

Economics of Bioenergy

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IrBEA Snapshot

- 180+ Members
- Representing BioEnergy in Ireland since 1998
- 4 Subgroups
 - Anaerobic Digestion
 - Wood Fuel
 - BioFuels
 - Electricity (REFIT & C...

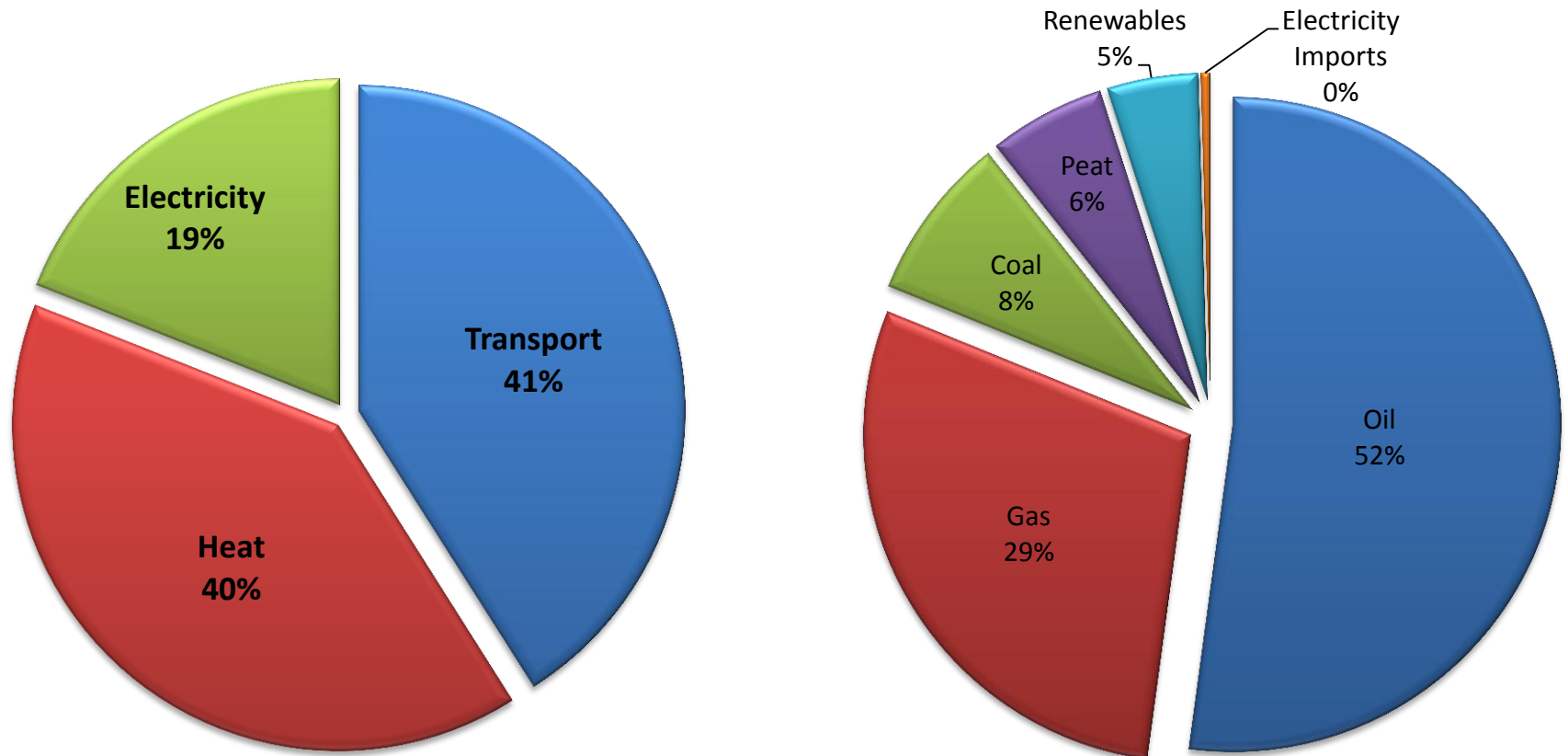
IrBEA Work

- Promoting Bioenergy
- Consultations to Government & Europe
- Conferences, Workshops
- Biomass Trade Centres
- Wood Fuel Quality Assurance Scheme

