

52 Claremont Road
Sandymount
Dublin 4

Monday 3rd September 2007

Dr Jonathan Derham
Office of Licensing & Guidance
Environmental Protection Agency
PO Box 3000
Johnstown Castle Estate
County Wexford

Re: WO232-01
Waste Licence Application by Dublin City Council
Dublin Waste to Energy Project
Pigeon House Road
Poolbeg Peninsula
Dublin 4

Dear Dr Derham,

Please find attached our submissions to the EPA on the implications of this proposed development for impact on the environment.

The most serious aspect of this proposal is that it will dump over 667,700 tonnes per annum of greenhouse gas into the atmosphere. The earth cannot tolerate any further increase in the CO₂ load.

Therefore the only sustainable option is to bury this waste in landfill after using anaerobic digestion to deal with the putrescible fraction.

The remaining CO₂ in the landfill would take some 25 years to release and would thus put back the impact of the remaining CO₂ while humankind grapples with the global warming crisis.

We owe it to our children and to ourselves to avoid making the current crisis any worse.

We attach a PowerPoint presentation with a detailed critique of the climate assessment presented in the EIS. The climate assessment was produced by Dr Edward Porter of AWN.

We had the opportunity to cross examine Dr Porter at the oral hearing held by An Bord Pleanála in Dublin from April to June this year. During that cross examination Dr Porter admitted that we had identified many mistakes in his modelling.

The mistakes made by him fundamentally undermine his conclusions as presented in his Poolbeg 1 Model and Poolbeg 2 Model. He acknowledged to the ABP hearing on 7th June 2007 that his Poolbeg 1 and Poolbeg 2 models could not be defended.

The numerous corrections required to his models are detailed by us in the attached presentation. These corrections show that this proposed plant is seriously injurious to the climate contrary to the claims made in 19 places throughout the Non Technical Summary, the EIS and its appendices.

As far as we can ascertain from your website, Dublin City Council has presented only two models to the EPA:

- the Poolbeg 1 Model in the original EIS in 2006, and
- the Poolbeg 2 Model on the CD submitted on 8th May 2007.

The applicant has not presented the Poolbeg 3 Model which was submitted to the oral hearing held by ABP.

We note that the European Communities (Environmental Impact Assessment) Regulations, 1989 to 2001 require the EIS to contain, inter alia, the following:

- (b) The data necessary to identify and assess the main effects which that development is likely to have on the environment;

The applicant has admitted to the oral hearing held by ABP that the data supplied in the EIS is incorrect.

We believe the EPA therefore is not in possession of the data necessary to identify and assess a mandatory aspect of the licence application namely the impact on the climate of the proposed development.

I would be grateful if you would confirm whether the EPA is yet in receipt of Dr Porter's third attempt at modelling the climate impact of this proposed development.

If you are, then we have additional material to submit to you. If not then we respectfully submit that the application is incomplete and can not be proceeded with until the applicant complies fully with Article 16.

Accordingly we ask the EPA to refuse a licence for this development.

Yours sincerely,

Yours sincerely,

Joe McCarthy
Chartered Engineer
BSc FICS MMII DLS CEng MIEI

Valerie Jennings
Chartered Physiotherapist
MCSP MISCPLicAcu

1. Unsustainable Development

This proposed development is unsustainable for the following reasons:

1. The cost of incineration is higher than the cost of landfill.
2. The greenhouse gas emissions from this plant are worse than emissions from landfill with anaerobic digestion.
3. Immediate release of the entire carbon fraction in the waste – 667,700 tonnes per annum.

2. Unsustainable Cost

It will be too costly to run.

The published running cost is already higher than the cost of landfill.
The published costs are also underestimated.

The development will become a White Elephant as a burden on the citizens of Dublin for the next 30 years. There is likely to be a drastic correction to our production of greenhouse gases as a result of policy changes by Government as it takes into account the urgency of the global warming crisis.

Since DONG / Elsam have been given guaranteed deliveries of waste under the Put or Pay clauses of the contract we will then be left paying for this incinerator for the remainder of the term without receiving any benefit for the expenditure.

Costs published in the EIS

The costs for the proposed incinerator can be derived from the figures presented on page 2 of Appendix 13.2:

Waste to Energy Environmental Impact Statement – Community Gain Proposals

Proposed Scale of the Community Gain Fund

Dublin City Council is proposing that the fund should comprise a once-off capital contribution of 3% of the capital cost of the facility and an annual revenue contribution of 0.5% of the amount of revenue generated by gate fees at the facility during its lifetime, subject to maximum annual contribution of €500,000. Based on the estimated construction cost of €266m, the capital contribution will be of the order of €8m. Based on a throughput of 600,000 tonnes per annum, the annual revenue contribution will be of the order of €265,000.

From the above paragraph we extract the following costs:

Construction cost: €266 million
Gate fee: €265,000 is 0.5% of the gate fee for 600,000 tonnes per annum
Total gate fee is therefore €53,000.000 per annum

Gate fee is therefore €88.33 per tonne

Costs omitted

Omitted from the published costs are several items which should have been included in the pricing model for this incinerator. These additional costs are:

1. Transport costs
Original site selection was based on having the South-Eastern Motorway running

across Sandymount strand to the M50. This roadway is not in place causing all traffic for the incinerator to run through Ringsend / Irishtown. It now means that all trucks from the baling stations arriving at the site will incur an East Link toll fee twice – one arriving and one departing and a portion will also incur West Link toll fees on the M50. These costs have not been assessed.

2. CO₂ emission costs

The Kyoto carbon credits are currently running at some €17 per tonne (Irish Times 25th July 2006). The excess CO₂ tonnage emitted by this plant should be costed.

3. Cost of bottom ash disposal

The applicant is proposing that bottom ash be exported abroad by sea from Dublin Port. This is an unsustainable proposal since reuse of bottom ash in other countries such as Denmark and the UK is only feasible due to Government policy interventions in those markets.

The bottom ash cannot be exported until testing of leachate proves it is not hazardous. The applicant has not stated where this testing is to take place. Section 10.5.3 on page 10-6 states that the bottom ash pre-treatment will not be undertaken at the Dublin WtE facility. Aging of bottom ash takes some 6 to 8 weeks to complete and during this period substantial changes occur in the chemical composition of the ash. The classification of the ash as hazardous or non-hazardous is unknown until pre-treatment is completed.

This means that the ash cannot be exported directly to another country contrary to the statement by the applicant. The consequences are that the bottom ash must be disposed of in Ireland entailing a considerable increase in traffic and additional costs for transport and for landfill fees. These costs have not been assessed.

4. Cost of baling of waste at the three baling stations were omitted.

5. Revenue from sale of heat is assumed with no proven demand.

It is notable that DCC has approved the Fabrizia application for 737 apartments within 500 metres of the incinerator site but have not specified any planning condition requiring use of the heat from the proposed incinerator.

6. The original BATNEEC decision was based on a 19% difference in NPV of the four scenarios. The NPVs were derived using an incorrect cost of money at 6.5%. Euribor is currently 3.53%.

Please see the attached Submission (August 2004) by J McCarthy to the Waste Management Plan Review by Dublin City Council for worked details of these omitted costs. The submission shows an additional €45.9 million per annum in omitted costs from the original MCKK Technical Studies and Dublin Waste Model (1997).

The gate fee of €88.33 per tonne proposed is at the same level as current landfill fees in Leinster and, when the above factors are priced into the project, may be much higher than landfill fees. The additional costs are likely to double the gate fee.

Such a high fee is unsustainable for the people and businesses of Dublin.

Such high fees might also encourage illegal dumping to avoid fees.

Affordability for the Developer

Indaver Ireland stated on 19th September 2006 at a conference at the Radisson – St Helens that their proposed incinerator in Carranstown, Co Meath will be uneconomical at a gate fee €90 per tonne.

They have demanded that Government intervene in the market by imposing a tax on landfill to bring the gate fee for landfill up to €120 per tonne before they are willing to proceed with their €100 million investment.

This begs the question of commercial interests dictating national policy in waste management.

If Indaver cannot run an incinerator with a gate fee €90 per tonne how can DCC afford to do so at €88.33 per tonne?

We suggest that the development is unsustainable on cost grounds.

3. Unsustainable Greenhouse Gas Emissions

Section 8 and Appendix 8 of the EIS.

The EIS states in Section 8.4.2 of Appendix 8.2 that burning the waste in the proposed incinerator produces more greenhouse gas emissions than treating the same waste using landfill with anaerobic digestion (AD). The difference between the treatments is 551,000 tonnes of CO₂ equivalent over the life of the proposed plant. (Table 8.11)

On page 21 of the non-technical summary of the EIS the applicant states:

9.3. Climate

9.3.1. An assessment was undertaken of the impact of the Facility on climate, in particular the greenhouse gas emissions from the Facility were quantified and compared with the alternative of landfilling the same amount of waste. The Facility was found to have marginally less greenhouse gas emissions than the landfilling alternative.

This statement is wrong. The applicant's detailed analysis states the opposite at Section 8.4.39 on page 8.29 where we find:

However, landfilling in conjunction with anaerobic digestion offers a small net savings over incineration of the order of 0.03% of the total greenhouse gas emissions in Ireland in 2012 (see Figure 8.6).

In plain terms incineration is the worst option available.

Please also refer to the detailed critique of Dr Porter's models accompanying this submission.

4. Immediate Release of Entire Carbon Fraction

A more important factor is the effect which incineration of our waste will have on the planet in the short term up to 2020. The global warming crisis is now acute making this proposed development unsustainable in the true sense of the word.

If proceeded with it will dump instantaneously the entire carbon fraction of Dublin's waste into the atmosphere causing an immediate increase in the greenhouse gas burden which the biosphere must cope with.

