The Business of Bio-Energy

From field to finance – commercialising Ireland's potential

15 June 2011

Session 1 Presentations

BYRNE WALLACE YOUR LEGAL BUSINESS PARTNERS

ENTERPRISE IRELAND

RSM Farrell Grant Sparks

Programme

Session 1 – Ian Duffy, RSM Farrell Grant Sparks - Chair

1.30	Sean Wallace, Partner, ByrneWallace
1.35	Simon Coveney TD, Minister for Agriculture, Food and Marine
2.00	Dr. Warner BJ Popkes, RSM Germany DPI AG, Managing Partner
2.25	Jer Bergin, IFA, Head of Climate Change and Renewable Energy
2.50	Shane Malone, Byrne O'Cleirigh Environmental Consultants, Biofuels Obligation Scheme Project Manager
3.10	Tom Kelly, Enterprise Ireland, Divisional Manager Cleantech, Electronics and Life Sciences
3.30	Panel discussion followed by break

BYRNE WALLACE YOUR LEGAL BUSINESS PARTNERS

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Simon Coveney TD
Minister for Agriculture, Marine and Food

RSM Germany

Partners for success

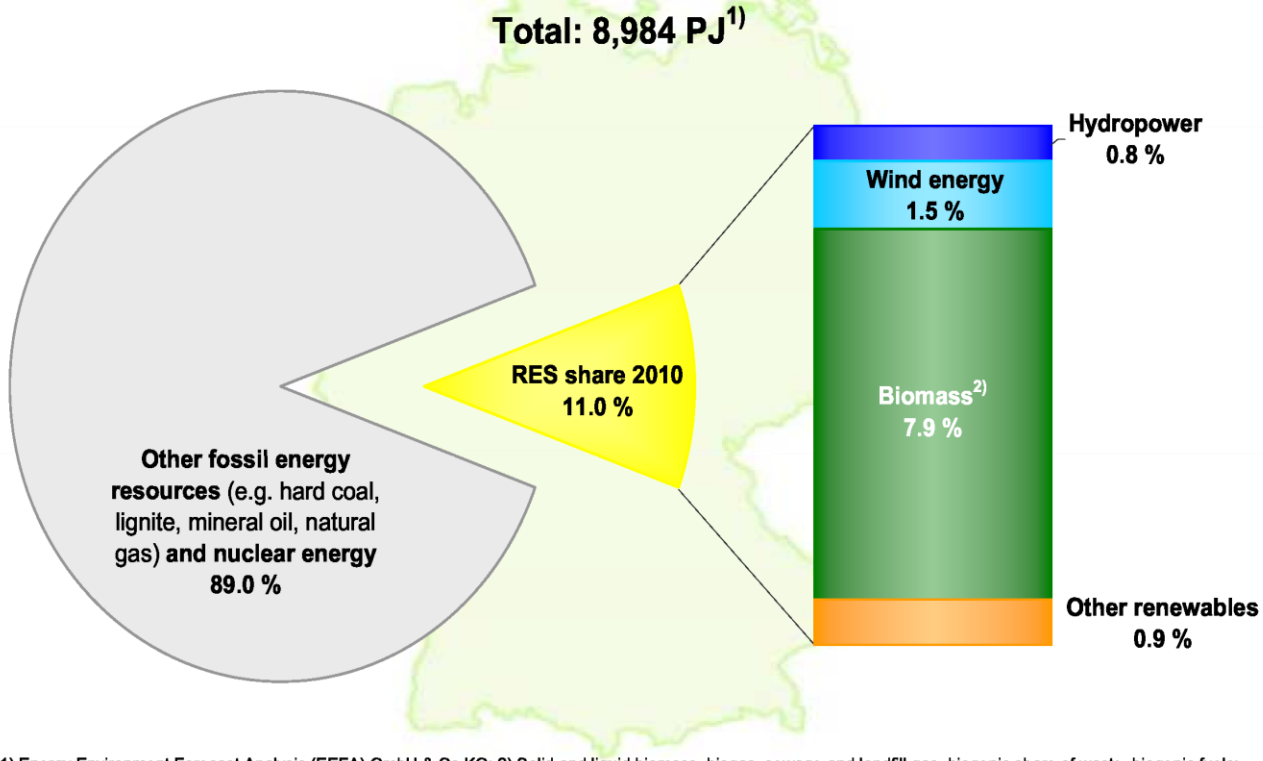
BIO-Energy Market in Germany

Recent Developments : Successes, Failures & Outlook

Warner B. J. Popkes – Dublin 15 June 2011

Board Member RSM Germany – Leader of German „Green Energy Group" and Member of International Initiative „Cleantech & Renewable Energy" within RSM International

Shares of renewable energy sources among total final energy consumption in Germany 2010



1) Energy Environment Forecast Analysis (EEFA) GmbH & Co KG; 2) Solid and liquid biomass, biogas, sewage and landfill gas, biogenic share of waste, biogenic fuels;
Source: BMU-KI III 1 based on Working Group on Renewable Energy Sources-Statistics (AGEE-Stat) and the Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW), according to Working Group on Energy Balances e.V. (AGEB); RES: Renewable Energy Sources; deviations in the totals are due to rounding; 1 PJ = 10^{15} Joule; as at: March 2011; all figures provisional

Common Driver behind RES (Renewable Energy Sources)

- Germany was trailblazer introducing an „Act on Sale of Electricity to the Grid" (StromEinspeiseGesetz) in 1991 – THE driving force for Renewables
- Utilities were and are obliged to purchase energy (price guarantee for investors)
- Restructuring of Energy market towards more decentralization established
- Key financial basis for financing projects with bank credits
- as per today the „EEG" ErneuerbareEnergienGesetz (Renewable Energy Sources Act) remains the main driver for BIO-Energy

EEG remuneration rates (EEG 2010)

Payments safeguarded for 20 years operating time with floating degression

all data in cent €: price per kwh

Wind	onshore: 9,2	off-shore: 15
Photovoltaik:	28,74 – 9,48	
Biomass	11,67 – 7,79	
Sewage etc.	6,16 – 9,0	

German Perspective - Mission Statement

Germany was visionary introducing Energy Laws (today EEG) to support the Renewable Energy Business and to protect climate & global warming threads

This idea was adopted and taken over in most countries – EU conformity approved

Based on the ground of EEG new technologies and industries developed and strengthend our export power

Today: leaving nuclear power is the next step: others will follow!

