we used ‘*are very low by historical standards (1-2% per annum) and do not seem to be based on an analysis of the likely growth in the number of Irish households or other recognised drivers of waste arisings*’ suggests that the future will always look like the past, even though logic suggests that there might be some danger in projecting forward fifteen years when one only has ten years or so of data of variable quality upon which to base the forecast. Indeed, statistically, this is unlikely to be an especially robust approach.

The first detailed objection to the targets is one concerning variation in household size. We know that this varies, and we know that household waste per inhabitant declines as the household size increases. We are looking at performance across local authorities, and there will be variation across them. Some will do better than others. The target is not intended for everyone to hit exactly. Targets are rarely met if one does not plan to exceed them.

The second objection from ESRI relates to the time period we have proposed. How long should this take? The principle limiting factor here will be:

1. The implementation of initiatives to prevent waste at source;
2. The development of the necessary collection systems; and
3. The development of the necessary treatment infrastructure to handle source segregated biowastes.

In the case of the first of these, there are some initiatives already under way, but this target would be expected to make their implementation less patchy across the country, whilst additional initiatives would be expected to be implemented at the local level.

In the case of the second of these, the longest lead-time required for any local authority would be related to the replacement cycle of the vehicle stock. This would be seven years at most.

In the case of the third of these, the relevant constraints relate to planning and funding for biowaste treatment facilities. The International Review recognises this and suggests a need for speeding up the planning process for facilities treating biowaste (not, as ESRI seems to believe, MBT facilities), whilst suggesting some levy revenue could be used to support biowaste treatment facilities.

Hence, in principle, if all was already in order, this target could be achieved in 7 years. Annex 59 of the International Review shows Flanders moving from 325kg/inh to 159 kg/inh in 9 years. The target is ‘challenging’ but very far from impossible.

There is a strange paragraph around target setting which reads as follows:

*Without an estimate of the level of residual BMW in excess of the Landfill Directive targets for 2013 and 2016, it is difficult to see how the international review can set credible targets for residual waste per household as well as recycling targets. The targets that are set may be too high, too low or just right.*

*Thus there is a disconnect between the goal of meeting the Landfill Directive targets for 2013 and 2016 and the various recommended targets set out by the Eunomia consortium.*

Let us be clear that whilst the International Review was tasked with considering policies to meet the Landfill Directive, this was not the only objective of the review. As such, the Landfill Directive was not the single point of orientation for the review, important as it may be. The 'disconnect' being highlighted reflects the absence of a need for a 'connect'. This will become clear in what follows.

## THE REVIEW FAILS TO ENSURE IRELAND MEETS ITS LANDFILL DIRECTIVE TARGETS

The ESRI report states, in referring to the Landfill Directive:

*In the short term, the most important goal of waste management policy is ensuring that Ireland meets the Landfill Directive targets for 2010, 2013 and 2016. Failure to do so will result in, potentially at least, large EU fines. Here the international review must be considered a failure. The international review does not set out the magnitude of the problem, except for 2010. It prefers not to forecast the likely magnitude of BMW for 2013 and 2016 on the grounds that it is extremely difficult and that there is considerable uncertainty. Curiously, two contradictory sets of forecasts are used for different purposes in annexes to the report, and they are neither compared nor used in the main report.*

One of the problems for the review was that existing policy clearly gave no actor any incentive to meet the Landfill Directive targets, and even though the regions might have been considered to be responsible for meeting the targets, there was no obvious target for them, let alone any sanction for not meeting one.

During the period in which the International Review was prepared, the EPA consulted upon, and then issued Technical Guidance on pre-treatment and residuals management (EPA (2009) *Municipal Solid Waste - Pre-treatment and Residuals Management: An EPA Technical Guidance Document*, Johnstown Castle Estate: EPA). The potential for this document to influence the meeting of short-term targets was deemed to be slim. Indeed, the potential to change much in the period before the first target had to be met (this year) was also slim, and so we suggested a series of possible short-term measures to be implemented.