If the same quantity is treated using landfill, with AD of the putrescible fraction, any greenhouse gas release will be significantly delayed with gradual release over some 25 years. Since the global warming crisis will peak in the next 15 years we must as human beings, never mind as Irish people, do all and everything we can to reduce the greenhouse gas burden.

The EIS states (Table 8.5) that in one year the incinerator will release 135,165 tonnes of CO₂ equivalent whereas the same waste going to landfill and to AD will release some 5,000 tonnes of CO₂ plus some 2,000 tonnes of CH₄ (estimates interpolated from Figure 8.1 of Appendix 8.2).

The short term one-year affect of incineration is therefore some 22 times worse than the alternative.

However, the actual carbon released is five times greater than the amount used in the EIS Climate Assessment calculations. This is because the authors use a fossil carbon fraction of 20.6 % in their analysis. The greenhouse gas released in one year by the incinerator is actually:

$$135,165 / 20.6\% = 656,140 \text{ tonnes.}$$

A comparable figure for the GHG released in the first year of a landfill with AD is estimated at 35,000 tonnes.

This difference of some 620,000 tonnes per annum cannot be ignored as the global warming crisis is already here.

We suggest that this release of greenhouse gas is unsustainable.

We respectfully request the Agency to seek additional information from the applicant to thoroughly analyse this aspect of their proposed development.

Having recalculated Dr Porter's climate models, our assessment is that the incinerator will release 17 million tonnes CO₂ eq in 25 years of operation whereas landfill with AD will release some 3.0 million tonnes.

Incineration is almost six times worse than the better alternative.

5. Sludge from Sewage plant

The application to the EPA details that 80,000 tonnes per annum of sewage sludge from the adjacent Tertiary Treatment Works will be incinerated in the plant. This is contrary to all statements at the Information Days run by DCC in Ringsend. Mr Matt Twomey explicitly denied on many occasions that sewage sludge would be burnt.

The principal reference in the EIS to sewage sludge is on page 5-7 as follows:

Sludge Pipeline

5.5.39. In the event that land spreading of sludge will no longer be an option due to environmental constraints, it will be possible to pump the sludge directly to the proposed WtE Facility for thermal treatment. It is intended to provide a sludge pipeline from the Ringsend Wastewater Treatment Works.[our emphasis] The sludge would be pumped from the Ringsend Wastewater Treatment Works and injected into the waste feed hoppers.

Here we find, buried deep in the EIS and in the middle of a paragraph, the most important sentence in the whole document.

The applicant is clearly requesting a licence to burn sewage sludge. However, the applicant does not state in the EIS the quantity of sludge which they wish to incinerate.

The EIS submitted to the Agency does not address the impact of burning of sludge at all. In fact the details are only to be found in the EPA application as shown in the following extract:

Attachment A.1 Non Technical Summary on page 5 of 232:

A.1.3 Quantity and Nature of Waste

The types of wastes to be accepted at the Facility include:

- Household
- Commercial
- Industrial Non-Hazardous Waste

Waste will be accepted only from permitted waste hauliers. No hazardous waste will be accepted at the facility.

The proposed quantities of waste to be accepted at the proposed Facility are given in the table below.

WASTE TYPE	TONNES PER ANNUM (proposed) (Note1)
Household	0-600,000
Commercial	0-600,000
Sewage Sludge (Note 2)	0-80,000
Industrial Non-Hazardous Sludges	0-80,000
Industrial Non-Hazardous Solids	0-600,000

Note 1: This application is being made for Household, Commercial and Non Hazardous Industrial waste which in aggregate is not to exceed 600,000 tonnes per annum. The detailed split of the types of waste is unknown at the time of submission of this application

Note 2: In the event that land spreading of sludge will no longer be an option due to environmental constraints, it will be possible to pump the sludge directly to the proposed WtE facility for thermal treatment

Note 1 in the above extract is ambiguous on the question of total quantities to be incinerated.

- Q. Is the total 600,000 tonnes per annum of all matter? or
Q. Is the total
600,000 tonnes of Household, Commercial and Non hazardous Industrial waste
plus
80,000 tonnes of sewage sludge
plus
80,000 tonnes of Industrial Non-Hazardous Sludges
making a total of 760,000 tonnes per annum?

Please seek additional information from the applicant to identify the exact quantities of each of the 5 waste types listed in their EPA application they intend to incinerate in the proposed development.

Impact of Incineration of Sludge

Table A8.3 in the EIS shows that sewage sludge is 13 times more potent than municipal waste in the release of N₂O which is 310 times more potent than CO₂.

One reading of the impact of incinerating 80,000 tonnes of sewage sludge is:

$$80,000 \text{ tonnes sludge} \times 13 = 1,040,000 \text{ tonnes MSW equivalent}$$

There will also be a significant reduction in the thermal efficiency of the plant if it is used to dry the wet sludges. Sewage sludge has a negative calorific value.

The applicant should be requested to supply additional information to analyse the impact of incinerating large quantities of both sewage sludge and industrial non-hazardous sludges in their proposed development.

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6. Visual Impact

The proposed building is enormous. It will be as tall as Liberty Hall and as long as Croke Park. This will be intrusive on the views from the shoreline all around Dublin Bay.

The proposed development will by reason of its overall height, scale, bulk and massing be visually intrusive in the landscape and will adversely impact on views from the shoreline all round Dublin Bay.

7. Traffic

Site selection proceeded on a false premise. The original traffic assessment was based on having the SE motorway across Sandymount strand which is neither built nor planned.

Traffic studies were based on 2004 traffic figures. These are now out of date.

Note that a new cement factory is in operation on Pigeon House Road opposite the proposed site since the traffic figures were collected. Also note that additional traffic in the area will be caused by:

- the Fabrizia development
- the building of the Lansdowne Stadium
- the new AIB Bankcentre and
- the extensive developments at Grand Canal Docks.

The traffic analysis has omitted the impact of traffic required to landfill the bottom ash.

8. Health

We have been particularly concerned about ultrafine particles emitted by incineration. Ultrafine particles are PM_{0.1} that is particles of less than 0.1 micron or 100 nanometers in diameter. Nanoparticles of otherwise benign substances are now found to be toxic at this small scale. The human body has no defenses against them.

The fabric filtration Flue Gas Treatment technologies proposed by the applicant are inadequate in stopping these particles.

The scientific understanding of these particles is incomplete and consequently emission levels or controls for them do not yet form part of the WHO guidelines or part of the EU standards.

Ultrafine particles have not been studied in the EIS despite our requests.

DCC failed to address in the EIS the health impact of ultrafine particulates despite being asked to do so by us in person, at public meetings, at private meetings, via written submissions and in letters during the public scoping exercise.

See our attached submissions and correspondence with DCC on the matter.

We reference a report from the WHO (see reference below). This report lists some 200 relevant papers dealing with air pollution. The EIS makes no reference to papers such as these in its analysis of air pollution particularly that caused by ultrafine

particulates. Dr Schrenk makes no reference to ultrafine particulates (other than in his criticism of the EcoMed paper).

Since these particles are so dangerous the precautionary principle should apply in the interim and no new source should be permitted. In particular a concentrated source like an incinerator located in the capital city is contrary to the precautionary principle.

The EIS is deficient in this respect.

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9. Wildlife

The EIS does not adequately address the impact of the development on wildlife in the vicinity.

On page 14.6 the EIS describes the site as follows:

14.3.9. The Site is surrounded by developed land to the north, east and west. These areas include buildings, hard surfaces and some ground with a weedy vegetation (Recolonising bare ground). Some bare ground and spoil heaps (ED2) also occurs to the south of the Site, along with further recolonising bare ground. The Shellybanks Road skirts the western boundary of the Site and associated with this is a line of planted sycamore trees and a strip of shrubbery (WS3).

You will note that this description omits any mention of the pitch and putt course situated across the Shellybanks Road to the west of the proposed site. The authors directed their attention to several other areas beyond the proposed development site but have ignored the pitch and putt course.

The aerial photo below shows, circled in red, this piece of ground which in size is some 25% of the applicant's site and some 20% of the nearby Irish Town Nature reserve.

That the authors could omit such an important area from their study is evidence of gross negligence.



The EIS makes no reference to the importance of this site for wildlife such as herons and frogs. We have personally observed a heronry with 2 adult and 3 young herons on this site at 15:30 on Sunday 14th August 2005.

The EIS is therefore incomplete in this important respect.

10. Epidemiological studies on human health

An Bord Pleanála gave an opinion to the applicant on the information to be contained in the EIS. This required that the assessment by the applicant of the proposed development on human beings should have regard to recent epidemiological studies carried out internationally. The EIS contains no reference to recent studies and is therefore incomplete.

Section 13.3.34 on page 13-11 has the following extract from the HRB report (2003):

'Epidemiological studies of the health effects of landfilling and incineration
As there is a paucity of literature relating to modern landfill and incineration sites, nearly all of the studies identified in this report relate to older technologies. It can be assumed that as emission controls improve risks of adverse health effects diminish.'

The HRB report itself states on page 13:

Work commenced on this project in December 2001 and the literature search was completed at the end of February 2002.

Thus it is clear that no references later than February 2002 have been made directly or indirectly in the EIS.

Dr A Staines has written a critique of the EIS. His conclusion states:

The proposed development, in my professional opinion, requires a proper HIA to ensure reasonable consideration of human health issues in the planning and licensing processes. The material provided in the EIS falls far short of any reasonable estimate of what is required. The people of Dublin and the local community deserve better.

The EIS is clearly deficient in this respect.

11. Conclusion

Our submissions on cost and greenhouse gases suggest that incineration is not the best available technology for handling waste in Dublin and therefore the original decision for deciding on incineration should be reviewed.