Achievements per today

Renewable Energy Sector is well established – Banks offer financing and KfW-Programmes support RES heavily

RES already a substantial player contributing to energy supply – farmers are among the winners (land lease windturbines, production of raw materials for biomass & biofuels, massive price increases

The energy-market has changed in 20 years: Less centralized – more players involved, mid-sized firms are the drivers behind the success story (German Mittelstand – technology provider

Some details and statistics now! You need to know the entire Renewable Market (RES) to better understand the BioEnergy Sector

Contribution of renewable energy sources to energy supply in Germany in 2010

Share of renewable energy sources		
in total final energy consumption	[%]	**11.0**
in total gross electricity consumption		**16.8**
in total heat supply		**9.8**
in total fuel consumption[1)]		**5.8**
in total primary energy consumption[2)]		**9.4**
CO_2- and GG-reduction through the use of renewable energy sources		
GG-emissions	[mill. t]	**approx. 120**
through the EEG compensated power input		*approx. 58*
CO_2-emissions		**approx. 117**
through the EEG compensated power input		*approx. 55*

1) Total consumption of engine fuels, excluding fuel in air traffic;

2) Calculated using efficiency method; source: Working Group on Energy Balaces e.V. (AGEB);

Deviations in the totals are due to rounding; Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources -Statistics (AGEE-Stat); as at: March 2011; all figures provisional

Contribution of renewable energy sources to energy supply in Germany in 2010

Electricity		
Hydropower		**19.7**
Wind energy		**36.5**
onshore		*36.3*
offshore		*0.2*
Biomass (total)		**33.5**
therefrom:		
solid biomass	[TWh = 1 billion kWh]	*12.1*
liquid biomass		*2.0*
biogas		*12.8*
sewage gas		*1.1*
landfill gas		*0.7*
biogenic share of waste		*4.8*
Photovoltaics		**12.0**
Geothermal energy		**0.027**
Total electricity		**101.7**

Heat		
Biomass (total)		**127.0**
therefrom:		
solid biomass	[TWh = 1 billion kWh]	*101.5*
liquid biomass		*4.6*
biogas		*7.6*
sewage gas		*1.1*
landfill gas		*0.4*
biogenic share of waste		*11.9*
Solar thermal energy		**5.2**
Deep geothermal energy		**0.3**
Near surface geothermal energy		**5.3**
Total heat		**137.8**

Biogenic fuels		
Biodiesel (approx. 2.6 mill. t)	[TWh = 1 billion kWh]	**26.6**
Vegetable oil (approx. 0.1 mill. t)		**0.6**
Bioethanol (approx. 1.2 mill. t)		**8.7**
Biogenic fuels (total)		**35.9**

Total final energy from renewable energy sources	**275.4**

Deviations in the totals are due to rounding; Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources -Statistics (AGEE-Stat); as at: March 2011; all figures provisional

Avoidance of CO_2 and Greenhouse-Gas emissions in Germany 2010

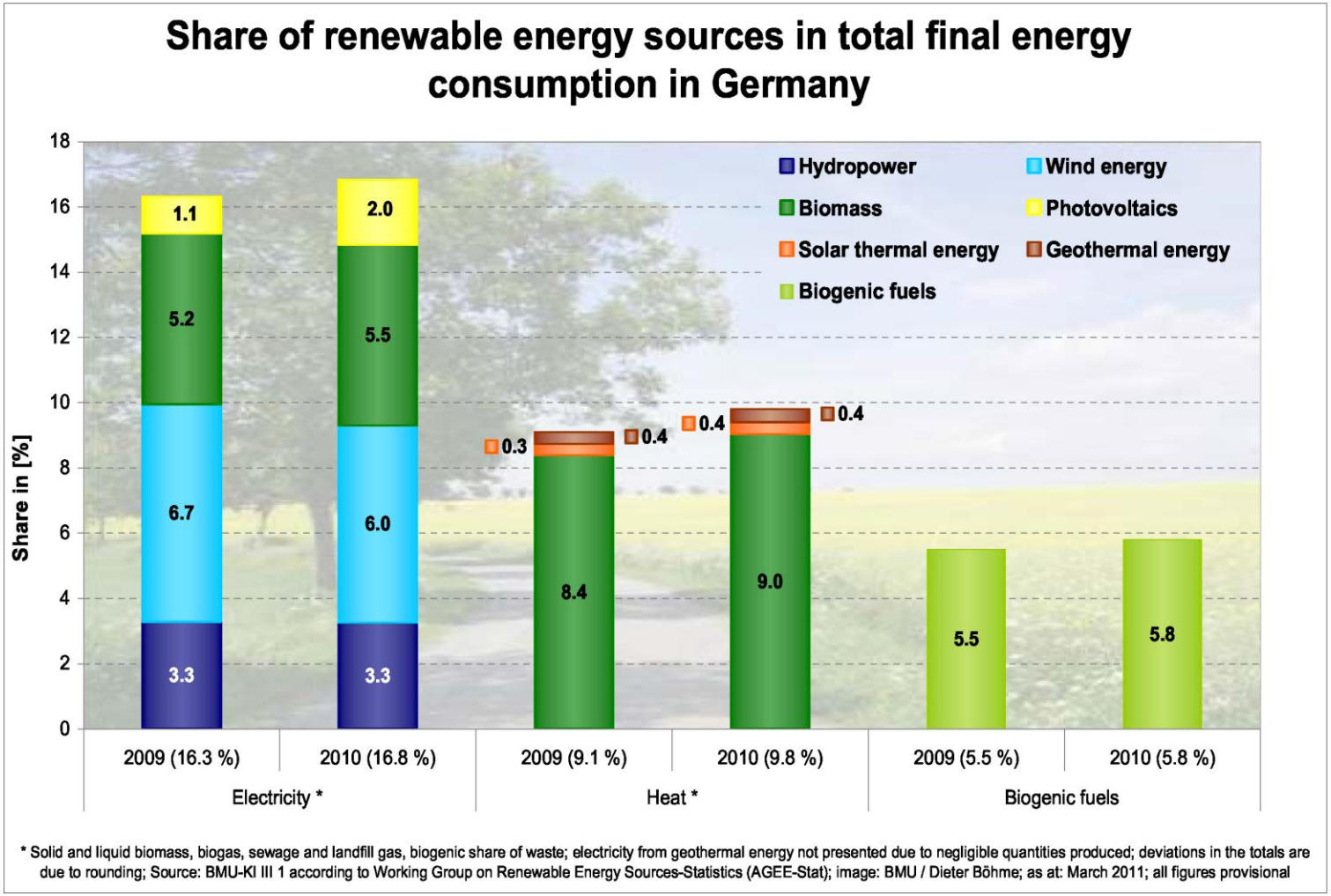
	Avoidance of CO_2 emissions [mill. t]	Avoidance of GG emissions [mill. t]
Electricity generation	**72.2**	**76.1**
Through the EEG compensated power input	***approx. 55***	***approx. 58***
Heat generation	**37.6**	**38.1**
Biogenic fuel generation	**7.2**	**5.2**
Total	**117.0**	**119.5**

