

Carbon in Waste

Environment Strategic Policy Committee

Dublin City Council

1st May 2019

Mr Joe McCarthy

- EPA Waste Characterisation Reports
- CO₂ from Poolbeg
- Electricity from Poolbeg
- Carbon Burden of Poolbeg

- EPA Waste Characterisation Reports
 - Household MSW
 - Non-household MSW

- Amount of waste

- Amount of Carbon
 - Biogenic
 - Fossil

EPA Waste Report Tables

Table 6.1 - National Profile Kerbside Collected Household Waste 2016

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Primary Waste Categories	MRW (t)	MDR (t)	OW (t)	2016 National Profile (t)	% Wet weight
Plastics	126,428	49,341	4,300	180,069	17.2%
Papers	68,624	86,950	4,562	160,137	15.3%
Organic waste (non-garden)	92,817	5,802	31,716	130,335	12.5%
Cardboards	26,193	63,088	10	89,292	8.5%
Fines (<20mm)	78,362	4,877	7,158	90,397	8.6%
Organic waste (garden)	16,902	144	62,659	79,704	7.6%
Textiles Excl. Nappies	70,478	8,334	520	79,332	7.6%
Nappies	68,491	839	524	69,854	6.7%
Metals	32,059	11,741	298	44,099	4.2%
Unclassified Combustibles	37,804	7,123	266	45,193	4.3%
Glass	21,660	5,239	69	26,969	2.6%
Unclassified Incombustibles	15,663	2,015	255	17,932	1.7%
Haz. Municipal Waste (Excl. WEEE & Tubes)	8,382	1,425	12	9,819	0.9%
Composite beverage cartons	3,779	4,235	10	8,025	0.8%
Wood	7,502	1,145	72	8,719	0.8%
WEEE & Tubes	5,884	1,028	32	6,943	0.7%
Total	681,027	253,328	112,464	1,046,819	100.00%

Table 21: National Profile for kerbside collected Non-Household Waste

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Primary Waste Categories	MRW (t)	MDR (t)	OW (t)	National Profile (t)	% Wet weight
Organic waste	162,062	14,875	66,201	243,139	34.0%
Paper	114,497	47,282	2,015	163,793	22.9%
Plastic	84,889	37,925	785	123,600	17.3%
Cardboard	26,888	28,319	141	55,348	7.7%
Textiles	27,474	1,321	0	28,795	4.0%
Metal	16,876	5,464	0	22,340	3.1%
Composites	14,506	3,239	218	17,963	2.5%
Unclassified combustibles	13,714	2,866	0	16,580	2.3%
Compostables	10,128	2,263	914	13,305	1.9%
Unclassified incombustibles	9,845	266	0	10,112	1.4%
Glass	5,994	1,571	20	7,584	1.1%
Wood	4,089	1,032	0	5,121	0.7%
Fines	3,850	637	0	4,487	0.6%
Haz. Municipal Waste	2,857	204	0	3,061	0.4%
Total	497,668	147,265	70,293	715,227	100%

Combine Household and Non-Household

Household		Non-Household		Both	
Cardboards	26,193	Cardboard	26,888	Cardboard	53,081 4.5%
Composite beverage cartons	3,779	Composites	14,506	Composites	18,285 1.6%
		Compostables	10,128	Compostables	10,128 0.9%
Fines (<20mm)	78,362	Fines	3,850	Fines	82,212 7.0%
Glass	21,660	Glass	5,994	Glass	27,654 2.3%
Haz. Municipal Waste (Excl. WEEE & Tubes)	8,382	Haz. Municipal Waste	2,857	Haz. Municipal Waste	11,239 1.0%
Metals	32,059	Metal	16,876	Metal	48,935 4.2%
Nappies	68,491			Nappies	68,491 5.8%
Organic waste (garden)	16,902			Organic waste (garden)	16,902 1.4%
Organic waste (non-garden)	92,817	Organic waste	162,062	Organic waste	254,879 21.6%
Papers	68,624	Paper	114,497	Paper	183,121 15.5%
Plastics	126,428	Plastic	84,889	Plastic	211,317 17.9%
Textiles Excl. Nappies		Textiles		Textiles	97,952 8.3%
	70,478		27,474		
Unclassified Combustibles	37,804	Unclassified combustibles	13,714	Unclassified combustibles	51,518 4.4%
Unclassified Incombustibles	15,663	Unclassified incombustibles	9,845	Unclassified incombustibles	25,508 2.2%
WEEE & Tubes	5,884			WEEE & Tubes	5,884 0.5%
Wood	7,502	Wood	4,089	Wood	11,591 1.0%
Total	681,027	Total	497,668		1,178,695 100.0%