The proposed development will be contrary to the proper planning and sustainable development of the area and of the world.

The proposed development will have a significant negative impact on the climate.

The proposed development will have a negative impact on the health of the community.

Attachments

- Submission to review of Dublin Waste Management Plan – J McCarthy
31st August 2004
- Submission to the EIS Scoping Exercise – J McCarthy, V Jennings
16th March 2006
- Email from Elizabeth Arnett
13th April 2006
- Letter from Matt Twomey
26th April 2006
- Email from Elizabeth Arnett
9th May 2006
- Letter to Elizabeth Arnett, Ringsend Office - J McCarthy, V Jennings
17th May 2006
- Critique of the Health Assessment in the EIS - Dr Anthony Staines UCD
September 2006

References

- Health Research Board (2003)
Health and Environmental Effects of Landfilling and Incineration of Waste – A Literature Review
- *Waste Management – A Strategy for Dublin*
Technical Studies and Dublin Waste Model
MCCK December 1997
- EPA Application W0232-01 *Non Technical Summary*
Available on the web at
http://www.epa.ie/licences/lic_eDMS/090151b2800f9c73.pdf
- *Health Aspects of Air Pollution – answers to follow-up questions from CAFE*
Report on a WHO working group meeting
Bonn, Germany, 15–16 January 2004
- WHO paper
Air quality guidelines global update, October 2005
- EcoMed Paper
The Health Effects of Waste Incinerators, December 2005
- CAFE Paper
Second Position Paper on Particulate Matter, December 2004

Poolbeg Incinerator EIS Climate Chapter

A Critique

Presented by Joe McCarthy & Valerie Jennings

August 2007

An Analysis of the EIS Climate Chapter

Submission to the Environmental Protection Agency

Waste Licence Application

W0232-01

Applicant:

Dublin City Council

Development:

Dublin Waste to Energy Facility

Pigeon House Road

Poolbeg Peninsula

Dublin 4

Submission by:

Joe McCarthy & Valerie Jennings

Agenda

- Three Poolbeg Models
 - Our Analysis
 - » of the first two models
 - » The Poolbeg 3 Model is not before the EPA as yet
 - Findings
 - Corrected Results
- Comparison of All Models
- Recent Climate Policy Changes
- Conclusion

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Poolbeg Climate Models

- Poolbeg 1
 - Published in the EIS

- Poolbeg 2
 - Submitted to Oral Hearing on 26th April 2007
 - Submitted to EPA via CD on 8th May 2007

- Poolbeg 3
 - Not submitted to the EPA as yet ?

Our Analysis

- Checked back to sources
- Checked the sums
- Checked the assumptions
- Checked the results published

- We reran the models with corrections
 - We did not analyse every aspect of each model

 - Focussed on CO₂
 - Not N₂O or CH₄

Climate Model Methodology

- Poolbeg Models
 - IPCC
 - EC 2001
 - ERM DEFRA

- Alternatives studied
 - Landfill
 - Anaerobic Digestion
 - Carbon Sequestration

- Changes in Mix & Factors

- Biogenic CO₂
 - 100% release of entire fraction
 - Not calculated or reported

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- Waste Mix
 - Sources - EPA, EC 2001
 - CCW and FCF
 - “Other” fraction

- Electricity produced
 - Incorrect MW hours used
 - CCGT Factor
 - CO₂ avoided

- Mistakes in the sums

- Corrected Result

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Poolbeg 1

Waste Mix – Error in Percentage Sums

Per Table A8.2

Composition	%carbon	CCW	% fossil	FCF	Should be
		weighted		weighted	
a	b	a * b	c	a * c	a * b * c
Paper	24.5%	33%	8.1%	0%	0.0%
Organics	36.7%	19%	7.0%	0%	0.0%
Plastic	13.2%	61%	8.0%	100%	8.0%
Glass	3.0%	0%	0.0%	0%	0.0%
Metals	3.1%	0%	0.0%	0%	0.0%
Textiles	8.1%	39%	3.2%	50%	1.6%
Others	11.4%	24%	2.7%	29%	0.8%
		29.0%		20.5%	10.4%
				5.95%	

Note: CCW and FCF factors taken directly from EC 2001 Waste Management Options and Climate Change

CO₂ emissions (tonnes/yr) = Σi(IWi x CCWi x FCFi x EFi x 44/12)

Per Dr Porter	Waste	CCW	FCF	EF	Conv to CO ₂	Result
	1,000	29%	20.6%	0.95	3.67	208
	600,000	29%	20.6%	0.95	3.67	124,857
		Average F C%				
		5.97%	a * b * a * c			

Correction 1 – Waste Mix Percentage Sums

CO2 emissions (tonnes/yr) = $\Sigma(i \text{ IWi} \times \text{CCWi} \times \text{FCFi} \times \text{EFi} \times 44/12)$

Per Dr Porter	Waste	CCW	FCF	EF	Conv to CO ₂	Result
	1,000	29%	20.6%	0.95	3.67	208
	600,000	29%	20.6%	0.95	3.67	124,857

Average F C%

Error 5.97% a * b * a * c

CO2 emissions (tonnes/yr) = $\Sigma(i \text{ IWi} \times \text{CCWi} \times \text{FCFi} \times \text{EFi} \times 44/12)$

Per JPMcC	Waste	CCW & FCF	EF	Conv to CO ₂	Result
	1,000	10.4%	0.95	3.67	363
	600,000	10.4%	0.95	3.67	217,700

Average F C%

10.4% a * b * c

Poolbeg 1

Error in CCW & FCF for “Other” Fraction

Per Table A8.2

			CCW		FCF
	Composition	%carbon	weighted	% fossil	weighted
	a	b	a * b	c	a * c
Paper	24.5%	33%	8.1%	0%	0.0%
Organics	36.7%	19%	7.0%	0%	0.0%
Plastic	13.2%	61%	8.0%	100%	13.2%
Glass	3.0%	0%	0.0%	0%	0.0%
Metals	3.1%	0%	0.0%	0%	0.0%
Textiles	8.1%	39%	3.2%	50%	4.0%
Others	11.4%	24%	2.7%	29%	3.3%
			29.0%		20.5%

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Poolbeg 1

Correction 2 – CCW & FCF for “Other” Fraction

Per JPMcC

with adjusted CCW and FCF for "Other"									
Waste input		1000							
Composition	Tonnes IW	%carbon CCW	Carbon	% fossil FCF	Fossil Carbon	EF	Conv	Result	
Paper	24.5%	245	33%	81	0%	0	0.95	3.67	0
Organics	36.7%	367	19%	70	0%	0	0.95	3.67	0
Plastic	13.2%	132	61%	80	100%	80	0.95	3.67	280
Glass	3.0%	30	0%	0	0%	0	0.95	3.67	0
Metals	3.1%	31	0%	0	0%	0	0.95	3.67	0
Textiles	8.1%	81	39%	32	50%	16	0.95	3.67	55
Others	11.4%	114	50%	57	75%	43	0.95	3.67	148
		1,000		319		139			484
Waste	600,000		191,684		83,302				290,168

Real F C%

13.9%

Entire Carbon Emitted

667,700

Note: “Others” mainly refers to composites, fine elements such as ash, unclassified incombustibles and unclassified combustibles including wood wastes. [Dr Porter footnote to Table 8.3 in Appendix 8.2] **[EPA 1998]**

Others: Includes cooking oil, mineral oil, batteries, composite packaging, tyres and 70,139 tonnes of residues from mechanical treatment of mixed municipal waste shipped to Germany and Northern Ireland for recovery and recycling respectively. **[EPA 2004]**

Corrected calculation of CO₂ emission

Per IPCC 1996	Waste	CCW	FCF	EF	Conv to CO ₂	Result
	1,000	40%	40.0%	0.95	3.67	557
	600,000	40%	40.0%	0.95	3.67	334,400

Average F C%

16.0%

Corrected Model

290,168

Take mid point of IPCC and JPMcC estimates	310,000
--------------------------------------------	----------------

EIS amount

124,857

Dr Porter is out by a factor of

2.5

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**Per Dr Porter
Table 8.6**

MW	Hours	MWhrs	Factor	CO ₂ Avoided
60	8,760	525,600	0.4	210,240

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Correction 3 - Electricity Exported

	MW (1)	Hours (2)	MWhrs	Factor	CO ₂ Avoided
Per Dr Porter	60	8,760	525,600	0.4	210,240
Per C Norgaard	53.45	8,352	446,414	0.4	178,566

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Error **31,674**

Corrections:

- 1. Internal electrical usage -6 MW
- 2. Planned and Forced Outages -17 days

Net Position of Incineration after 3 Corrections

	Incineration	CO2	Electricity MW Hours	CO2 Avoided	Net
Per Dr Porter	600,000	124,857	525,600	210,240	-85,383
As corrected	600,000	310,000	446,414	178,566	131,434

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Error	216,817
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Corrections:

1. Waste mix % calculation error
2. Waste mix "Other" fraction
3. Internal electricity usage of 6 MW and Planned and Forced Outages of 17 days

- Incineration

- Landfill
 - + Carbon sequestration
- Landfill with AD
 - + Carbon sequestration

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Per Dr Porter
Table 8.6

	Tonnes CO ₂ Eq per annum
Landfill total emissions	173,600
Greenhouse gas avoid	-13,200
Total after allowing power generation	160,400
Greenhouse gas sequestered	-216,000
Total after power generation with carbon sequestration	-55,600

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Incineration v Landfill

	Incineration	Landfill	Landfill + Carbon Sequestration	Net
Per Dr Porter	-85,383	160,400		-245,783
As corrected	131,434		-55,600	187,034

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Error 432,817

This model **proves** that landfill with carbon sequestration is **better** than incineration!