EEG: Renewable Energy Sources Act; deviations in the totals are due to rounding; Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); as at: March 2011; all figures provisional

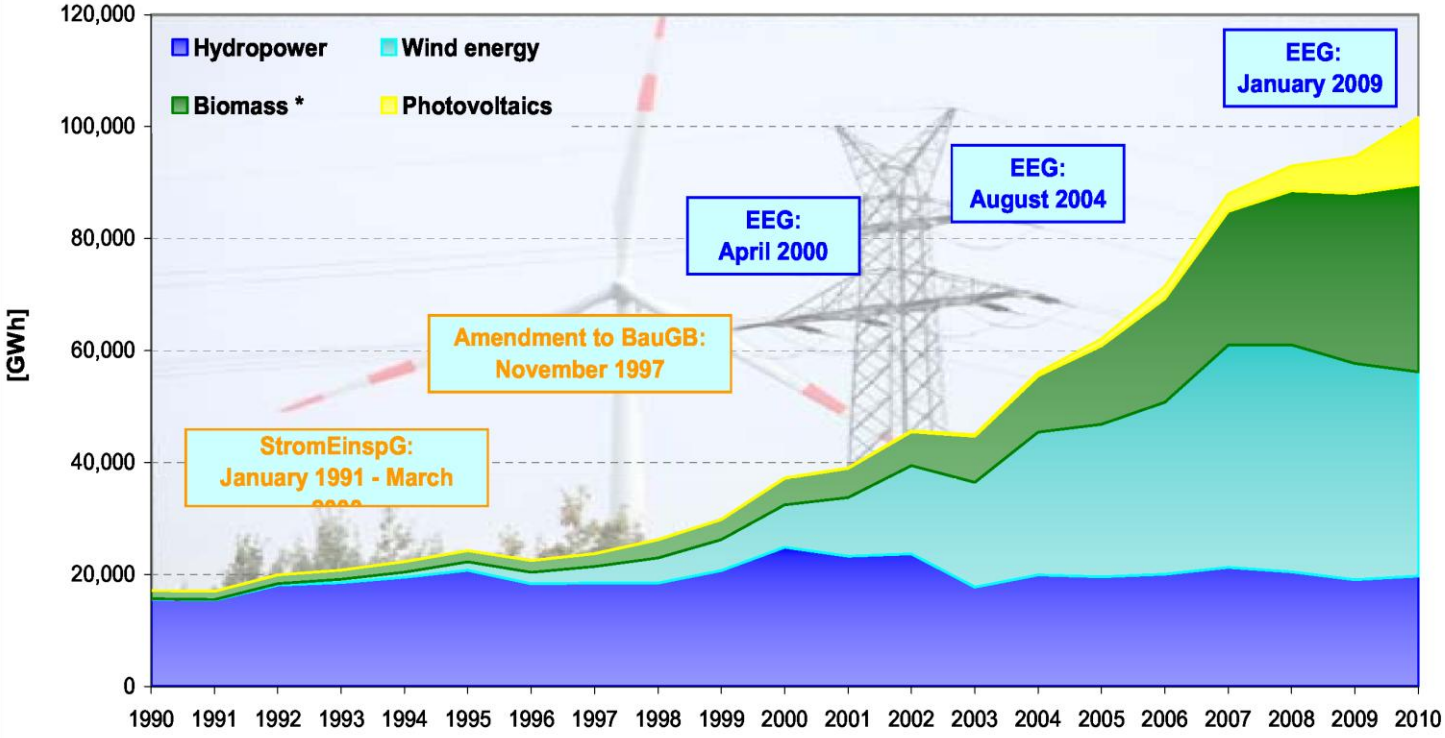
Renewable energy sources as a share of energy supply in Germany

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Renewables as a share of total final energy consumption (FEC)	[%]											
Electricity generation (in relation to total gross electricity consumption)	3.1	6.4	6.7	7.8	7.5	9.2	10.1	11.6	14.2	15.1	16.3	16.8
Heat supply (in relation to total heat supply)	2.1	3.9	4.2	4.3	5.1	5.5	6.0	6.2	7.4	7.4	9.1	9.8
Fuel consumption[1)] (in relation to total fuel consumption)	0.0	0.4	0.6	0.9	1.4	1.8	3.7	6.3	7.2	5.9	5.5	5.8
Renewables as a share of total FEC	**1.9**	**3.8**	**4.1**	**4.5**	**5.0**	**5.9**	**6.8**	**8.0**	**9.4**	**9.3**	**10.4**	**11.0**
Primary energy consumption (PEC)	[%]											
Renewables as a share of PEC[2)]	**1.3**	**2.9**	**2.9**	**3.2**	**3.8**	**4.5**	**5.3**	**6.3**	**7.9**	**8.1**	**8.9**	**9.4**

1) Until 2002, the reference variable was fuel consumption in road traffic, from 2003, the reference variable here is the total consumption of engine fuels, excluding fuel in air traffic;
2) Calculated using efficiency method; source: Working Group on Energy Balances e.V. (AGEB);
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources -Statistics (AGEE-Stat);
as at: March 2011; all figures provisional