Consolidated Waste Categories

Consolidated categories for comparison to 2007 EIS									EPA waste fraction
Paper	15.5%	Cardboard	4.5%					Paper	20.0%
Glass	2.3%							Glass	2.3%
Plastic	17.9%							Plastic	17.9%
Metal	4.2%							Metal	4.2%
Nappies	5.8%							Nappies	5.8%
Textiles	8.3%							Textiles	8.3%
Organic waste	21.6%	Organic waste (garden)	1.4%	Compostables	0.9%			Organic waste	23.9%
WEEE & Tubes	0.5%	Haz. Municipal Waste	1.0%					WEEE & Tubes	1.5%
Wood	1.0%							Wood	1.0%
Fines	7.0%	Unclassified combustibles	4.4%	Unclassified incombustibles	2.2%	Composites	1.6%	Fines	15.1%
								Total	100.0%

Poolbeg Carbon

Fossil Carbon Calculation

	EPA waste fraction	Tonnes	CCW (wet)	Total carbon	Total CO ₂	FCF	Fossil Carbon	Fossil CO ₂
	a	b = a * 600k	c	d = b * c	d * 44 / 12	e	f = d * e	f * 44 / 12
Paper	20.0%	120,236	33%	39,678	145,485	0%	0	
Glass	2.3%	14,077	0%					
Plastic	17.9%	107,568	61%	65,617	240,594	100%	65,617	240,594
Metal	4.2%	24,910	0%					
Nappies	5.8%	34,864	24%	8,367	30,681	10%	837	3,068
Textiles	8.3%	49,861	39%	19,446	71,302	50%	9,723	35,651
Organic waste	23.9%	143,502	19%	27,265	99,973	0.2%	55	200
WEEE & Tubes	1.5%	8,716	0%					
Wood	1.0%	5,900	42.5%	2,508	9,195	0%	0	
Fines	15.1%	90,366	24%	21,688	79,522	29%	6,289	23,061
Total	100.0%	600,001		184,569	676,752		82,520	302,575
From Ringaskiddy EIS by Arup:			CCW = Carbon Content of Waste			FCF = Fossil Carbon Fraction		

302,575

tonnes of fossil CO₂ per annum

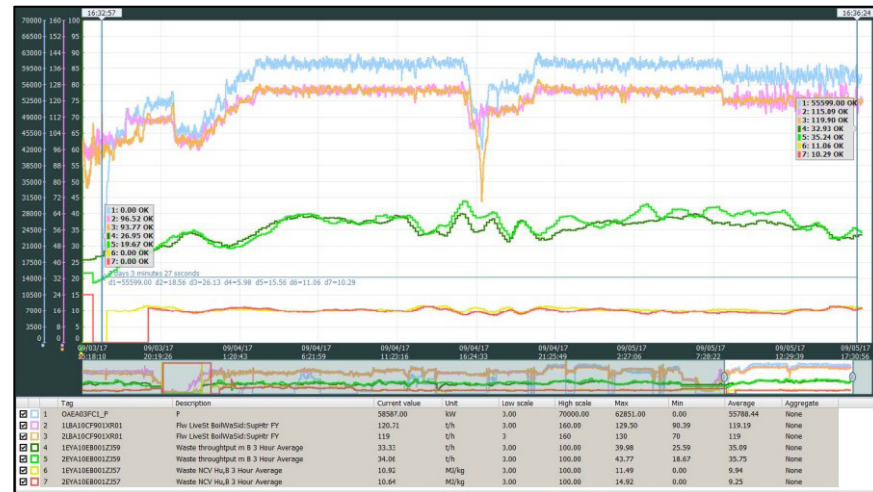
- HZI Performance Test Report
- Covanta SEC filing
- Press Release - electricity produced