2012 National BioEnergy Conference – 16th February



Ireland's Energy Usage



€6.6 Billion / yr

(excluding VAT, excise, carbon tax and oil products markup pricing)

ICE Brent Crude Oil Closing Price (begin July 1988)



Ireland's Energy Cost 2009

Fuel	ktoe	Cost (€ million)	Cost / toe
Oil (@ \$93/bbl)	7745	4,011	518
Gas	4309	1,869	434
Coal	1214	127	105
Peat	856	179	209
Renewables	665	386	580
Electricity Imports	66	38	576
Total	14,855	6,610	
Import (Excluding Peat and Renewables)		6,045	

BioEnergy for the Irish Economy

- Fuel Cost Savings
 - ≈50% Cost Savings on fossil fuels
- Irelands Trade Balance
 - €6+ Billion leaves the economy each year to pay for fossil fuel
 - Over 90% of spend on fossil fuel leaves the economy
 - 80%+ of spend on BioEnergy is spent within 50 miles
- Job Creation
 - 13,000 jobs by 2020 (SEAI)
 - 8,250 jobs in AD alone (Joint Oireachtais Committee)
 - 27 Firm projects waiting on REFIT III can provide 700-1800 jobs in the next 2 years

Irish
unemployment
rate:

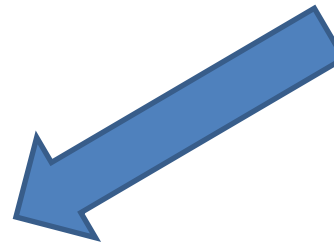
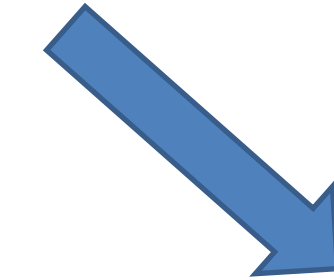
14.2%

(Over 400,000)

€21,000 per
person unemployed
Cost of Jobseekers
benefit plus lost taxes

80% income
remains within

50 miles.