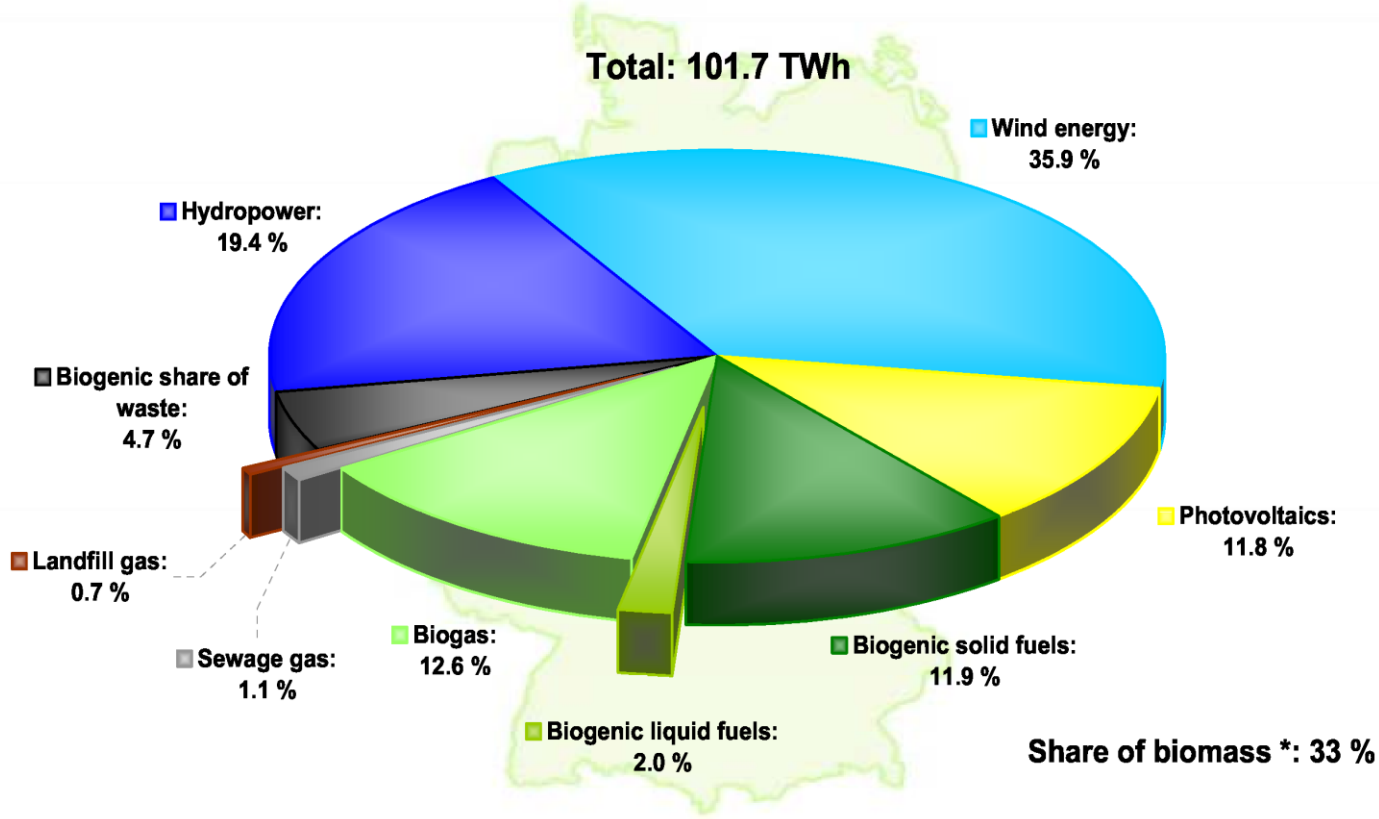

Share of renewable energy sources in total final energy consumption in Germany
Share in [%]
18
16
14
12
10
8
6
4
2
0
Hydropower
Wind energy
Biomass
Photovoltaics
Solar thermal energy
Geothermal energy
Biogenic fuels
1.1
5.2
6.7
3.3
2.0
5.5
6.0
3.3
0.3
0.4
8.4
0.4
0.4
9.0
5.5
5.8
2009 (16.3 %)
2010 (16.8 %)
2009 (9.1 %)
2010 (9.8 %)
2009 (5.5 %)
2010 (5.8 %)
Electricity *
Heat *
Biogenic fuels
* Solid and liquid biomass, biogas, sewage and landfill gas, biogenic share of waste; electricity from geothermal energy not presented due to negligible quantities produced; deviations in the totals are due to rounding; Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); image: BMU / Dieter Böhme; as at: March 2011; all figures provisional

Development of electricity generation from renewable energy sources in Germany



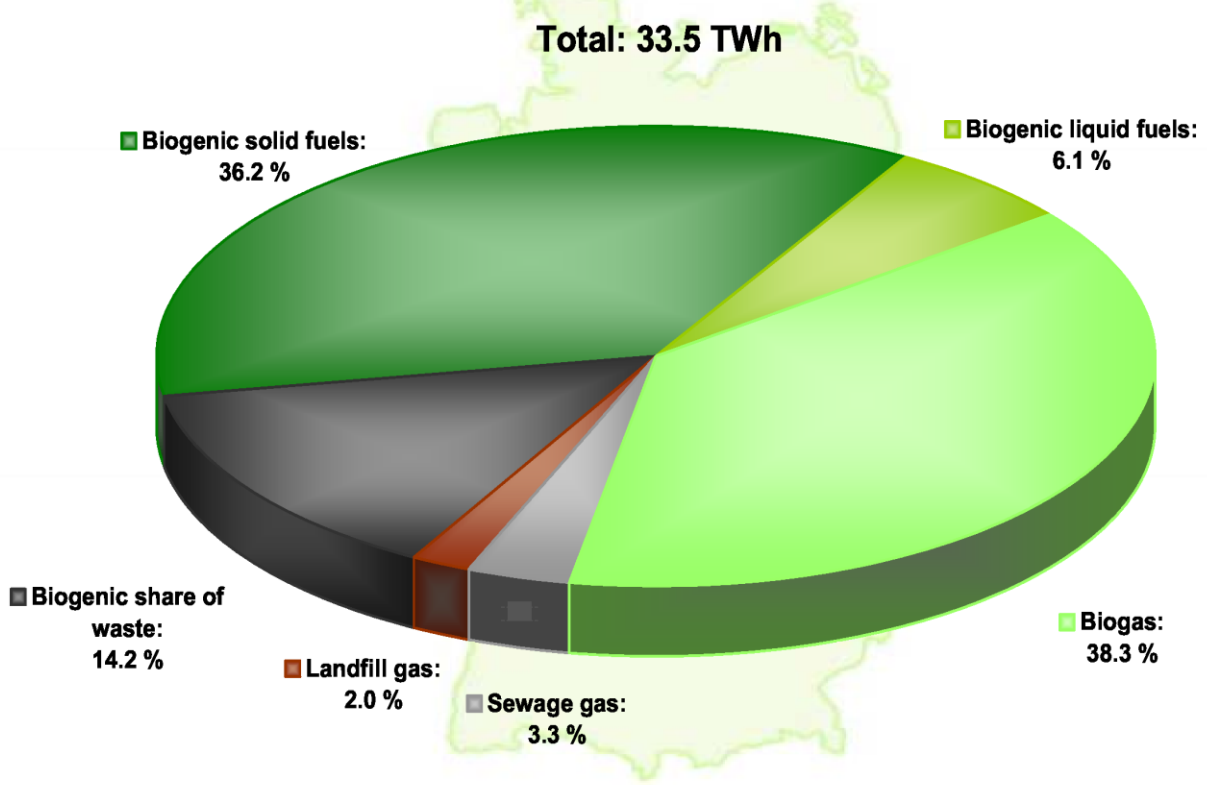
* Solid and liquid biomass, biogas, sewage and landfill gas, biogenic share of waste; electricity from geothermal energy not presented due to negligible quantities produced; 1 GWh = 1 Mill. kWh;
StromEinspG: Act on the Sale of Electricity to the Grid; BauGB: Construction Code; EEG: Renewable Energy Sources Act;
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); image: BMU / Christoph Edelhoff; as at: March 2011; all figures provisional