Poolbeg Electricity

1 CDM Smith

Report on Performance Demonstration Tests

24 May 2018 Page 7



2 Covanta 2018 10-K page 12

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
Form 10-K

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018

Project	Location	Design Capacity	
		Waste Processing (Metric TPD)	Gross Electric (MW)
1. Dublin ^{(1) (2)}	Ireland	1,800	58.0

3 DWtE Press Release 26 March 2019

One millionth tonne
700,000 MW hours

One tonne produces 0.7 MWhr
70 tonnes per hour **49 MW**

Poolbeg Electricity Exported

MW Generated	MW Exported	Hours	MWhrs
58	52	8,000	416,000

416,000

Megawatt hours per annum

Poolbeg Emission Intensity

Poolbeg

$$\frac{302,575 \text{ tonnes}}{416,000 \text{ MWh}} = 0.73 \text{ t / MWh Fossil}$$

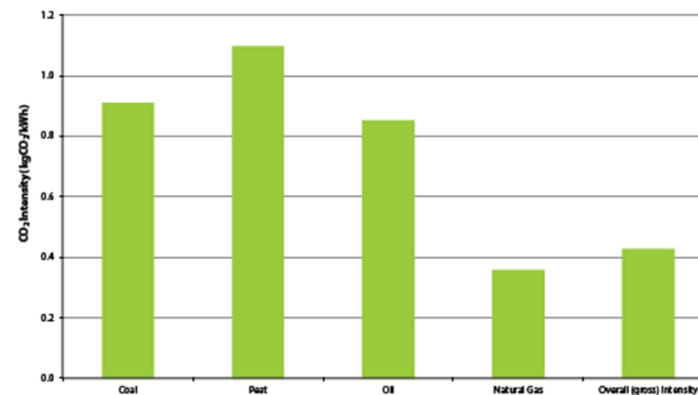
$$\frac{676,752 \text{ tonnes}}{416,000 \text{ MWh}} = 1.63 \text{ t / MWh Total}$$