€6,600

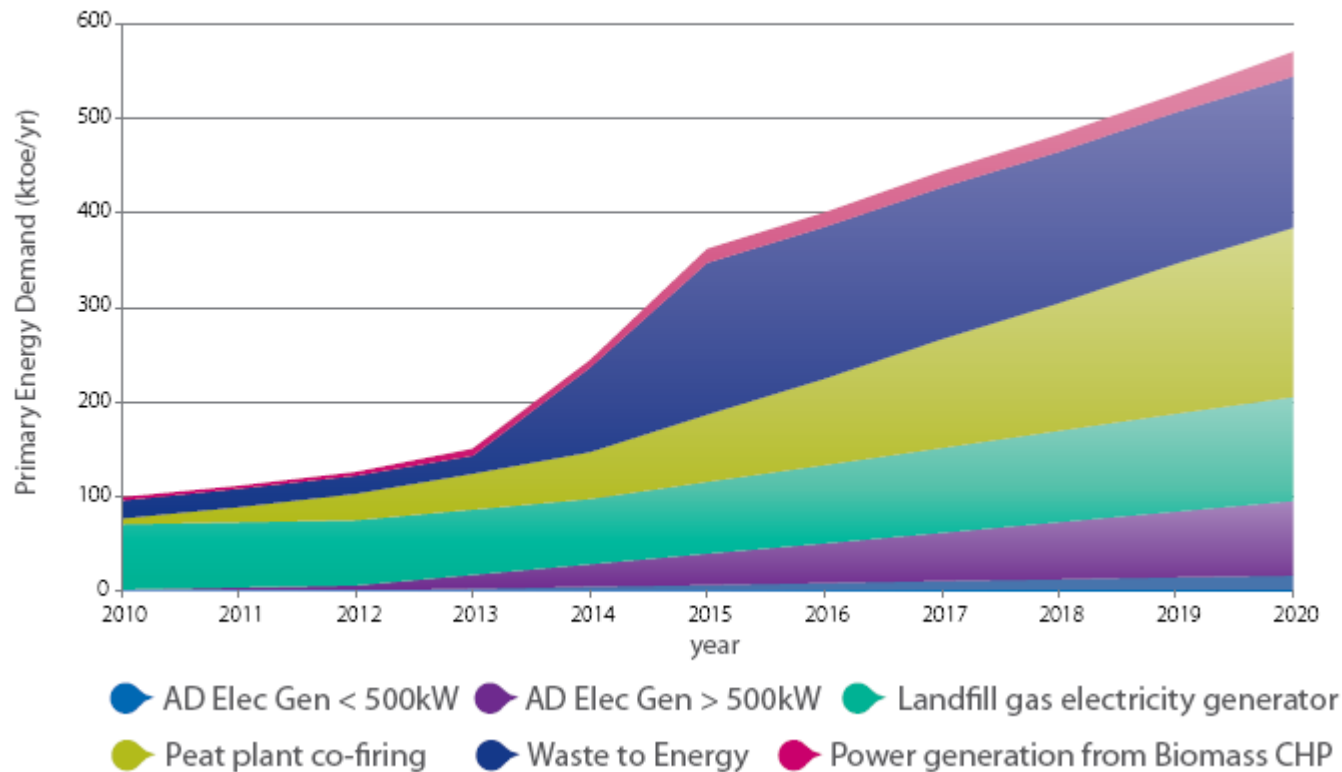
Investment in
bioenergy to
create a FTE
position for 1 year

Source: SEAI Economic Modelling

SEAI BioEnergy Roadmap

Biomass for Electricity

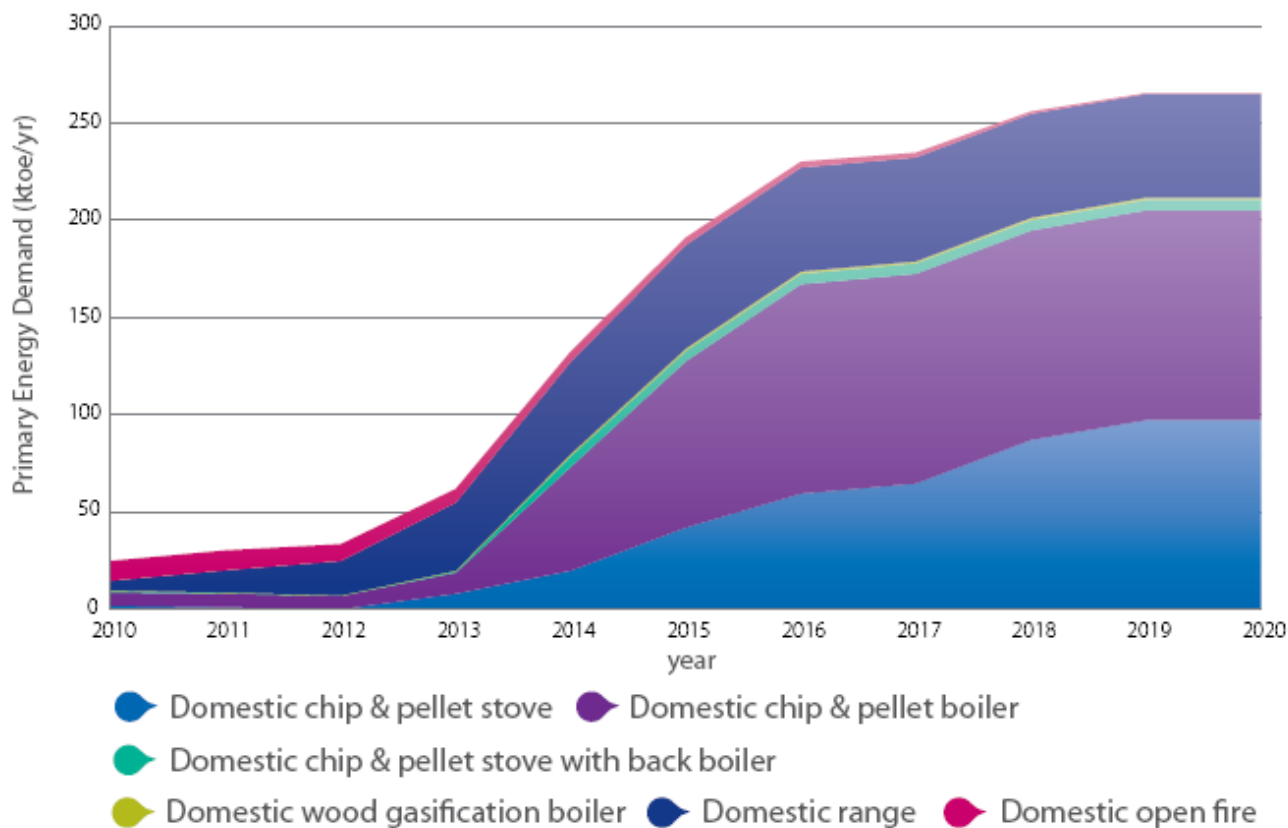
Electrical generation satisfied by bioenergy to 2020



