

From: [Neeson, Patrick \(DoF\)](#)
To: [McAfee, Rachel](#); [McNally, Noel](#); [Finlay, Christine](#)
Subject: FW: RHI - Annex C
Date: 16 January 2017 10:12:41
Attachments: [image001.png](#)
[Book1.xlsx](#)

Annex B calculations

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From: Murphy, Shane
Sent: 16 January 2017 09:54
To: Neeson, Patrick (DoF)
Cc: Scott, Michelle; McMurray, Stephen; Smith, Alan
Subject: RHI - Annex C

Patrick,

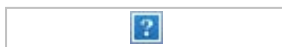
See enclosed a copy of the spreadsheet for Annex C. Think this was raised by you when talking to Alan.

Happy to talk thru if you want.

Shane

Shane Murphy

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Please consider the environment - do you really need to print this e-mail?

CEPA 2012: Capex & Opex Environment (Dec 2010 Prices)						
<u>50kW Biomass Boiler</u>						
	Capex	Opex	Size	Life	Up Front	Ongoing
	£/kW	£/kW/yr	kW	yr	Barrier	Barrier
Biomass	608.00	4.60	50	20	3951	828
Oil	97.00	3.45	50	15	0	0
<u>200 kW Biomass Boiler</u>						
Biomass	486.00	4.60	200	20	5364	878
Oil	68.00	1.47	360	15	0	0
<u>Estimated for 99kW Biomass Boiler Using Average of 50kW and 200kW</u>						
Biomass	547.00	4.60	99	20	4658	853
Oil	82.50	2.46	99	15		
Rate of Return (Annualised)			12.00%			
Frequency (No. Payments p.a.)			4			
<u>Annuitised</u>						
- Biomass Capex		£6,945	(Quarterly as per CEPA)			
- Oil Capex		£1,149	(Quarterly as per CEPA)			
Additional Annualised Cost		£5,796	A			
Annuitised Initial Barrier Costs		£597	B			
Ongoing Barrier		£853	C			
Annual Opex Difference		£212	D			
Annual / Annualised Cost		£7,458	A + B + C + D			
Heat Output @ Tier		130086	(99kW x 1314)			
Cost per kW		5.73p				
CEPA Fuel Differential		-0.10p	See CEPA 2012 Report			
Overall Cost (Dec 2010 Prices)		5.63p	CEPA's Cost Inputs in Dec 2010 Prices			
Cost Indexed to Nov 2016		16.2%	CEPA only updated to Dec 2011			
Cost Indexed to Nov 2016		6.55p	As per latest available RPI figure			
Implied RoR @ Tier for 99kW		11.86%	Implied RoR with a 6.5p Tariff			

Mid 2015: Capex & Opex Environment (Sources incl DETI Business Case)	
<u>Aim of Tariff Design</u>	
- Up to the Tier (1314hr)	6.40p With excess over 1.5p to reward capital
- From Tier to Cap	1.50p For the then fuel / opex cost differential
<u>Capital Cost</u>	

Table A.28: Biomass (larger commercial) – technology parameters

	Capex (£/kW)	Opex (£/kW/year)	Efficiency (%)	Load Factor (%)	Size (kW)	Lifetime (years)	Fuel cost (p/kWh)	Upfront barrier costs (£)	Ongoing barrier costs (£/year)
Biomass	486 ⁵³	4.60	81%	36%	200	20	4.4	5,364	878 ⁵⁴
Oil	68	1.47	89%	20%	360	15	4.86	0	0

Biomass – small commercial

The picture for small commercial biomass is slightly different to that for domestic, in that the fuel is marginally cheaper than oil, as shown in the table of costs below.

Table A.25: Biomass (small commercial) – technology parameters

	Capex (£/kW)	Opex (£/kW/year)	Efficiency (%)	Load Factor (%)	Size (kW)	Lifetime (years)	Fuel cost (p/kWh)	Upfront barrier costs (£)	Ongoing barrier costs (£/year)
Biomass	608	4.60	85%	17%	50	20	4.39	3,951	828 ⁵²
Oil	97	3.45	93%	17%	50	15	4.86	0	0

The slightly lower fuel cost is though outweighed by the significantly higher capital cost in particular, translating into a tariff almost identical to that for domestic biomass. This is shown in more detail in the two tables below.