SEAI Emissions Intensity of different Fuels

ENERGY-RELATED CO₂ EMISSIONS IN IRELAND 2005-
2016 2018 Report Page 24

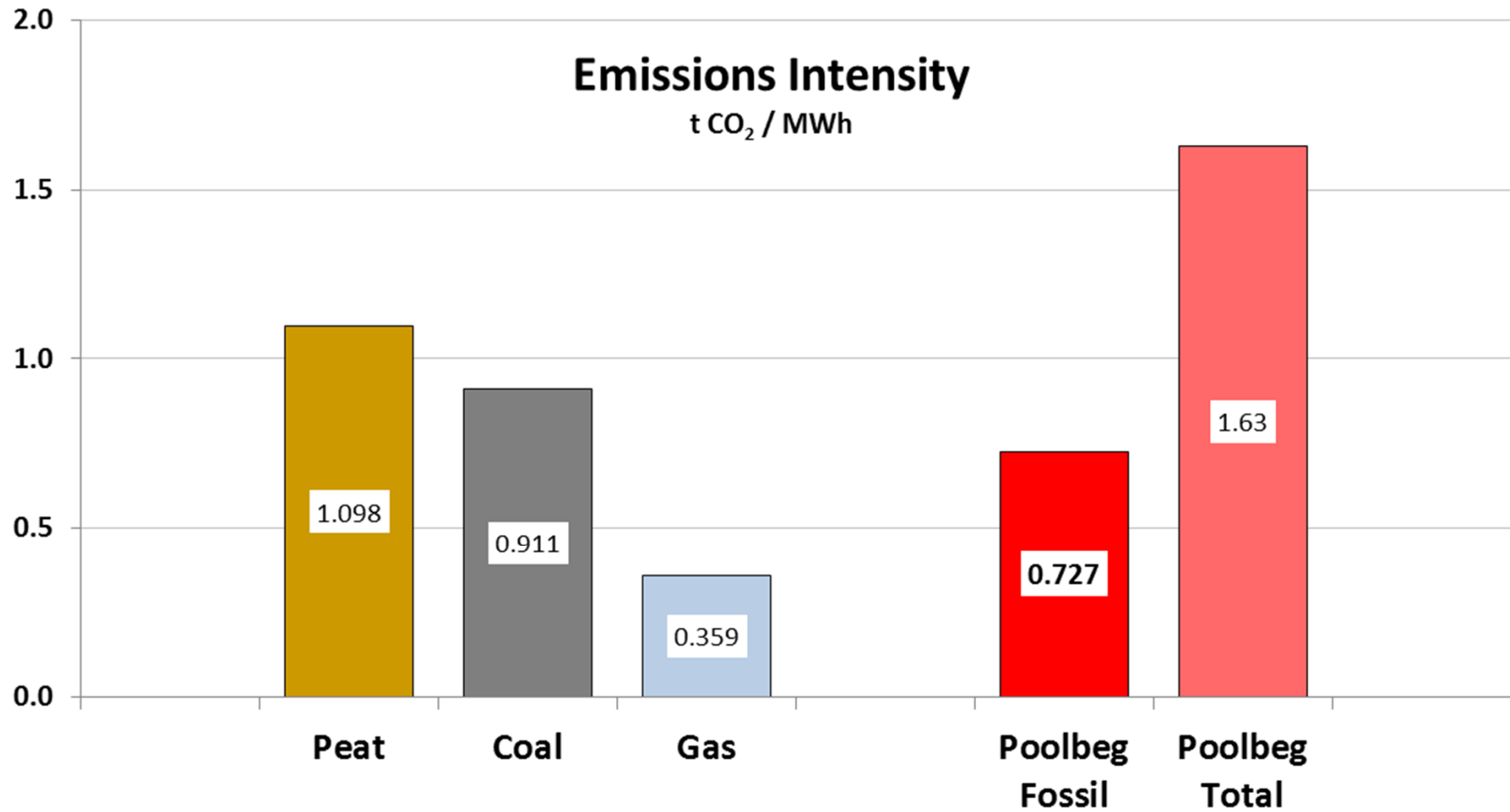
Figure 19 shows the relative emissions intensity of electricity generation from different fuels in 2016. Emissions from peat are the highest, at 1,098 gCO₂/kWh, followed by coal at 911 gCO₂/kWh. Electricity generated from oil was 854 gCO₂/kWh but oil generation only made up 1% of the electricity generated in 2016. The emissions intensity of natural gas generation was 359 gCO₂/kWh in 2016 and the overall figure (on a gross basis) was 428 gCO₂/kWh.