SEAI BioEnergy Roadmap

Biomass for Heat

Domestic thermal consumption demand from bioenergy to 2020



BioEnergy for HEAT



Heating Fuel Cost Comparison

Fuel	Sale Unit	Cost / unit €	Boiler Efficiency	Cent / kwh delivered heat	Comparison to 1000 litres of Kerosene	
					€	%
Kerosene (condenser boiler)	Litre	0.85	0.9	8.9	€ 850	100%
Kerosene (old style boiler)	Litre	0.85	0.65	12.3	€ 1,177	138%
Gas	m3	0.68	0.9	6.7	€ 644	76%
Night rate Electricity	kwh	0.0947	1	9.5	€ 907	107%
Wood Chip (30% Moisture)	Tonne	120	0.85	4.1	€ 393	46%
Wood Pellet	Tonne	215	0.9	5.3	€ 504	59%
Oats (dried to 15%)	Tonne	165	0.86	4.6	€ 441	52%

Value of Biomass compared to Oil

Kerosene

333 L = 3530 kwh

Cost breakdown

PLATTS Price (ex Rotterdam)	63c
+ transport to customer	7c
+ VAT	9.45c
=	79.45c/l

Total Cost	=	€265
Exported funds	=	€213

Woodchip (30%DM)

1000 kg = 3530 kwh

Cost breakdown

Per tonne	€110
+ VAT	€14.85
Customer Cost	= €124.85
Customer saving	= €140

	=	€265
Exported Funds	=	<€15

Potential of 1 Ha of Biomass to replace imports of Kerosene

<u>ITEM</u>		<u>INFORMATION SOURCE</u>
Tonnes of biomass DM / Ha	10 tonnes/Ha	Teagasc
Equivalent Litres of Kerosene	5056 Litres	Based on 18Mj/Kg biomass, 35.6Mj/Litre Kerosene
Import Price of Kerosene c/l	€0.63 c/litre	PLATTS spot price, ex Rotterdam
Value of imported oil replaced with biomass produced on one HA	€3,178	
Carbon Credit Purchase cost	€0.04 c/litre	2.68kg CO ₂ / litre. €14.61 / Tonne Carbon (DOF)
Value of carbon saved	€198	
Total Displaced cost to Ireland Inc	€3,376	