Per Dr Porter
Table 8.10

	CO2 Tonnes Eq per annum
Landfill 357,780 tonnes	44,000
Greenhouse Gas Avoid	-7,871
Net Flux from AD of 242,220 tonnes	-5,087
Total	31,042
Carbon Sequestered –AD	-1,696
Carbon Sequestered –Landfill	-128,000
Total after electricity avoid and carbon sequestration	-98,653

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Incineration v Landfill & Anaerobic Digestion

	Incineration	Landfill & AD	Landfill & AD with Carbon Sequestration	Net
Per Dr Porter	-85,383	31,042		- 116,425
As corrected	131,434		-98,653	230,087

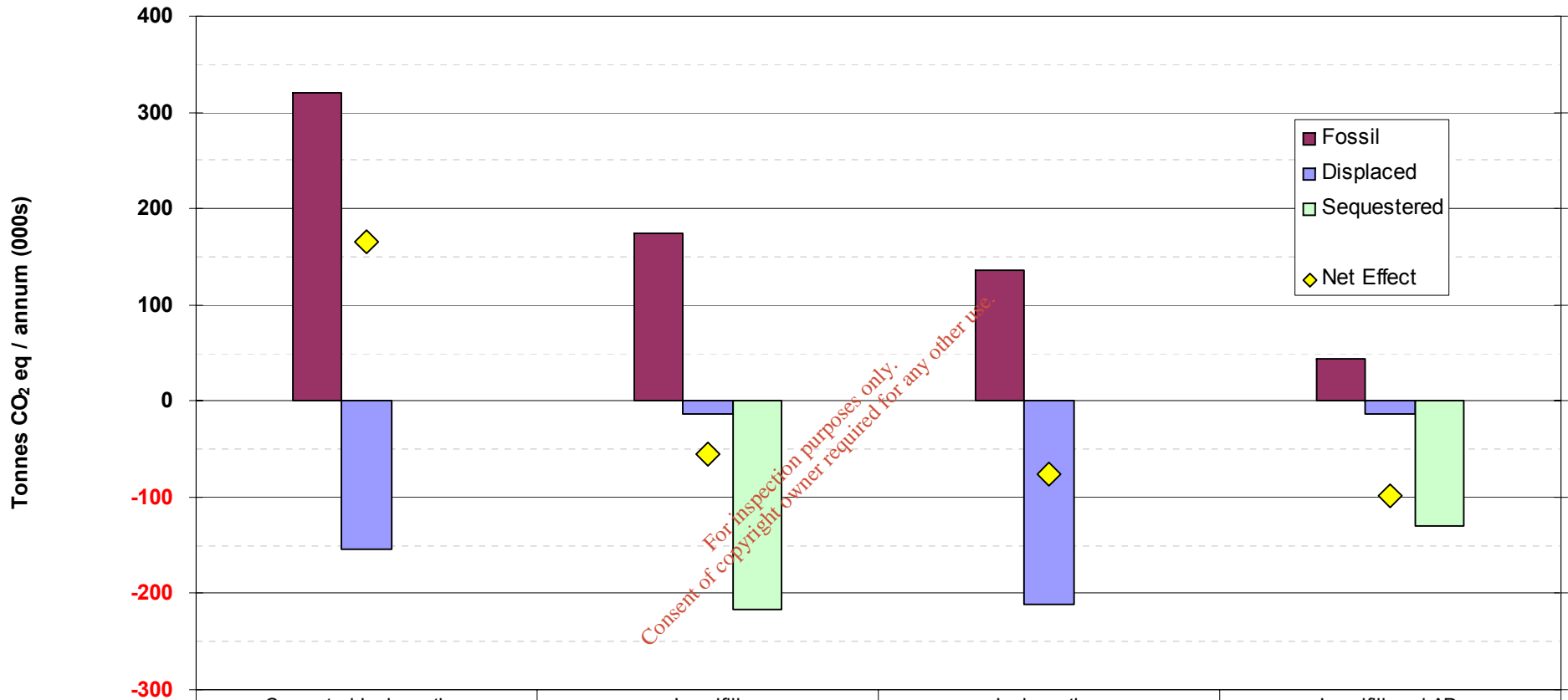
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Error 346,512

This model **proves** that landfill & AD with carbon sequestration is **much better** than incineration!

Poolbeg 1

Poolbeg 1 - GHG Emissions



	Corrected Incineration	Landfill	Incineration	Landfill and AD
Fossil	320,308	173,600	135,165	44,000
Displaced	-154,786	-13,200	-211,666	-12,958
Sequestered	0	-216,000	0	-129,696
Net Effect	165,522	-55,600	-76,501	-98,653

J P McCarthy
Chartered Engineer
BSc FICS DLS CEng MIEI

Climate Impact Analysis
20th March 2007
Ver 1.0

- Waste Mix
 - Sources - EPA, EC 2001
 - CCW and FCF
 - “Other” fraction

- Electricity produced
 - Incorrect MW hours used
 - CCGT Factor
 - CO₂ avoided

- Corrected Result

Poolbeg 2

Waste Mix & Factors

From sheet "incineration calculations"

2005 Scenario						600000
	Tonnage	Waste Fraction	% Dry Matter Content	Total Carbon Content (Dry)	Fossil Carbon Fraction	CO2 Emissions (Tonnes/Annum)
Paper	449,957	24.7%	90.0%	35.4%	0.0%	
Glass	53,461	2.9%	100.0%	0.3%	0.0%	
Plastic	241,423	13.2%	100.0%	51.3%	100.0%	149,375
Ferrous	24,204	1.3%	100.0%	0.0%	0.0%	
Aluminium	20,280	1.1%	100.0%	0.0%	0.0%	
Other Metals	12,521	0.7%	100.0%	0.0%	0.0%	
Textiles	146,790	8.0%	80.0%	24.9%	50.0%	17,633
Organics	667,513	36.6%	40.0%	35.8%	0.2%	231
WEEE	12,312	0.7%	100.0%	0.0%	0.0%	
Wood	13,939	0.8%	85.0%	50.0%	0.0%	
Others	181,665	10.0%	90.0%	11.0%	50.0%	10,796
Total Fossil Fuel	367,501					
Total Non-Fossil Fuel	1,456,564					
Total	1,824,065	100.0%	72.9%	32.1%	22.3%	178,036

Poolbeg 2

Correction 1 - Waste Mix & Factors

From sheet "incineration calculations"

2005 Scenario						600000
	Tonnage	Waste Fraction	% Dry Matter Content	Total Carbon Content (Dry)	Fossil Carbon Fraction	CO2 Emissions (Tonnes/Annum)
Paper	449,957	24.7%	90.0%	35.4%	0.0%	
Glass	53,461	2.9%	100.0%	0.3%	0.0%	
Plastic	241,423	13.2%	100.0%	61%	100.0%	177,620
Ferrous	24,204	1.3%	100.0%	0.0%	0.0%	
Aluminium	20,280	1.1%	100.0%	0.0%	0.0%	
Other Metals	12,521	0.7%	100.0%	0.0%	0.0%	
Textiles	146,790	8.0%	80.0%	24.9%	100.0%	35,267
Organics	667,513	36.6%	40.0%	35.8%	0.2%	231
WEEE	12,312	0.7%	100.0%	0.0%	0.0%	
Wood	13,939	0.8%	85.0%	50.0%	0.0%	
Others	181,665	10.0%	90.0%	50.0%	100.0%	98,598
Total Fossil Fuel	367,501					
Total Non-Fossil Fuel	1,456,564					
Total	1,824,065	100.0%	72.9%	32.1%	22.3%	311,715

**Per Dr Porter
Table 8.6**

MW (1)	Hours (2)	MWhrs	Factor	CO ₂ Avoided
59.45	8760	520,782	0.567	295,283

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	MW (1)	Hours (2)	MWhrs	Factor	CO ₂ Avoided
Per Dr Porter	59.45	8760	520,782	0.567	295,283
Per C Norgaard	53.45	8,352	446,414	0.4	178,566

Error **116,718**

Corrections:

- 1. Internal electrical usage -6 MW
- 2. Planned and Forced Outages -17 days
- 3. Factor for avoided electricity

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Poolbeg 2

Net position of Incineration after 2 Corrections

	Incineration	CO2	Electricity MW Hours	CO2 Avoided	Net
Per Dr Porter	600,000	178,036	520,782	295,283	-117,247
As corrected	600,000	311,715	446,414	178,566	133,149

Error 250,397

Corrections:

1. Waste mix Plastic CCW%
Waste mix FCF 50% to 100% for Textiles and Other
Other "composition"
2. Internal electrical usage -6 MW
Planned and Forced Outages -17 days
Factor for avoided electricity

- Scenario 1 – Incineration v Landfilling
- Scenario 2 – Incineration v Landfilling & AD
- Scenario 3 – Incineration v Landfilling
 - with reducing tonnages
- Scenario 4 – Incineration v Landfilling
 - with reducing biogenic content
- Scenario 5 – Incineration v Landfilling
 - As Scenario 4 with reducing gas capture
- Scenario 6 – Incineration v Landfilling & AD
 - with carbon sequestration
- Scenario 7 – Incineration v Landfilling
 - with 80,000 tonnes sludge
- Scenario 8 – Incineration v Landfilling & AD
 - with carbon sequestration and District Heating