In the period to 2013, we would expect that the Guidance would have some effect. However, we were not of the view that sufficient certainty would be given to meeting 2013 targets through the measure envisaged, which in its current form would not allow any waste to be landfilled unless it had been treated to render it no longer biodegradable (thus dealing with the Landfill Directive issue – in principle, no other measure is required though the levy incentivises the necessary changes in the intervening period). The International review states, therefore:

*The EPA's recent issuing of Technical Guidance on Municipal Solid Waste - Pre-treatment and Residuals Guidance should assist in delivering Landfill Directive targets.<sup>11</sup> There are reasons to believe that it will not be sufficient, at least not until 2016, when the pre-treatment requirement effectively eliminates the biodegradability of landfilled waste of municipal origin. We suggest that the requirement to biologically pre-treat waste prior to its being landfilled (to the proposed standard for stability) be brought forward to 2013. This is likely to give additional certainty that the 2013 targets will be met. However, we also suggest that the target level of stability at which waste is considered no longer biodegradable for the purpose of the Landfill Directive is set at 10 mg O<sub>2</sub>/g d.m and not at 7 mg O<sub>2</sub>/g d.m. for the period from*

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<sup>11</sup> EPA (2009) *Municipal Solid Waste - Pre-treatment and Residuals Management: An EPA Technical Guidance Document*, Johnstown Castle Estate: EPA.

*2013. Changing the standard from 10 mg O<sub>2</sub>/g d.m to 7 mg O<sub>2</sub>/g d.m will simply diminish capacity with practically zero environmental benefit.*

ESRI does not mention the EPA's Pre-treatment Guidance, even though it constitutes the major measure for implementing the requirements of the Directive. If this is effectively implemented, then there would be no need for an alternative measure. Of course, the effective ban on landfilling waste that has not been pre-treated raises questions as to where that waste should go. The other recommendations in the report are designed to assist in ensuring that the situation does not arise whereby waste requiring treatment essentially has nowhere to go.

The ESRI Report goes on to state:

*However, Eunomia could have considered alternative scenarios to assist in guiding policy. Does it matter if BMW grows at 1% or 4%? Which is more likely? The scenarios indicate a range of possible outcomes, depending on the assumptions made. Suppose, for example, under all reasonable scenarios there is a large volume of residual waste for 2013 and 2016. If this was the case then it would make sense to invest in (say) an incinerator since these have a large sunk capital component and need to operate at close to capacity to achieve maximum efficiency. If, on the other hand, the evidence was much more equivocal about what the level of residual waste, then it would make sense to invest in technologies that could be ramped up at short notice or perhaps waste could be exported for disposal.*

In truth, for policy purposes, it does not matter much whether BMW grows at 1% or 4%. Why should that, or rather, our lack of knowledge as to exactly what the growth might be, change the policy? It might change the requirements (in terms of the quantum of infrastructure etc.), but apart from seeking to reduce the amount of waste generated (for perhaps obvious reasons, and arguably, the more so the more waste grows), policy should set the framework for making decisions regarding infrastructure, not make them itself. This is, again, entirely consistent the ESRI report's own proposed economic approach (which they choose, it seems, to pick up and then let drop rather like a loose pair of pants).

We would be concerned, however, if infrastructure planning requirements (as opposed to policy) were set on the basis of a high projection of waste growth in years ahead.

## THE REVIEW DOES NOT PROVIDE A ROADMAP

The ESRI Report states:

*The purpose of the international review is to provide a roadmap for waste management policy in Ireland.*

*For a roadmap to be successful, however, it must provide unambiguous instructions, which can be easily understood. In the context of the international review this means that the recommendations must be clear, have a carefully explained and sound rationale and be credible. A characteristic of some of the most important recommendations made in the international review is that these conditions are not satisfied.*

First of all, it was not the intention of the review to provide 'a roadmap'. The Request for Tenders makes no mention of this. The Eunomia team does not set policy for Ireland.

It is also important to recognise – particularly with respect to the Landfill Directive – that a review of policy is not the same as 'a strategy'. As such, a review of policy would not 'tell everyone what to do'. Indeed, this would be inconsistent with an economic approach to waste management, which would seek to incentivise behaviour such that it moves in the right direction.

The review aims to highlight policies which could be implemented in Ireland, but it could not – itself – determine which policies would or would not be chosen for subsequent implementation. It would have been arrogant for the review to determine that every recommendation would in fact be implemented. That having been said, the policy recommendations are clear, they have a sound rationale, and they are credible. It is worth recalling that your organisation – as clearly demonstrated by this report - knows next to nothing about the subject it has been asked to discuss. The collective experience of the authors in this area is extraordinarily limited. It is unsurprising, therefore, that the report fails to understand the policy recommendations being made, and also, the fact that they are recommendations only. The Summary Report states clearly:

*some consultees and some others viewing this study have suggested that any recommendation should be accompanied by a full cost benefit analysis. In a study of this nature, this would be both premature, whilst also being, a very significant task given the number of recommendations. It is not, generally, possible to conduct a full cost-benefit analysis of a policy proposal until that proposal is well developed (the costs and benefits of implementation will depend upon the detailed design). Furthermore, in this work, the changes proposed are not necessarily 'discrete'. The costs and benefits of one change being undertaken have an impact on the costs and benefits of undertaking another. The task of working up any specific policy for its subsequent implementation is not a trivial task. The point at which a policy is well developed (in terms of its detailed design) is the appropriate time at which to conduct such an analysis (rather than in advance of a policy being taken forward for consideration).*

The point of the Sequencing and Dependencies exercise was to make clear that if a given policy was implemented, or indeed, not implemented, then the decision might have ramifications for another policy, and

that these should be considered. In other words, it was not our assumption that each recommendation would be adopted, though clearly, our view is that matters would be improved if they were.

## IMPLICATIONS OF THE ABOVE FOR ESRI'S CONCLUSIONS

Returning to the key criticisms made:

1. That the basis for the levy on residual waste is not clear from the underlying research;  
We have noted that ESRI both mis-read the report, and also failed to read relevant Annexes. We accept that matters could have been slightly clearer, but the mistakes are mainly of ESRI's own making;
2. That the levy rates proposed are flawed because they include externalities which are already internalised and because no account is taken of disamenity;  
On disamenity, we think there is a judgement call to be made. On the changes implied by the actual level of internalisation, the key effect is to increase the recommended levies for incineration and for SRF combustion at cement kilns. The effect is only of great significance if one assumes that the way in which the existing EU-ETS affects the price of electricity is that all electricity is priced in a manner such that the traded price of EUAs affects electricity prices directly, and in the same way as if all allowances were auctioned. This is an extreme assumption. There is minimal impact on the other processes covered by the levy, and the Carbon Tax has a trivial influence on the next externalities of the processes (the greatest effect is €0.5 per tonne for incineration). The same cannot be said for ESRI's own analysis, which omits key externalities because mistaken assumptions about the effects of policies. ESRI's values imply that the uninternalised externalities of incineration and MBT are more or less exactly the same whether or not the facility is actually treating waste (because only disamenity, and a trivial contribution from methane, are considered). There is no reason for ESRI to re-hash the already hashed analysis;
3. That the review did not pronounce on the mix of technologies required;  
We have highlighted the fact that our approach – of not making such a pronouncement – is actually entirely consistent with ESRI's own view, which stated: *We are neutral concerning the technological mix for dealing with residual waste management in terms of an a priori preference for landfill, incineration and/or MBT. There is no reason to prefer one technology over another, except on the basis of the private costs and benefits and the proposed residual waste levy that is set out above.* We are not in the habit of criticising people who agree with us, and suggest ESRI follows a similar course of action;
4. That the targets for residual waste are not credible;  
The time required is no more than seven years. The targets look more challenging than they are owing to ESRI's worryingly high growth rate projections. The residual waste targets will be more likely to be met with the financial incentives as suggested by the levy from the International Review (and the incentive would be enhanced if the changes hinted at in this document were also implemented);
5. That the review does not ensure that Ireland meets its Landfill Directive targets;  
The ESRI report does not mention once the EPA's Pre-treatment Guidance (other than referencing the document as a source of data), which was finalised during the course of the International Review. This effectively implies a ban on landfilling biodegradable waste by 2016, so constitutes the principle means through which that target will be delivered. Our suggestion (in the International Review) was to bring this measure forward in time to give additional certainty that targets in 2013 would be met. This, along

with other measures recommended, should be sufficient as long as the Guidance is implemented as planned; and

6. That the review does not provide a roadmap;

It is not entirely clear what this means. The International Review was about policy, not specific actions, or pieces of equipment. These decisions should be taken at more local level, with the national policy guiding, rather than making, these decisions.

It is difficult to see how the recommendations in the ESRI report could remain as they are once the report is revised. In particular, we are more confident than ever that with the exception of the cement kiln levy, and to a lesser extent, that on incineration, the proposed levy rates are as they should be. It is, of course, a matter for Government to decide the appropriate rates at which to set the levy, and indeed, upon the nature of implementation of other policies recommended in our review.