Figure 19: Gross Emissions Intensity of Electricity Generation by Fuel in 2016



Source: SEAI

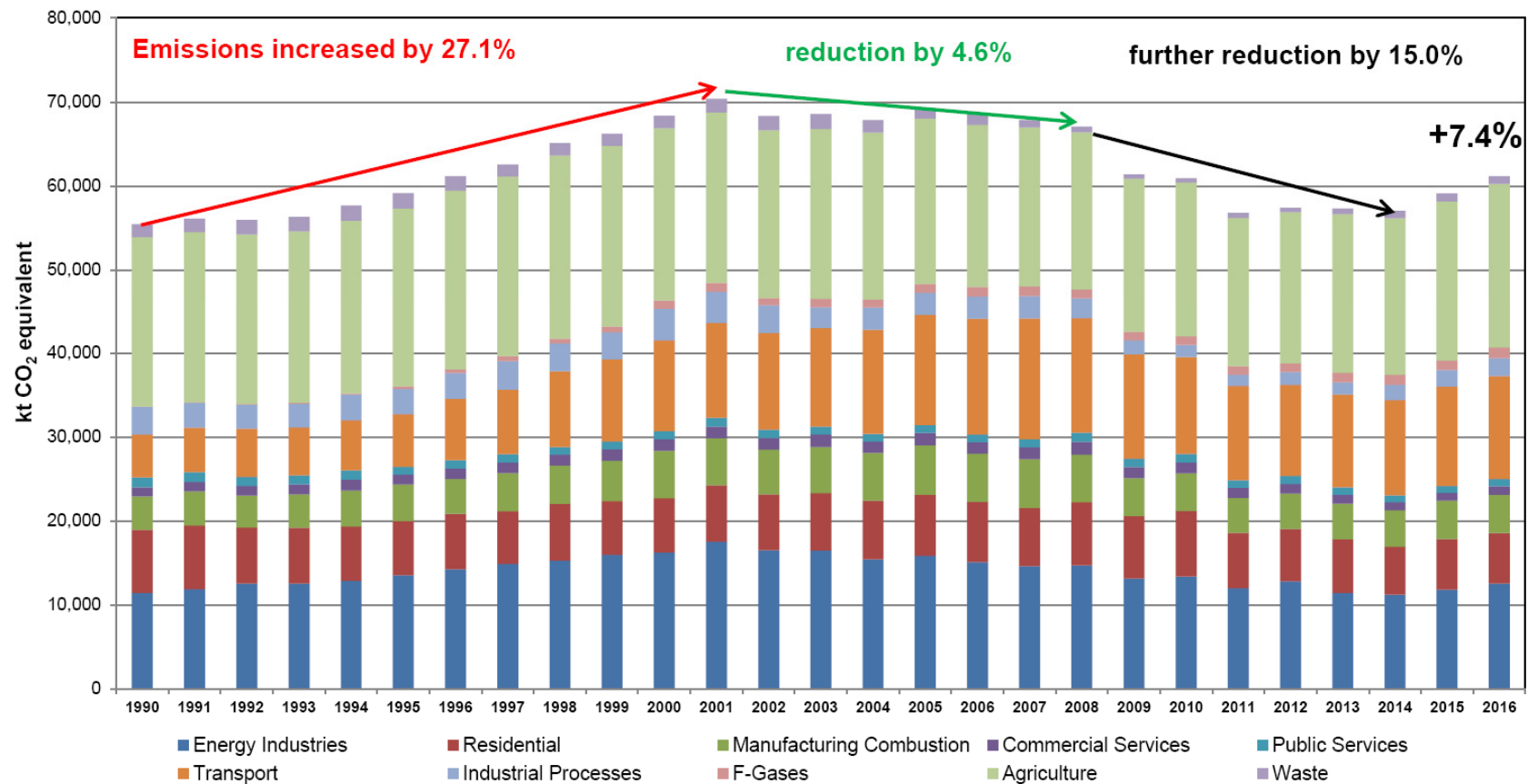
Poolbeg Emission Comparison



Actual GHG



GHG emissions 1990-2016