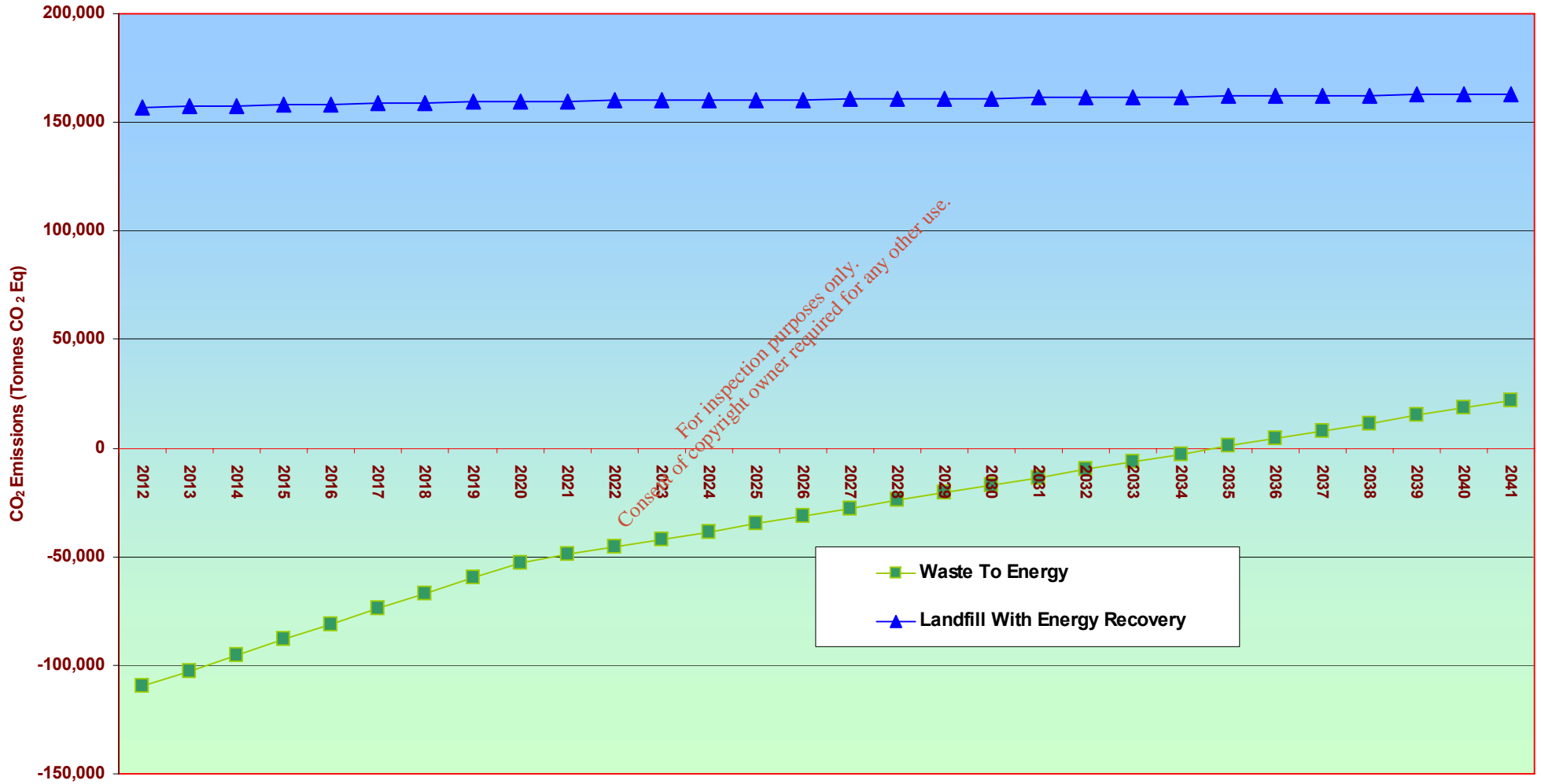
Per Dr Porter
Scenario 1 from spreadsheet

	Tonnes CO ₂ Eq per annum
Landfill total emissions	170,245
Greenhouse gas avoid	-13,200
Total after allowing power generation	157,045
Greenhouse gas sequestered [from Anaerobic Digestion sheet]	-201,667
	- 44,622

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Poolbeg 2

Poolbeg 2 - Scenario 1 Incineration v Landfill



Incineration v Landfill

	Incineration	Landfill	Landfill with Carbon Sequestration	Net
Per Dr Porter	-117,247	157,045		-274,292
As corrected	133,149		-44,622	177,771

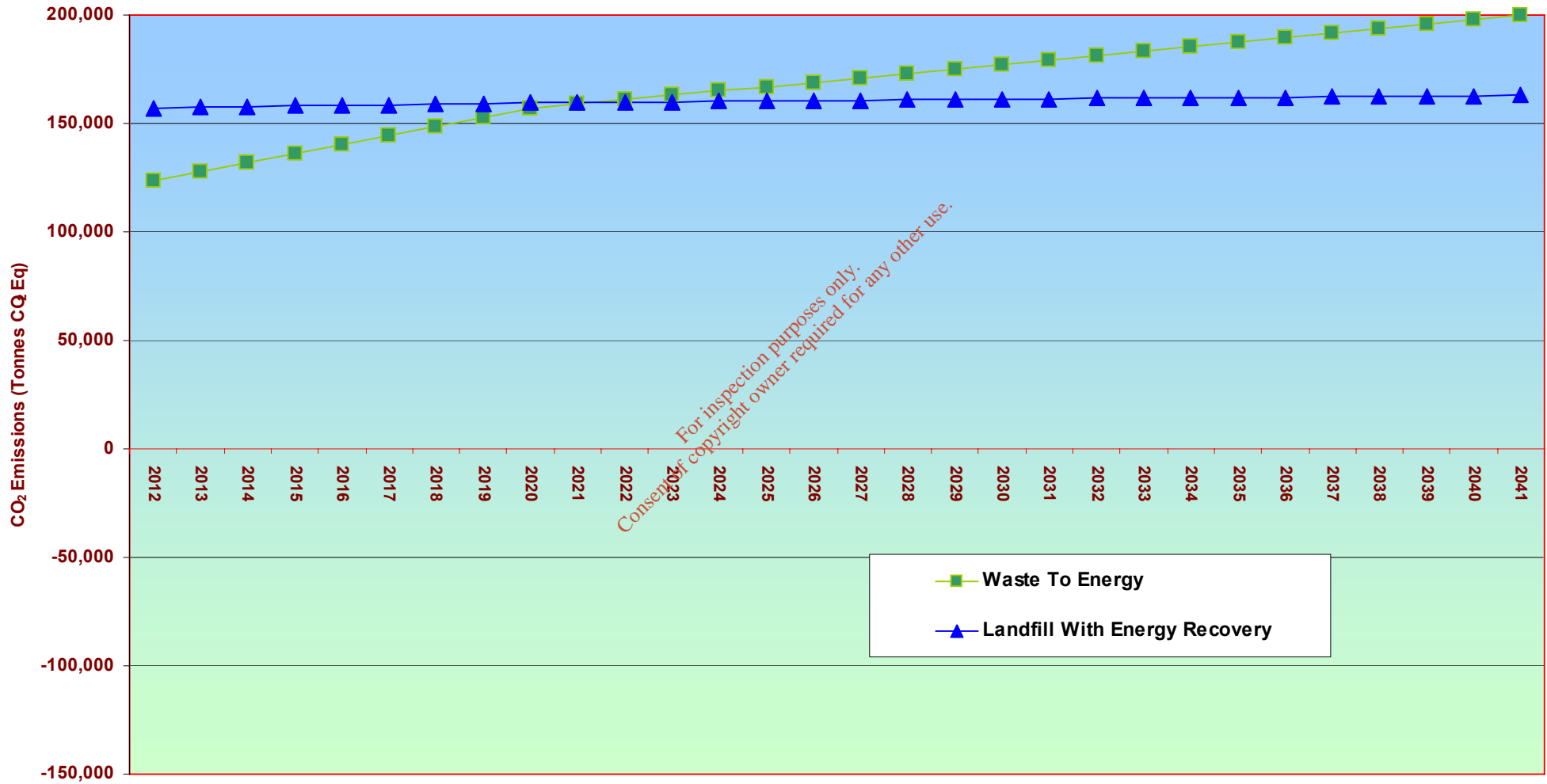
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Error 452,063

This model **proves** that landfill is **better** than incineration!