Economic Benefit to Ireland Inc. from 1 Ha in Beef Production

<u>ITEM</u>			<u>INFORMATION SOURCE</u>
Total land area in Beef & Dairy	3.52	million Ha	Teagasc
Total Land area in Beef	2.816	million Ha	assuming 80% of area in beef production
<u>Beef Exports 2010</u>			
Beef Exports	1,510	million	Bord Bia
Live Animal Exports	245	million	Bord Bia
Beef product consumed in Ireland	225	million	Calculated - based on Irl being 671% self sufficient
Total Production from Beef Sector	€ 1,980	million	Sum Total
Economic value of Beef / Ha*	€ 703		Sum Total / Land Area

* No account is made of the cost of state aids to the beef sector

Economic Benefit to Ireland Inc. From 1 Ha in Dairy Production

<u>ITEM</u>			<u>INFORMATION SOURCE</u>
Total land area in Beef & Dairy	3.52	million Ha	Teagasc
Total Land area in Dairy	0.704	million Ha	assuming 20% of area in Dairy production
<u>Dairy Exports 2010</u>			
Dairy Products & Ingredient Exports	2,285	million	Bord Bia
Dairy product consumed in Ireland	571	million	Calculated - based on 75% export of produce
Total Production from Dairy Sector	€ 2,856	million	Sum Total
Economic value of Dairy / Ha*	€ 4,057		Sum Total / Land Area

* No account is made of the cost of state aids to the dairy sector

Economic Benefits of converting 1 Ha to Biomass

Total Economic Benefit from 1 Ha of Biomass**	€ 3,376
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Total Economic Benefit from 1 Ha in Beef production	€ 703
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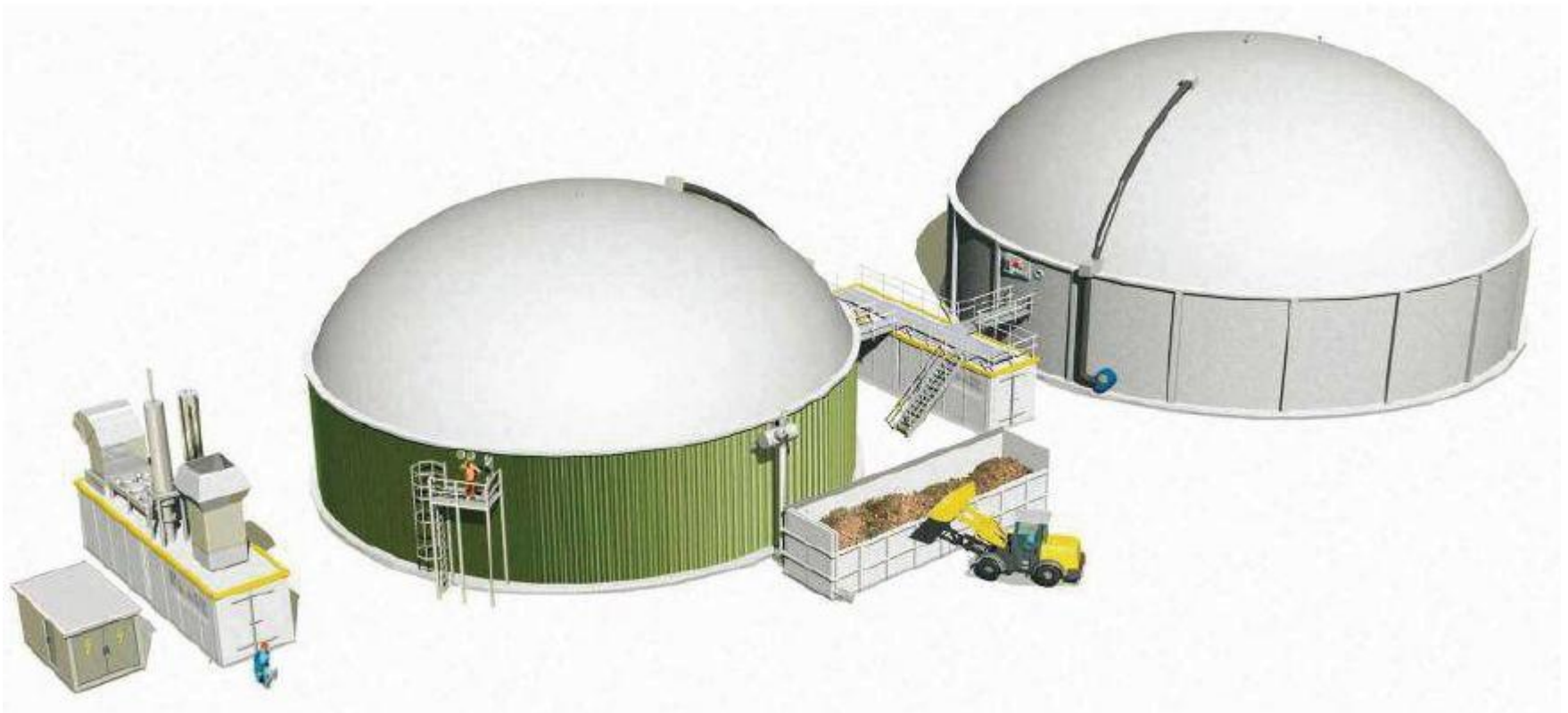
NET Economic Benefit of converting from BEEF to BIOMASS	€2,673
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Total Economic Benefit from 1 Ha in Dairy farming	€ 4,057
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NET Economic Benefit of converting from DAIRY to BIOMASS	-€681
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** Value is to the entire economy, over 50% will be as fuel savings to the consumer, the remainder goes to the grower, the fuel processor and the exchequer (through carbon saving).