Structure of electricity supply from renewable energy sources in Germany 2010

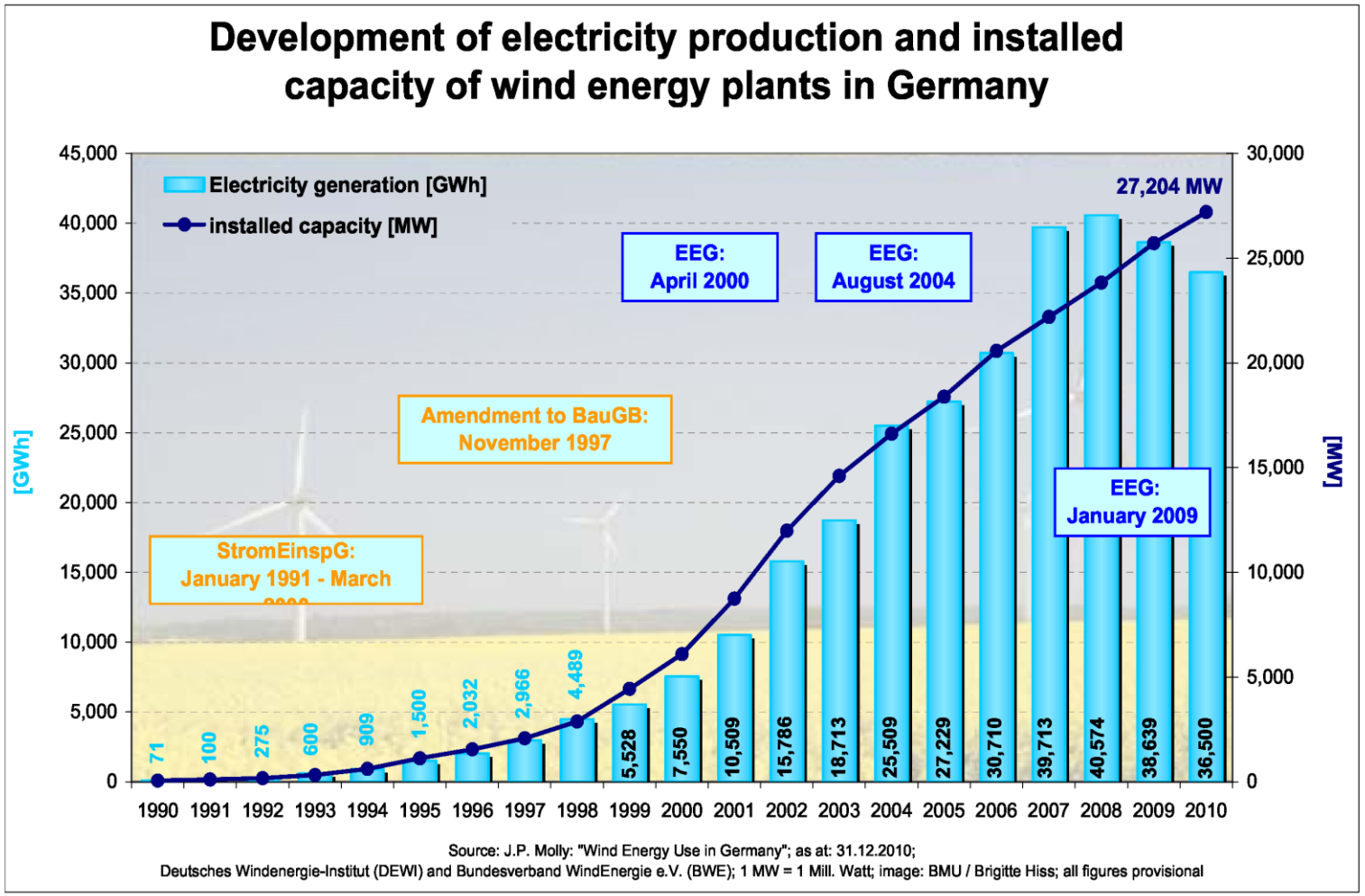


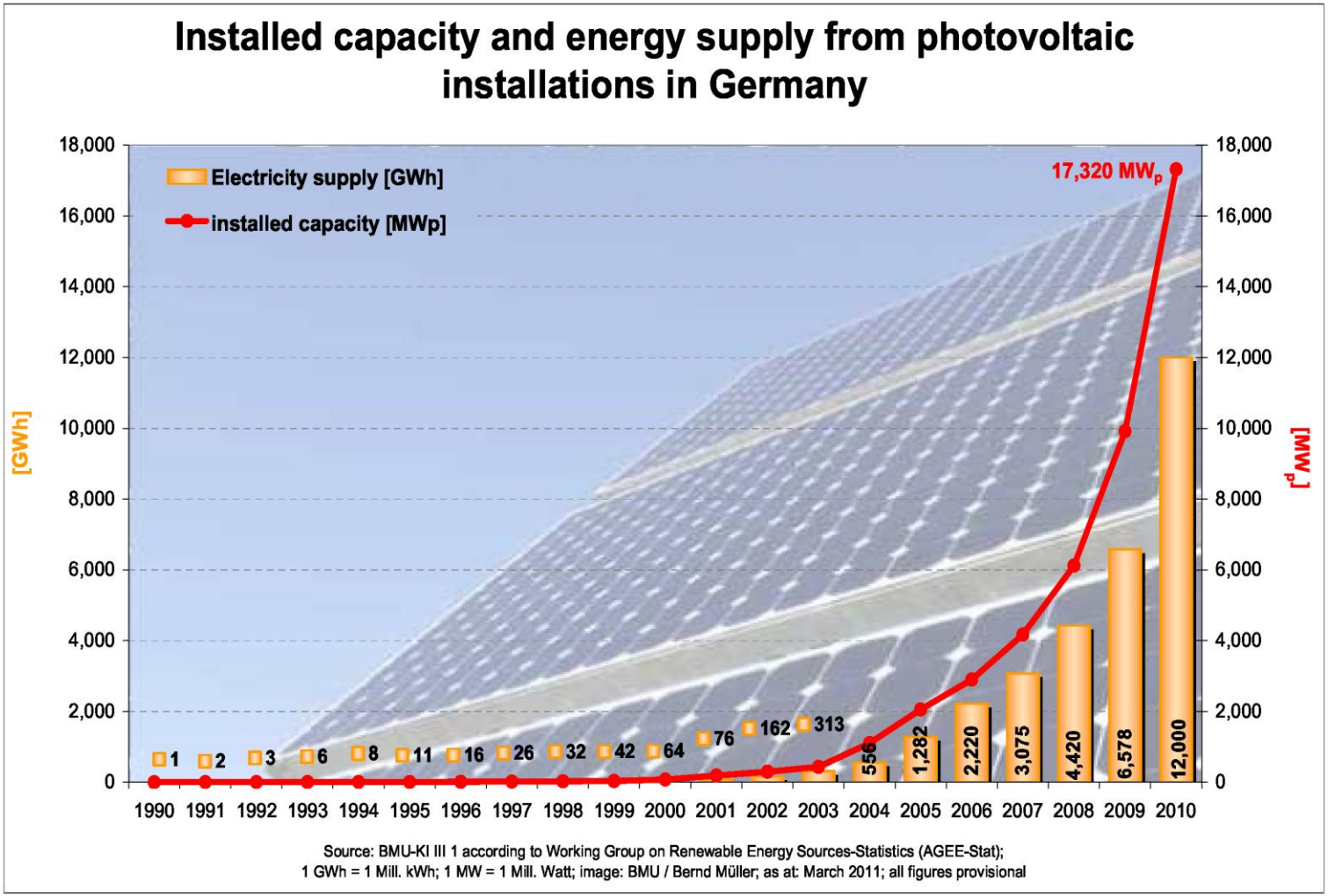
* Solid and liquid biomass, biogas, sewage and landfill gas, biogenic share of waste; electricity from geothermal energy not presented due