Poolbeg 2

Poolbeg 2 - Scenario 1 Corrected Incineration v Landfill



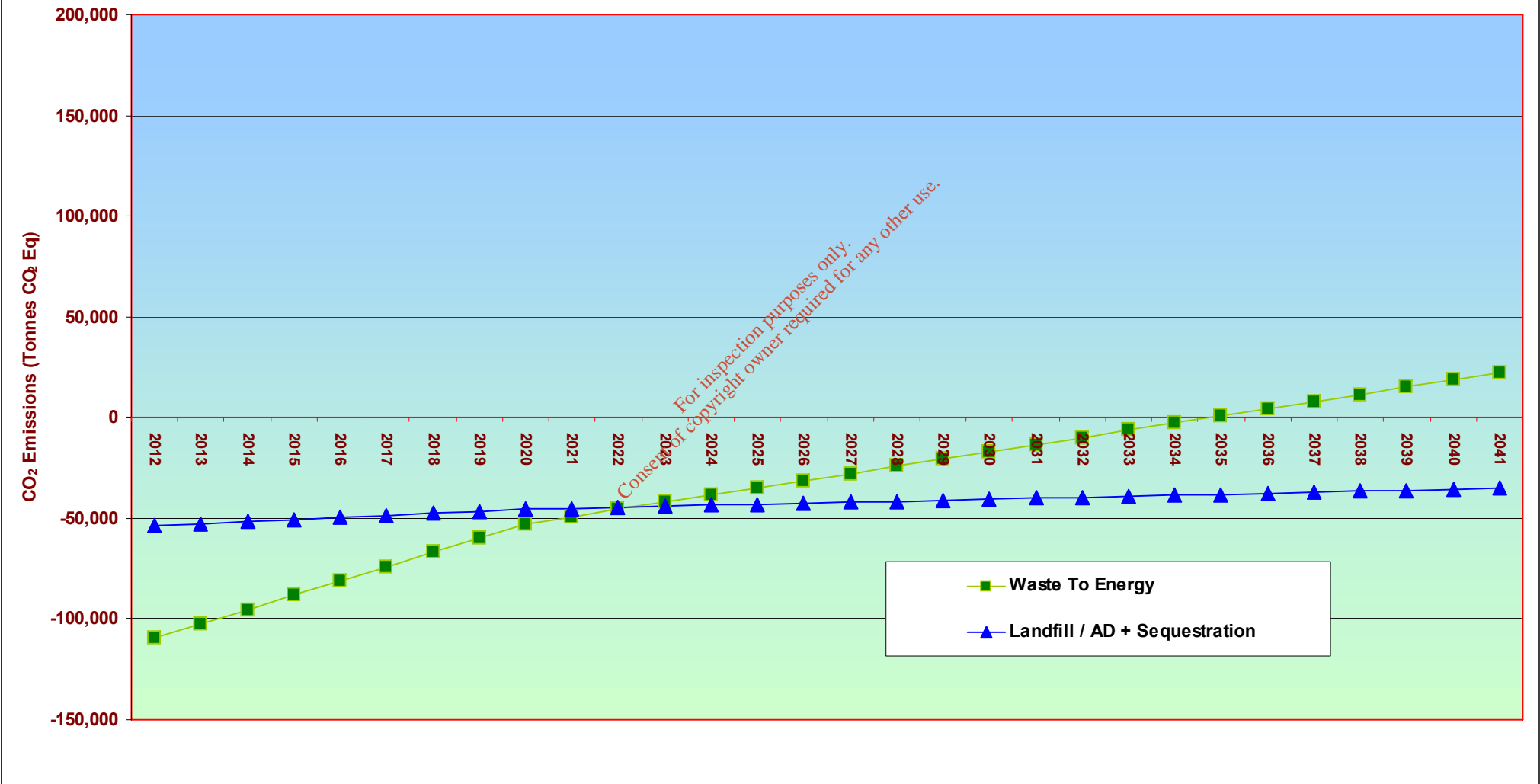
Per Dr Porter

	CO2 Tonnes Eq per annum
Landfill 357,780 tonnes	66,600
Greenhouse Gas Avoid	-7,871
Net Flux from AD of 242,220 tonnes	-31,776
Total	27,552
Carbon Sequestered – AD & Landfill	-101,896
Total after electricity avoid and carbon sequestration	- 74,344

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Poolbeg 2

**Poolbeg 2 - Scenario 6
Incineration v Landfill &AD with Carbon Sequestration**



Incineration v Landfill & Anaerobic Digestion

	Incineration	Landfill & AD	Landfill & AD with Carbon Sequestration	Net
Per Dr Porter	-117,247	27,552		-144,799
As corrected	133,149		-74,344	207,493

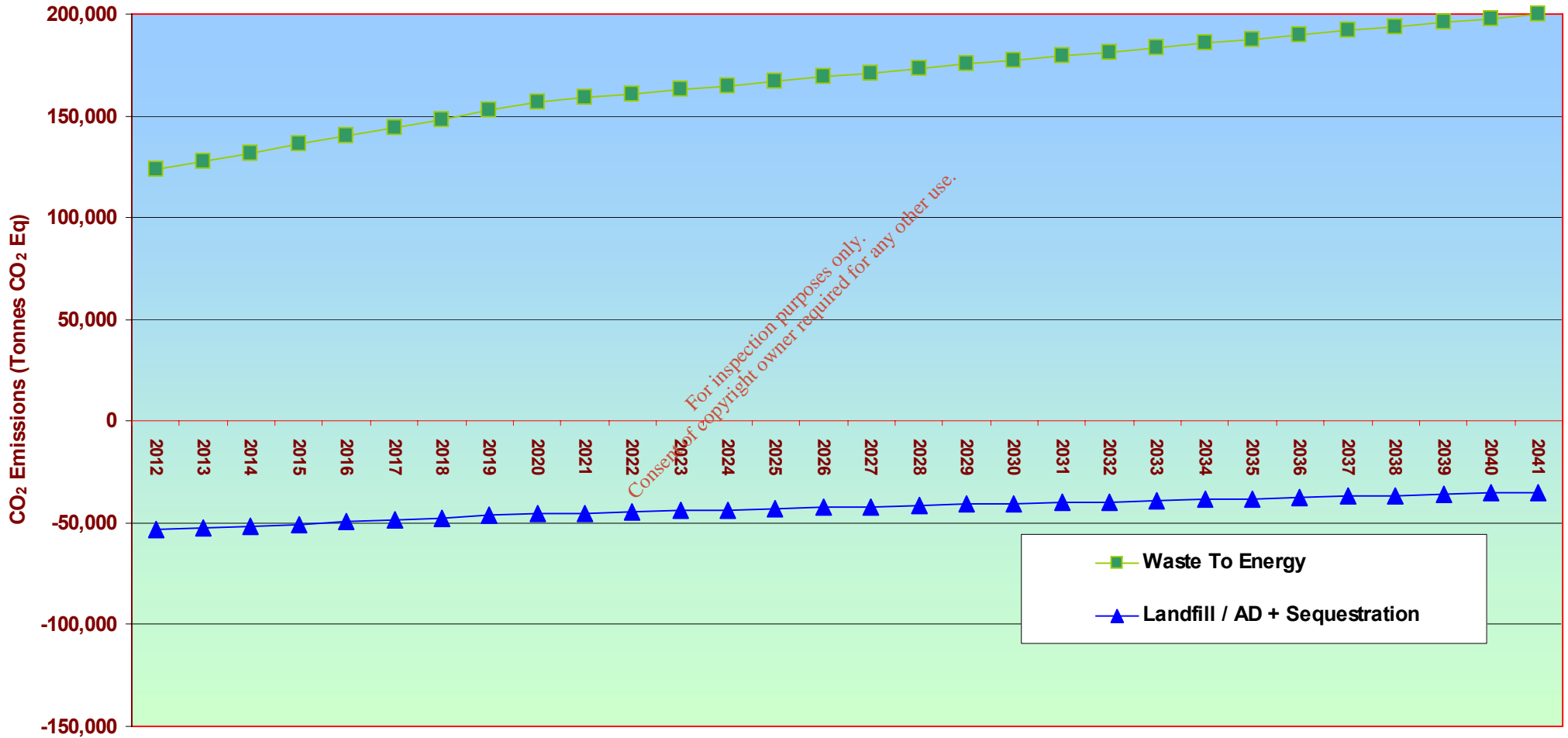
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Error 352,292

This model **proves** that landfill and AD is **much better** than incineration!

Poolbeg 2

Poolbeg 2 - Scenario 6 Corrected Incineration v Landfill & AD with Carbon Sequestration



Criticisms

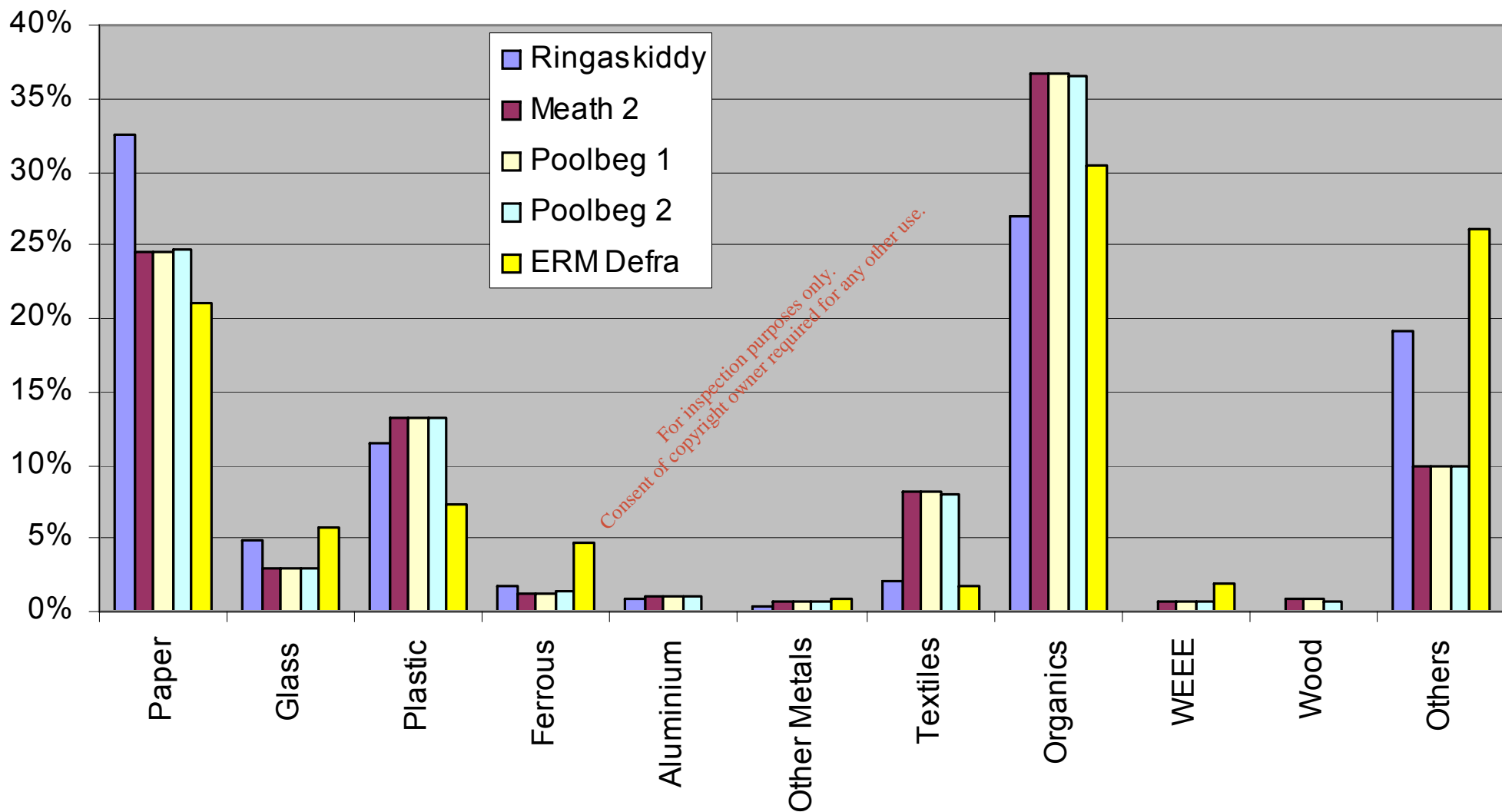
- Dr Porter changes his models
 - 3 different attempts for this EIS

- Inconsistent sources
 - EPA, DEFRA, EC 2001, IPCC
 - Why were factors replaced?