Anaerobic Digestion



AD Potential

Joint Oireachtas Committee report states that 8,250 jobs could be created in 10 years

Over 20 plants in Ireland have planning and Grid Connection offers. These will create over 100 full time operational jobs and 600 design/construction job years.

AD can supply electricity, heat and transport fuel

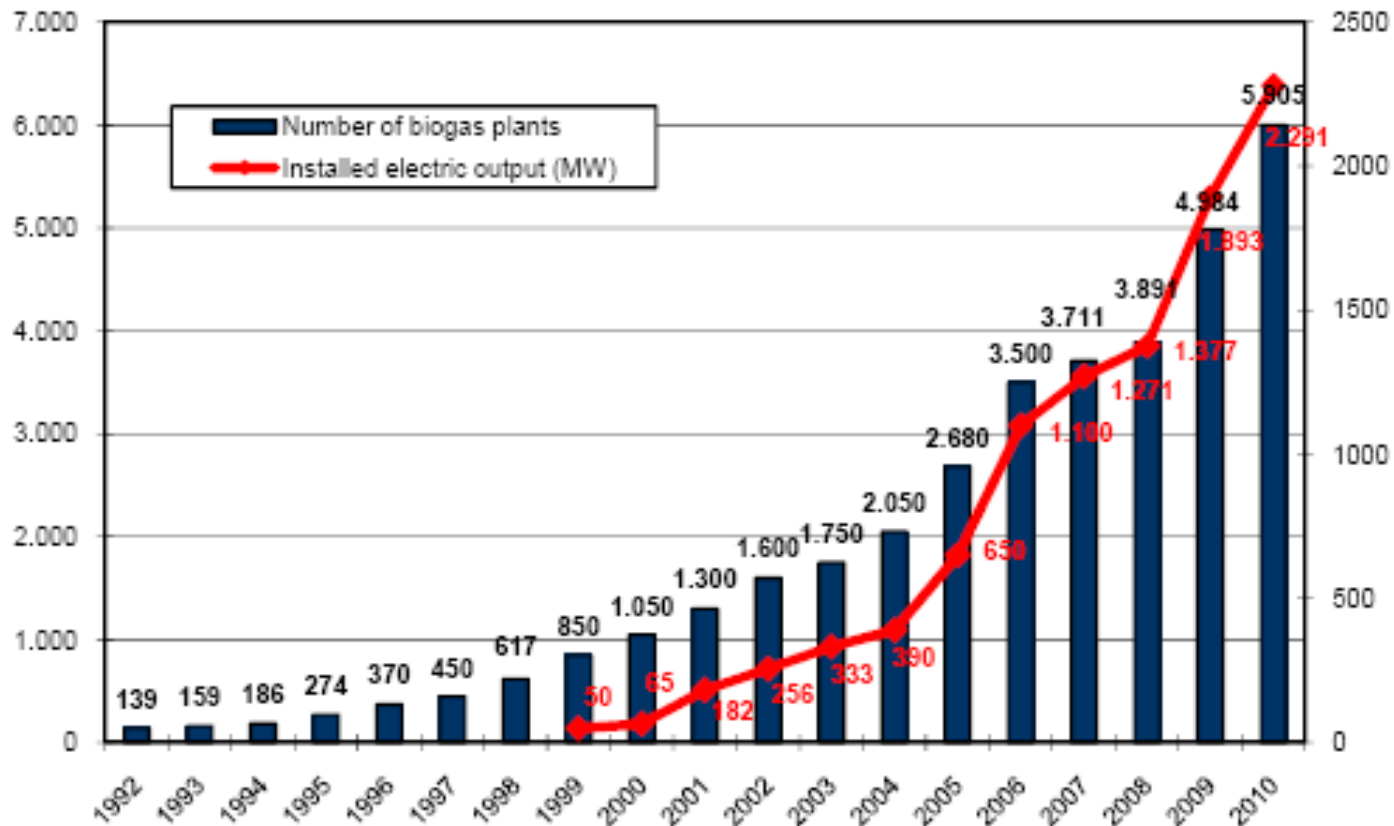
What to do with BioGas?