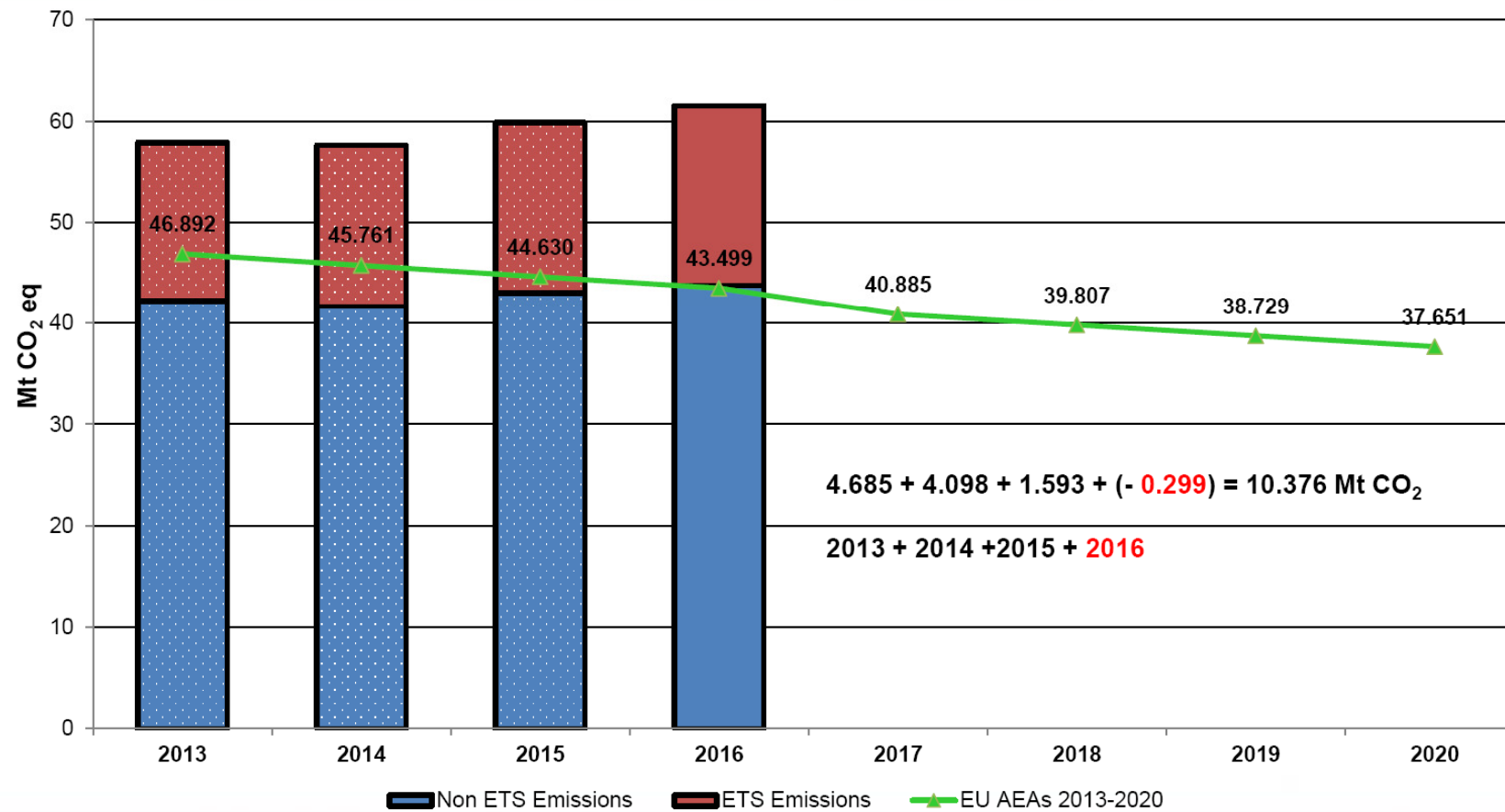


Overall emissions in 2016 are 10.9% above 1990 levels

Target 2020



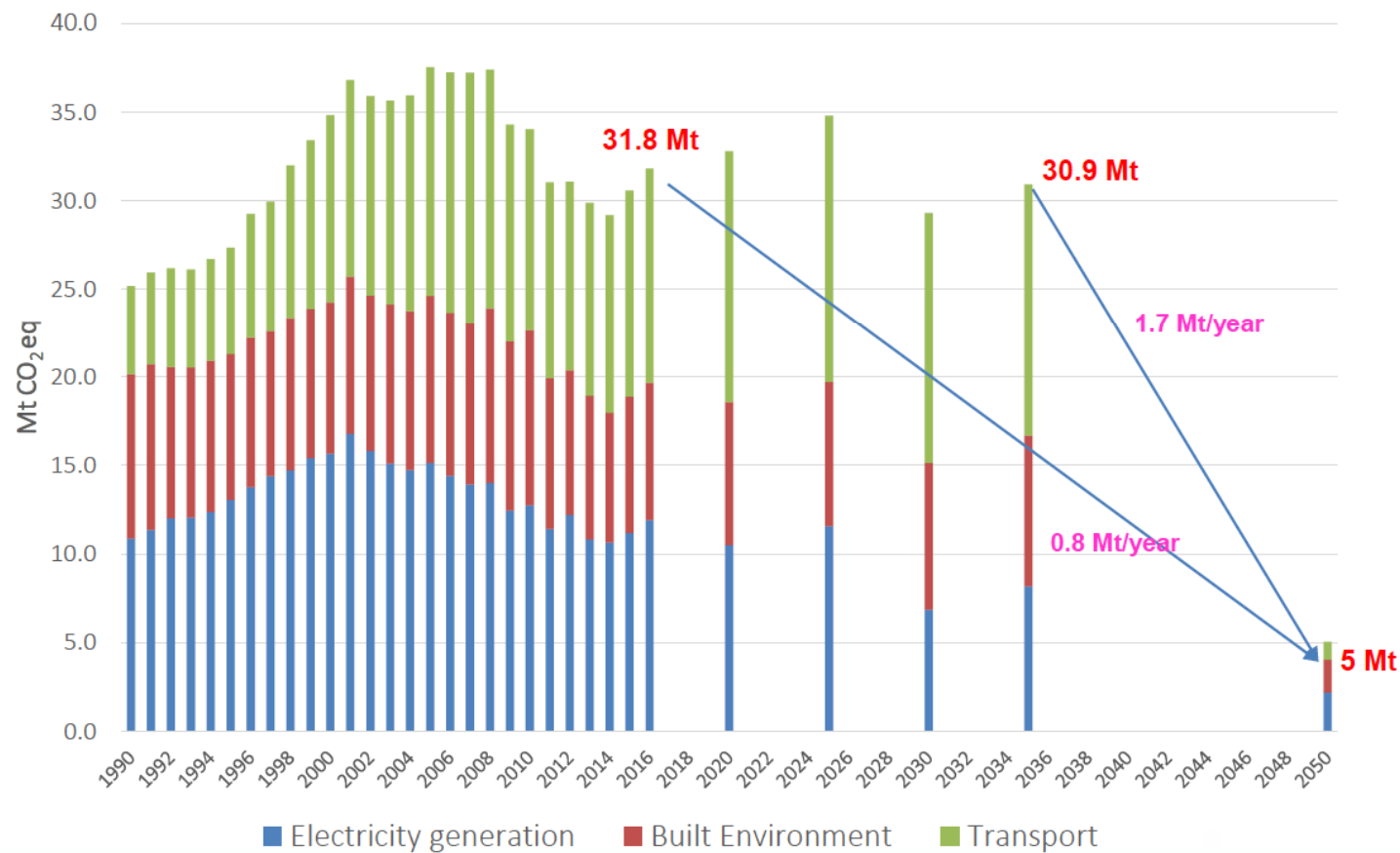
Effort Sharing Decision compliance 2013-2020