to negligible quantities produced; deviations in the totals are due to rounding; 1 TWh = 1 Bill. kWh; Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); as at: March 2011; all figures provisional

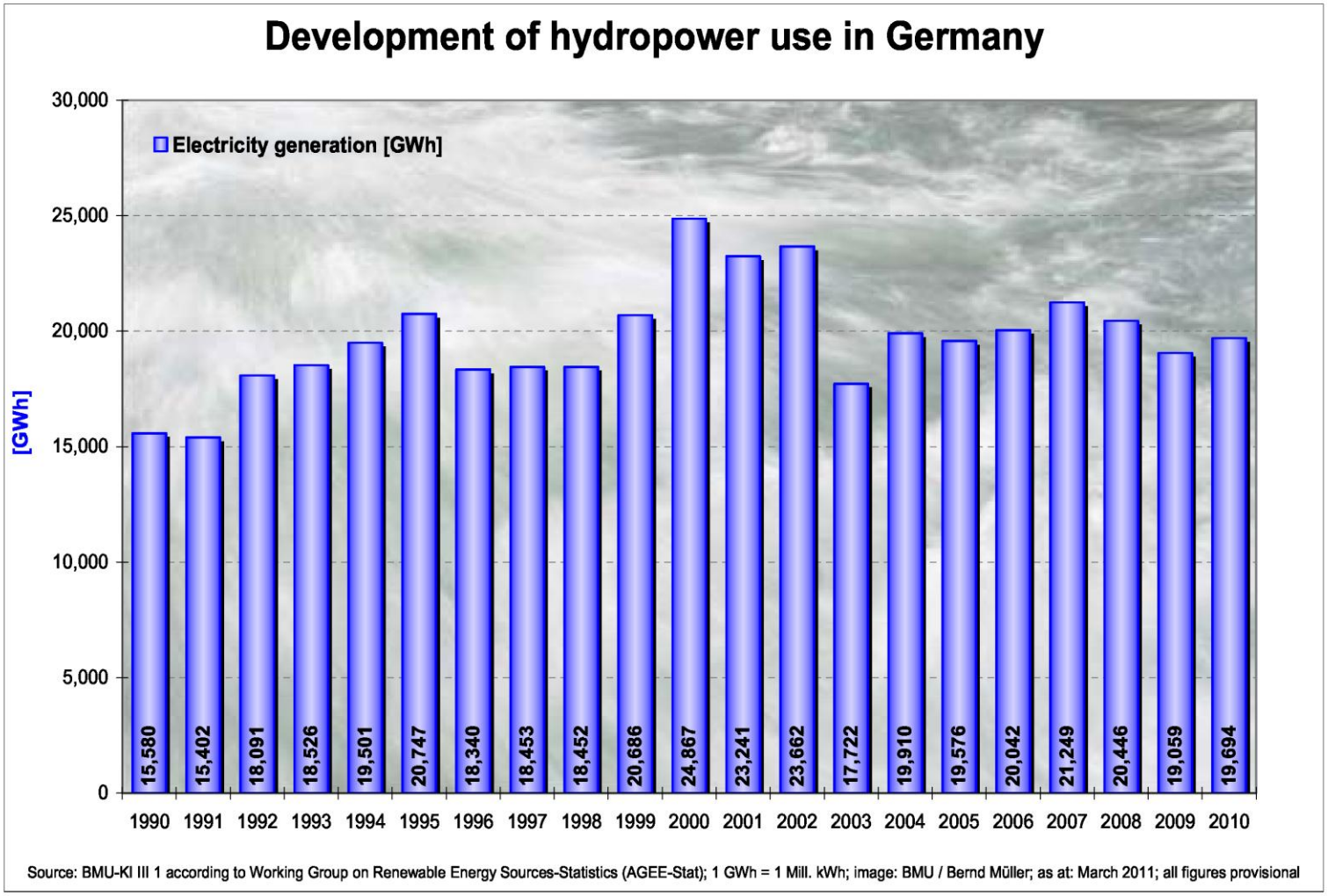
Structure of electricity supply from biomass in Germany 2010