Table A.26: Biomass (small commercial) – technology resource costs in £ per year

	Annuitised Capital cost at 12%	Annual operating costs	Annual fuel costs	Annuitised Upfront barrier costs	Ongoing barrier costs
Biomass	4,073	230	3,868	718	828

- 99kW Biomass Boiler	£50,000	As per DETI Business Case
- Implied Cost per kW	£505	Case notes Capital Costs had fallen
- 99kW Oil Boiler	£3,000	
- Implied Cost per kW	£30	
<i>Rate of Return (Annualised)</i>	12.00%	
<i>Frequency (No. Payments p.a.)</i>	4	
<u>Annuitised</u>		
- Biomass Boiler	£6,412	
- Oil Boiler	£422	
<i>Annualised Capital Cost</i>	£5,990	
<i>Heat Output @ Tier</i>	130086	(99kW x 1314)
<i>Cost per kWh for Capital</i>	4.60p	
<i>Cost total (Sept 2015 Prices)</i>	6.10p	4.6p plus the 1.5p for Fuel / Opex
<i>Cost Indexed to Nov 2016</i>	6.24p	As per latest available RPI figure
<i>Implied RoR @ Tier for 99kW</i>	12.90%	Implied RoR with a 6.5p Traiff

2008 MAY 215.1
2008 JUN 216.8
2008 JUL 216.5
2008 AUG 217.2
2008 SEP 218.4
2008 OCT 217.7
2008 NOV 216.0
2008 DEC 212.9
2009 JAN 210.1
2009 FEB 211.4
2009 MAR 211.3
2009 APR 211.5
2009 MAY 212.8
2009 JUN 213.4
2009 JUL 213.4
2009 AUG 214.4
2009 SEP 215.3
2009 OCT 216.0
2009 NOV 216.6
2009 DEC 218.0
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2010 FEB 219.2
2010 MAR 220.7
2010 APR 222.8
2010 MAY 223.6
2010 JUN 224.1
2010 JUL 223.6
2010 AUG 224.5
2010 SEP 225.3
2010 OCT 225.8
2010 NOV 226.8
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2011 MAR 232.5
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2012 MAR 240.8
2012 APR 242.5
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2012 JUN 241.8

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2012 JUL	242.1
2012 AUG	243.0
2012 SEP	244.2
2012 OCT	245.6
2012 NOV	245.6
2012 DEC	246.8
2013 JAN	245.8
2013 FEB	247.6
2013 MAR	248.7
2013 APR	249.5
2013 MAY	250.0
2013 JUN	249.7
2013 JUL	249.7
2013 AUG	251.0
2013 SEP	251.9
2013 OCT	251.9
2013 NOV	252.1
2013 DEC	253.4
2014 JAN	252.6
2014 FEB	254.2
2014 MAR	254.8
2014 APR	255.7
2014 MAY	255.9
2014 JUN	256.3
2014 JUL	256.0
2014 AUG	257.0
2014 SEP	257.6
2014 OCT	257.7
2014 NOV	257.1
2014 DEC	257.5
2015 JAN	255.4
2015 FEB	256.7
2015 MAR	257.1
2015 APR	258.0
2015 MAY	258.5
2015 JUN	258.9
2015 JUL	258.6
2015 AUG	259.8
2015 SEP	259.6
2015 OCT	259.5
2015 NOV	259.8
2015 DEC	260.6
2016 JAN	258.8
2016 FEB	260.0
2016 MAR	261.1
2016 APR	261.4
2016 MAY	262.1
2016 JUN	263.1
2016 JUL	263.4
2016 AUG	264.4

2016 SEP	264.9			
2016 OCT	264.8			
2016 NOV	265.5	1.02194	1.162434	1.022727

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