Usage		Conversion Efficiency	Sale Value		Value c/m3	Cost of Conversion	Customer saving requirement	Realizable price
			c/kwh	Basis		c/m3	%	c/kwh
Electricity only		36%		11REFIT rate	25.66	2	0%	3.65
Elec + heat	Elec	36%		15REFIT rate	34.99	2		
	Heat	30%		2.0	3.89	0.5		
	Total	66%			38.88	2.5	0%	5.61
Vehicle Fuel		90%		10.77Diesel ex VAT	62.81	18	15%	5.88
Heat (replacing Kerosene)		100%		6.86Kerosene	44.46	0.5	5%	6.44
Heat (Replacing Natural Gas)		100%		5.34Natural Gas	34.59	0.5	5%	5.00

German Development

Biogas Segment Statistics 2010

Development of the number of biogas plants and the total installed electric output in megawatt [MW] (as of 06/2011)



German AD Statistics

Biogas Sector Statistics at a Glance

	End of 2010	Forecast for 2011
Number of plants (of these feeding biomethane)	5.905 (45)	7.000 (60)
Installed electric output in MW	2.291	2.728
Net electricity production in MWh per annum	14,8 Mio.	17,8 Mio.
Homes supplied with biogas-based electricity	4,2 Mio.	5,1 Mio.
Proportion of electricity consumption in %	2,46	3,1
Turnover in Germany in €	5,1 Mrd.	5,9 Mrd.
Jobs	39.100	44.500
Export rate in %	10	10

Source: Fachverband Biogas e.V.

SUBSTRATES

SUBSTRATE	Gas / Tonne DM	Tonnes available PA	Total Methane Gas (mcm)*	Electrical Generation Capacity	Notes
Agricultural Slurries	160 - Nm3	535,000	47	60 MW	Out of 4.5 million tonnes
Food Waste / Organic Fraction	120 Nm3	484,000	32	41 MW	Out of 1.5 million tonnes BMW
Food Processing Waste	120 - 300 Nm3	363,000	30	39 MW	
Energy Crops	300 - 480 Nm3	1,100,000	300	386 MW	90,000 Ha 2% of Agri
TOTAL			409	526 MW**	

Source: Jerry Murphy - UCC

* Ireland imports approx 5 Billion m3 methane per annum.

** Embedded Dispatchable Generation



Benefits of BioEnergy Socio Economic Study

DUE FOR PUBLICATION – Q1 2012



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