- Electricity Avoid Factor
 - CCGT 0.4 or Renewable 0.0

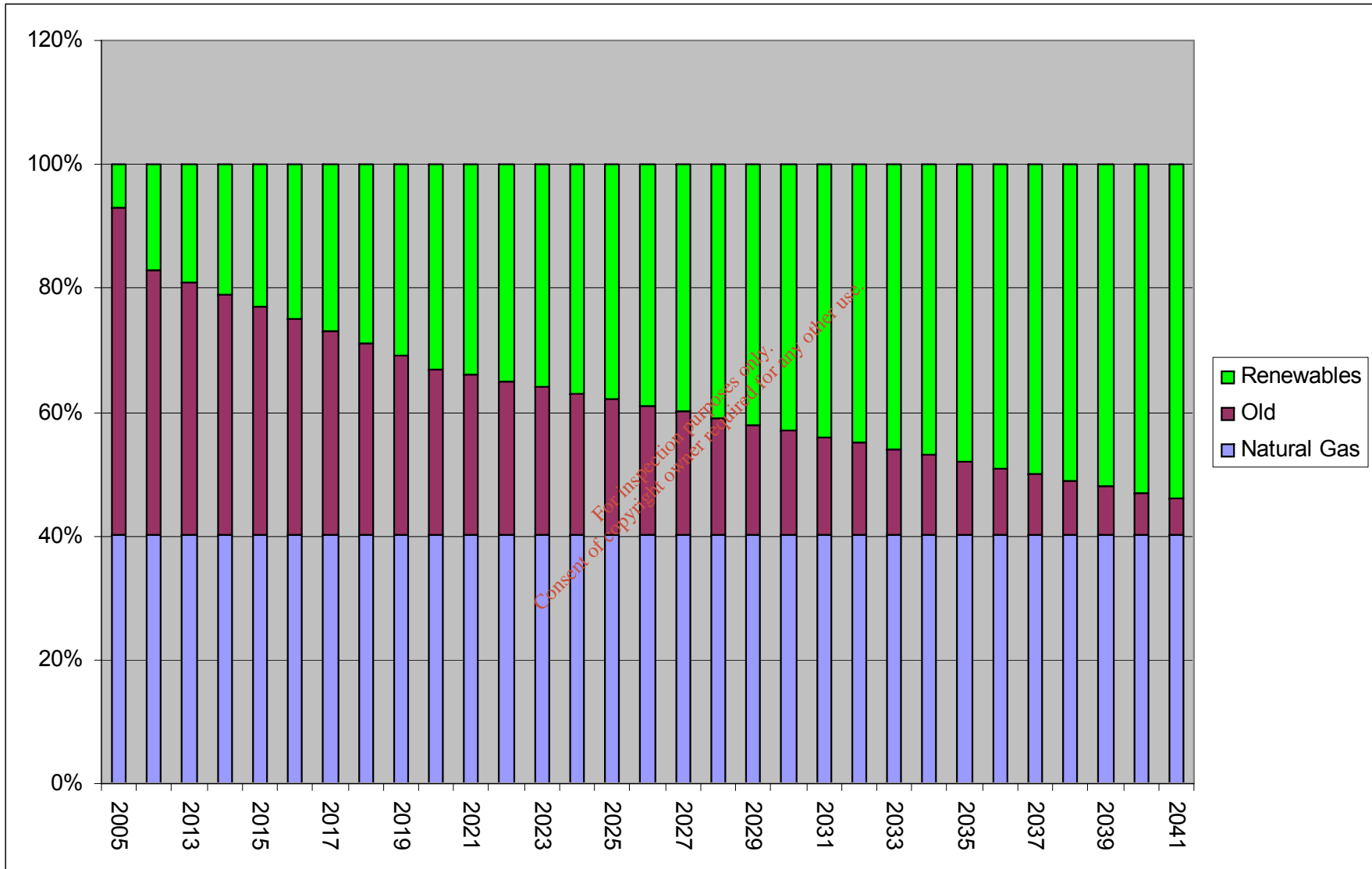
- Models were not peer reviewed
 - His models were accepted at face value
 - Ringaskiddy
 - Meath 1 and Meath 2
 - Poolbeg 1

Waste Mixes Used

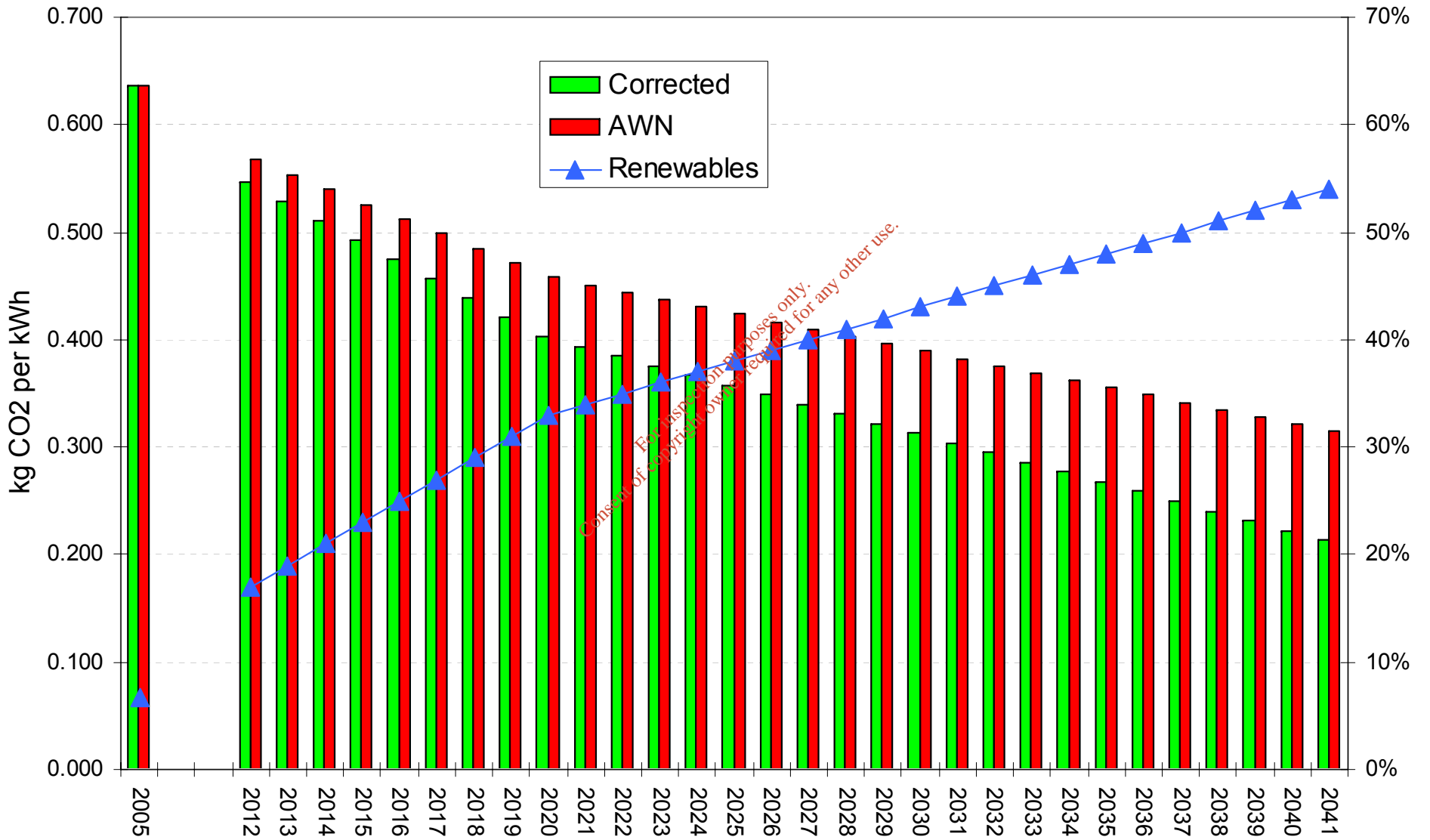


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Electricity Mix – Based on SEI