Target 2050



Electricity Generation, Built Environment and Transport – 2018 Projections v 2050 policy trajectory



National Totals

		2020	2030	2050
Non-ETS Targets		37,651,000	31,000,000	7,500,000
Poolbeg Fossil CO ₂		302,575	302,575	302,575
		0.8%	1%	4%

Cost of Carbon

Report of the Joint Committee on Climate Action

- Climate Change: A Cross-Party Consensus for Action
- March 2019

The Committee recommends increasing the existing carbon tax from:

Page 4

- € 20 now
- € 80 per tonne by 2030

This will require all public projects to price any future GHG emissions at the estimated costs that society will have to bear in reaching climate change targets. The Department is proposing a shadow cost of carbon that will reach:

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- € 32 per tonne by 2020
- € 100 per tonne by 2030
- € 265 per tonne by 2050

Cost to Poolbeg Incinerator

- Cost of CO₂
- € 80 per tonne 2030
- € 265 per tonne 2050

€ 24,206,000

€ 80,182,375

Corrections to Poolbeg EIS

EIS Claim is now disproven

8.4.37. The contribution of the Waste-to-Energy Facility to total greenhouse gas emissions in Ireland is equivalent to a **net positive impact** of 0.11% of total emissions in 2012, when energy recovery is taken into account.

DUBLIN WASTE TO ENERGY PROJECT
Chapter 8 – Air quality and climate

ENVIRONMENTAL IMPACT STATEMENT
Page 8-28 of 8-33

Inspector's Report

The assessments of the impact of the development on climate change and CO2 emissions carried out by Dr. Porter and Mr. McCarthy and the assessment of same carried out by Dr. Broderick indicates that the result one obtains essentially depends on the assumptions one makes in the calculations.

An essential difference in the calculations given by Dr. Porter and those given by Mr. McCarthy relates to the electrical output from the plant.

I am **sceptical whether the energy efficiency** suggested by Dublin City Council can be obtained.

PL29S.CH2061/ An Bord Pleanála
PL29S.EF2022

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Actual Figures

Fossil CO2 emitted	305,000 tonnes per annum
Electricity produced	416,000 Megawatt hours per annum
Emissions Intensity	0.73 t CO₂ / MWh

Conclusion

The Poolbeg Incinerator

- Not a renewable generator of electricity
- Causing significant greenhouse gas emissions
- No increase in capacity