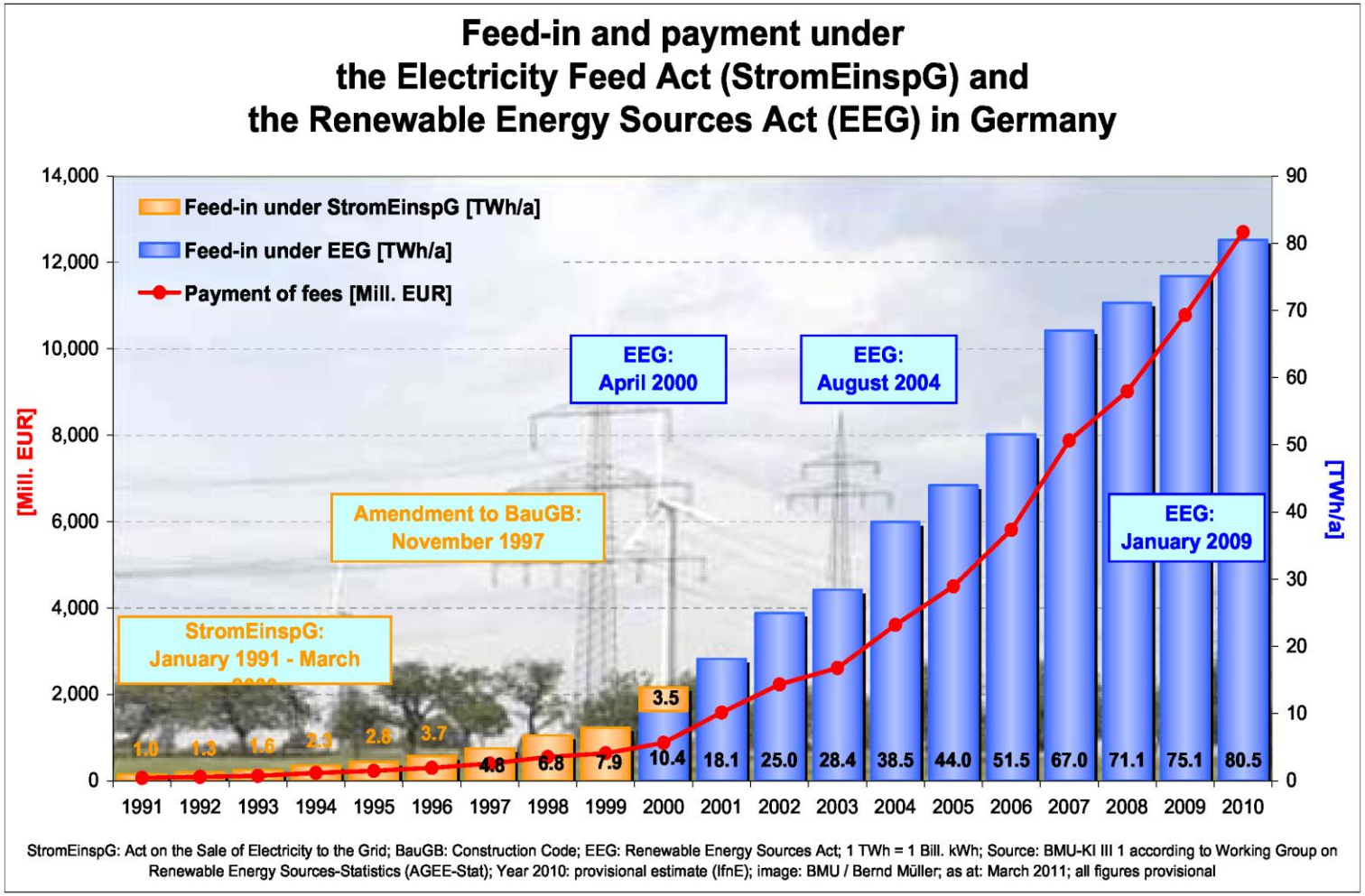


Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); 1 TWh = 1 Bill. kWh; deviations in the totals are due to rounding; as at: March 2011; all figures provisional


Development of electricity production and installed capacity of wind energy plants in Germany
Electricity generation [GWh]
installed capacity [MW]
27,204 MW
EEG: April 2000
EEG: August 2004
Amendment to BauGB: November 1997
StromEinspG: January 1991 - March
EEG: January 2009
[GWh]
[MW]
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
30,000
25,000
20,000
15,000
10,000
5,000
0
71
100
275
600
909
1,500
2,032
2,966
4,489
5,528
7,550
10,509
15,786
18,713
25,509
27,229
30,710
39,713
40,574
38,639
36,500
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Source: J.P. Molly: "Wind Energy Use in Germany"; as at: 31.12.2010;
Deutsches Windenergie-Institut (DEWI) and Bundesverband WindEnergie e.V. (BWE); 1 MW = 1 Mill. Watt; image: BMU / Brigitte Hiss; all figures provisional


Installed capacity and energy supply from photovoltaic installations in Germany
Electricity supply [GWh]
installed capacity [MWp]
17,320 MWp
[GWh]
[MWp]
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1 2 3 6 8 11 16 26 32 42 64 76 162 313 556 1,282 2,220 3,075 4,420 6,578 12,000
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat);
1 GWh = 1 Mill. kWh; 1 MW = 1 Mill. Watt; image: BMU / Bernd Müller; as at: March 2011; all figures provisional