CCGT CO2 Avoided



Presentation of results

- **Figures for comparison**

- Scientific Notation

3.45E+05 tonnes

- %s of large national total

0.17%

- Simplify

345,000 tonnes

- **Graphs**

- Varying Scales
- Confusing scenarios

- **Presented results different from model**

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Trends in interpretation

- Porter Models

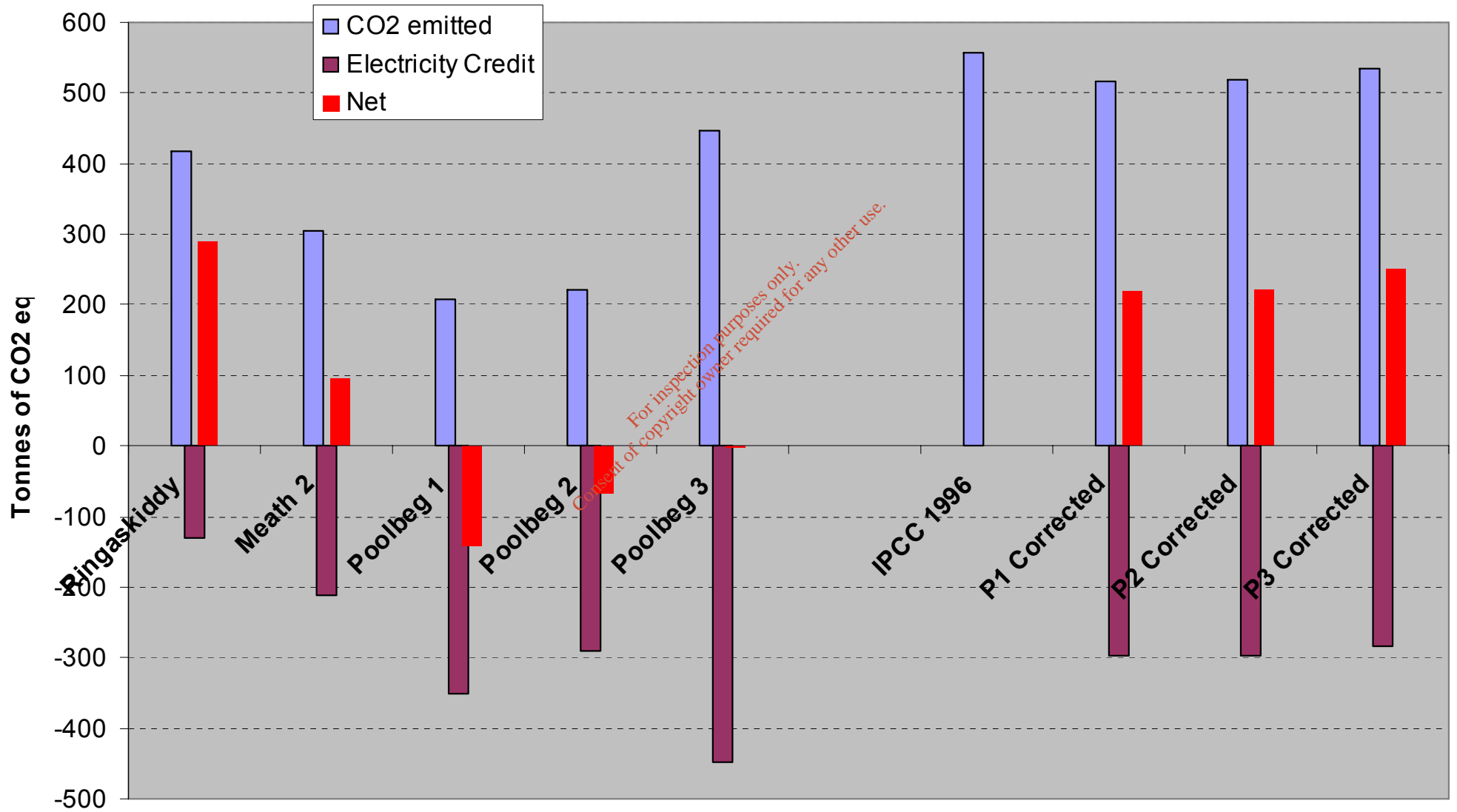
- Ringaskiddy
- Meath 1
- Meath 2
- Poolbeg 1
- Poolbeg 2
- Poolbeg 3 – not submitted to the EPA

- Corrected Models

- Poolbeg 1
- Poolbeg 2
- Poolbeg 3

Porter Incineration Models

Emissions per 1000 tonnes MSW



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Conclusion

- Dr Porter's climate models are wrong
- EIS statements on climate are wrong
- Entire carbon fraction assessment omitted
- Policy on climate has changed
- The EPA should refuse licence

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Conclusion - Models

- Dr Porter's climate models are wrong
 - Wrong sums
 - Wrong waste mix
 - Wrong carbon fractions
 - Wrong credit for electricity
- Dr Porter's result 124,000 tonnes
- Corrected result 310,000 tonnes

Conclusion – EIS Statements

- EIS statements on climate are wrong
- Non Technical Summary is wrong

Conclusion – Entire carbon fraction

- Entire carbon fraction not assessed
- Required by IPCC 2006 Rules
- Incineration 667,700 tonnes pa

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Cost of CO2 emitted

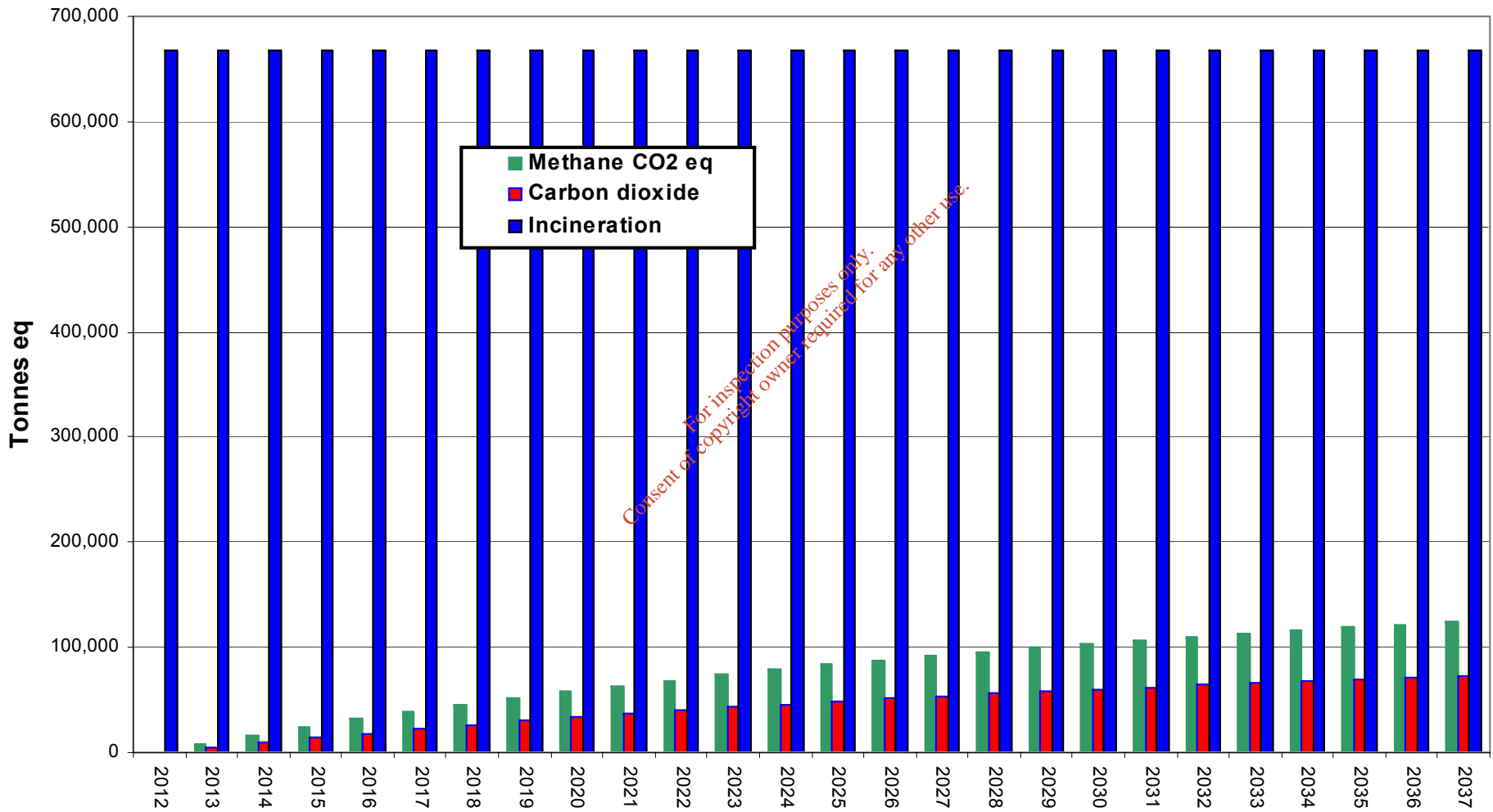
Tonnes	Price per tonne	Cost per annum
667,700	€ 20	€ 13,354,008
	€ 50	€ 33,385,019

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Cumulative CO2 over 25 years

from Incineration
from Landfill

17.3m tonnes
3.0m tonnes



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Climate Policy Drivers

- Stern Report
 - Economic crisis

- NCCS in Ireland

- IPCC Reports
 - Urgent Action Required

- EU Heads of Government
 - 20% target announced for 2020
 - To become 30% with agreement

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Conclusion – Policy Changes

- Policy on climate has changed
- EC Heads of Government
 - 20% reduction by 2020
 - 30% if US, China and India agree
- Drastic change in policy
- Kyoto target of 63mt drops to 48mt

Conclusion

- The EPA should refuse a licence
 - Take climate policy changes into account
 - Require DCC to produce a correct climate model
 - Require DCC to assess 100% carbon release
 - Require DCC to submit a fully revised EIS
 - Allow the public to submit further objections