The International review was not a failure. ESRI suggests that:

*First, the task is too big and the terms of reference were too wide. Second, in the 2007 Programme for Government and Section 60 policy direction on incineration and other matters constraints were placed on policy choices for no coherent or compelling reason. In other words, incineration was to be disfavoured and MBT encouraged. Starting from what appears to be an ill-thought premise and then write a coherent report is a difficult task even for the best of researchers.*

The insinuation that the Programme for Government and Section 60 policy direction on incineration and other matters constrained, or directed our thinking is simply untrue. Obvious evidence of this is to be found in the non-zero rates for levies on MBT, and in the following paragraph in the Summary Report:

*It is worth noting that the combination of measures proposed in this Policy Review would, in our view, if implemented in full, render the need for measures to limit incineration capacity, envisaged under the Section 60 Policy Direction, more or less redundant. Incineration would be no more, or less, constrained than other residual waste treatments, but the emphasis would remain on shifting waste up the waste management hierarchy, leading to the achievement of significant environmental benefits.*

ESRI has made some cheap shots in an expensive report, but it has made a number of mistakes, it has been inconsistent in the way it supposedly upholds economic principles, and made assumptions in matters of economics that are extremely difficult to comprehend. There are many more errors outside the narrow confines discussed here, but we simply do not have the time to go into all of them. One depressing paragraph, which I have taken the liberty of marking up in capitals, is highlighted below. It is all froth and bluster, a piece of lobby-oriented polemic full of mis-representations, which is actually rather disgraceful and discredits the good name of the organisation.

## A FINAL NOTE - THE REAL ECONOMICS OF WASTE MANAGEMENT AND WHY ESRI DOES IRELAND A DISSERVICE

It is interesting that the 'economic approach' to waste management shows little knowledge of anything other than landfill gate fees. On the Irish Economy blog, an ESRI Professor, made the following statements about incineration costs:

*"The ESRI indeed does not optimize the portfolio of waste management options. However, walking away from incineration now would trigger a substantial claim for compensation." ...*

*... "Incineration is a relatively clean, relatively cheap way to get rid of waste. This explains its popularity"*

*... "The ESRI report does not deal with these (cost of incineration) issues.*

*My comment about the relative costs of incineration is based on its widespread use in the rest of Europe."*

This is stunning economics. The statement that incineration is 'relatively cheap' is based, apparently, on no understanding of what those costs are, only the costs of compensation claims. The costs of consultants alone to Dublin have already run up to a sum equivalent to the capital cost of a 100,000 tonne MBT plant (which could be built far more quickly).

Generally, as a rule of thumb we find that once residual waste treatment / disposal costs rise to above around €90 per tonne, then in most EU countries, source separation of most materials stacks up financially;

In Annex 64, we carried out some analysis of possible costs of different waste management systems. This looked specifically at rolling out food waste collections;

*In Error! Reference source not found., we show how the costs of the modelled service (as described above) would change when a dedicated weekly collection of food waste is added to the existing service. It can be seen that the increase in cost per household is relatively small, with higher collection costs offset by reduced costs for treatment and disposal.*

*It should be noted that:*

- 1. The above analysis assumes no change in the frequency of refuse collection. If such changes occurred, costs ought to fall as round logistics are re-optimised; and*
- 2. The above analysis assumes no change in the costs as the costs of residual waste treatment / disposal increase, so the collection costs will remain unchanged, but the costs of dealing with the collected residual waste increase. Hence, the effects of an increased landfill levy would be expected to move the balance in favour of the system which sends less material to landfill.*

*If such possibilities were factored in, the financial argument would shift more in favour of the system which includes the collection of food waste on a weekly basis.*

The relatively high cost assumed for biological treatment in the analysis in Annex 65 (high compared with UK and several other countries) suggests this 'break even' residual waste treatment / disposal cost is higher in Ireland (order €110-120 per tonne) than in some other countries, at least for biowaste, since the biowaste treatment costs are high (and the incremental cost of separate collection of biowaste is partly a function of the differential between the costs of biowaste treatment and the costs of treating / disposing of residual waste)

The decision of ESRI not to internalize the relevant externalities from waste treatment, quite apart from being incorrect, effectively undermines the economics of separate collection. This comment is not obviously appreciated by ESRI. The supply of recycling services (and the breadth of their scope), not to mention the efforts to prevent waste, is affected by the costs of residual waste treatment / disposal which will be avoided by recycling (or waste prevention).

Properly internalising the external costs of residual waste management IS likely to achieve the objectives ESRI set for waste management, namely increasing social welfare. That is why internalising externalities correctly is desirable. Under the ESRI approach, demand for MBT and incineration will exceed the level which maximizes social welfare precisely because the demand for these services will be above what it would be if the externalities were properly internalised. In essence, the half-baked defence of one incinerator project by the ESRI Report actually serves to undermine the very objective that ESRI assigns to the role of public policy – that of maximizing social welfare.