Development of hydropower use in Germany
Electricity generation [GWh]
[GWh]
30,000
25,000
20,000
15,000
10,000
5,000
0
15,580
15,402
18,091
18,526
19,501
20,747
18,340
18,453
18,452
20,686
24,867
23,241
23,662
17,722
19,910
19,576
20,042
21,249
20,446
19,059
19,694
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); 1 GWh = 1 Mill. kWh; image: BMU / Bernd Müller; as at: March 2011; all figures provisional



StromEinspG: Act on the Sale of Electricity to the Grid; BauGB: Construction Code; EEG: Renewable Energy Sources Act; 1 TWh = 1 Bill. kWh; Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); Year 2010: provisional estimate (IfnE); image: BMU / Bernd Müller; as at: March 2011; all figures provisional

Contribution of renewable energy sources to heat supply in Germany 1990 to 2010

	Biomass [1]	Biogenic share of waste [2]	Solar thermal energy [3]	Geothermal energy [4]	Total heat generation	Share of heat consumption
	[GWh]	[GWh]	[GWh]	[GWh]	[GWh]	[%]
1990	28,265	2,308	107	1,515	32,195	2.1
1991	28,360	2,308	169	1,517	32,354	2.1
1992	28,362	2,308	221	1,522	32,413	2.1
1993	28,368	2,308	280	1,530	32,486	2.1
1994	28,375	2,308	355	1,537	32,575	2.2
1995	28,387	2,308	440	1,540	32,675	2.1
1996	28,277	2,538	549	1,551	32,915	2.0
1997	45,591	2,290	690	1,569	50,140	3.2
1998	49,740	3,405	848	1,604	55,597	3.6
1999	50,858	3,674	1,026	1,645	57,203	3.8
2000	51,419	3,548	1,261	1,694	57,922	3.9
2001	58,220	3,421	1,587	1,765	64,993	4.2
2002	57,242	3,295	1,884	1,855	64,276	4.3
2003	69,182	3,169	2,144	1,956	76,451	5.0
2004	75,376	3,690	2,443	2,086	83,595	5.5
2005	79,746	4,692	2,778	2,294	89,510	6.0
2006	83,023	4,911	3,218	2,762	93,914	6.2
2007	86,670	4,783	3,638	3,415	98,506	7.4
2008	93,133	5,020	4,134	4,168	106,455	7.4
2009	103,247	10,863	4,733	4,931	123,774	9.1
2010	115,150	11,850	5,200	5,585	137,785	9.8

1) Solid and liquid biomass, biogas, landfill and sewage gas;

2) Biogenic waste share in waste estimated at 50 %;

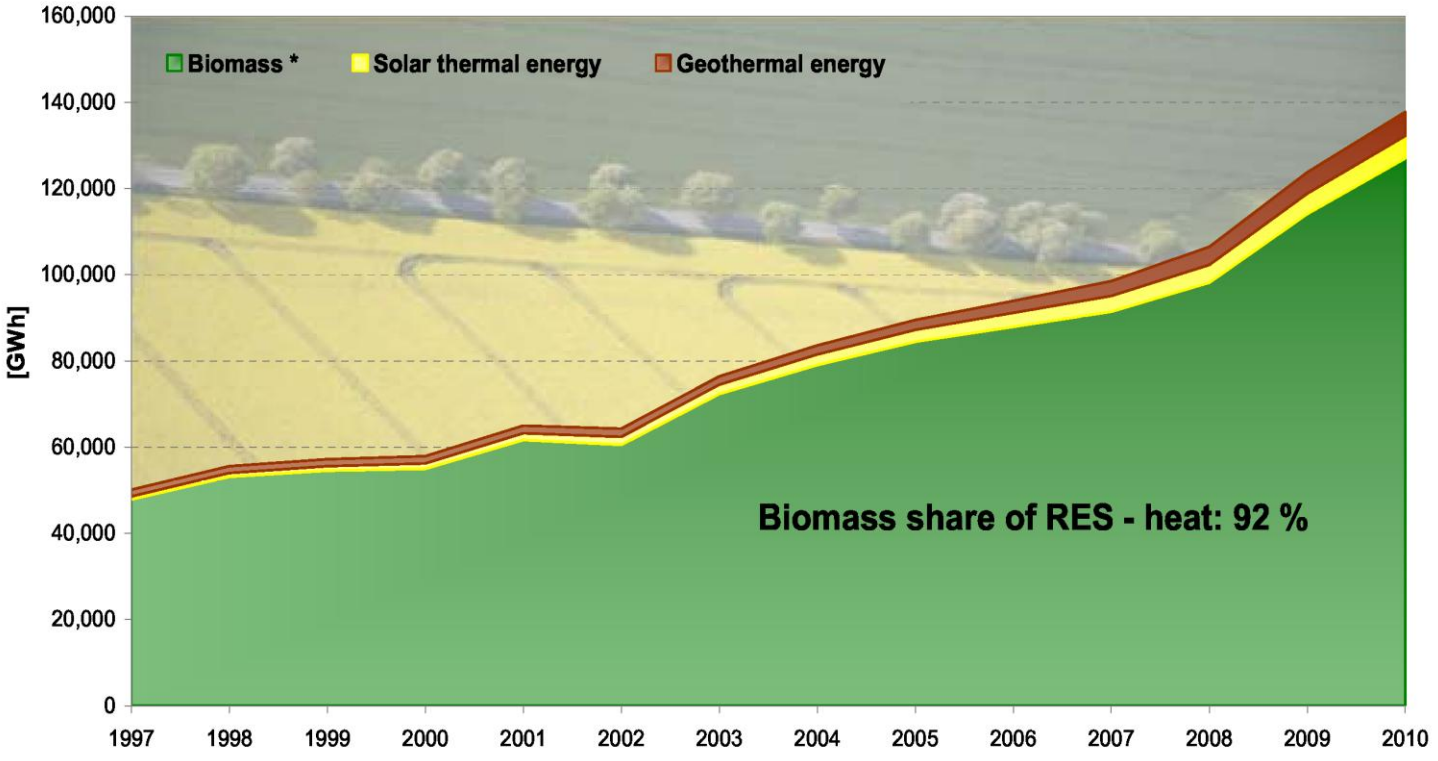
3) Net energy; deconstruction of existing installations is considered;

4) Including Air/Water-, Water/Water- and Brine/Water-Heatpumps;

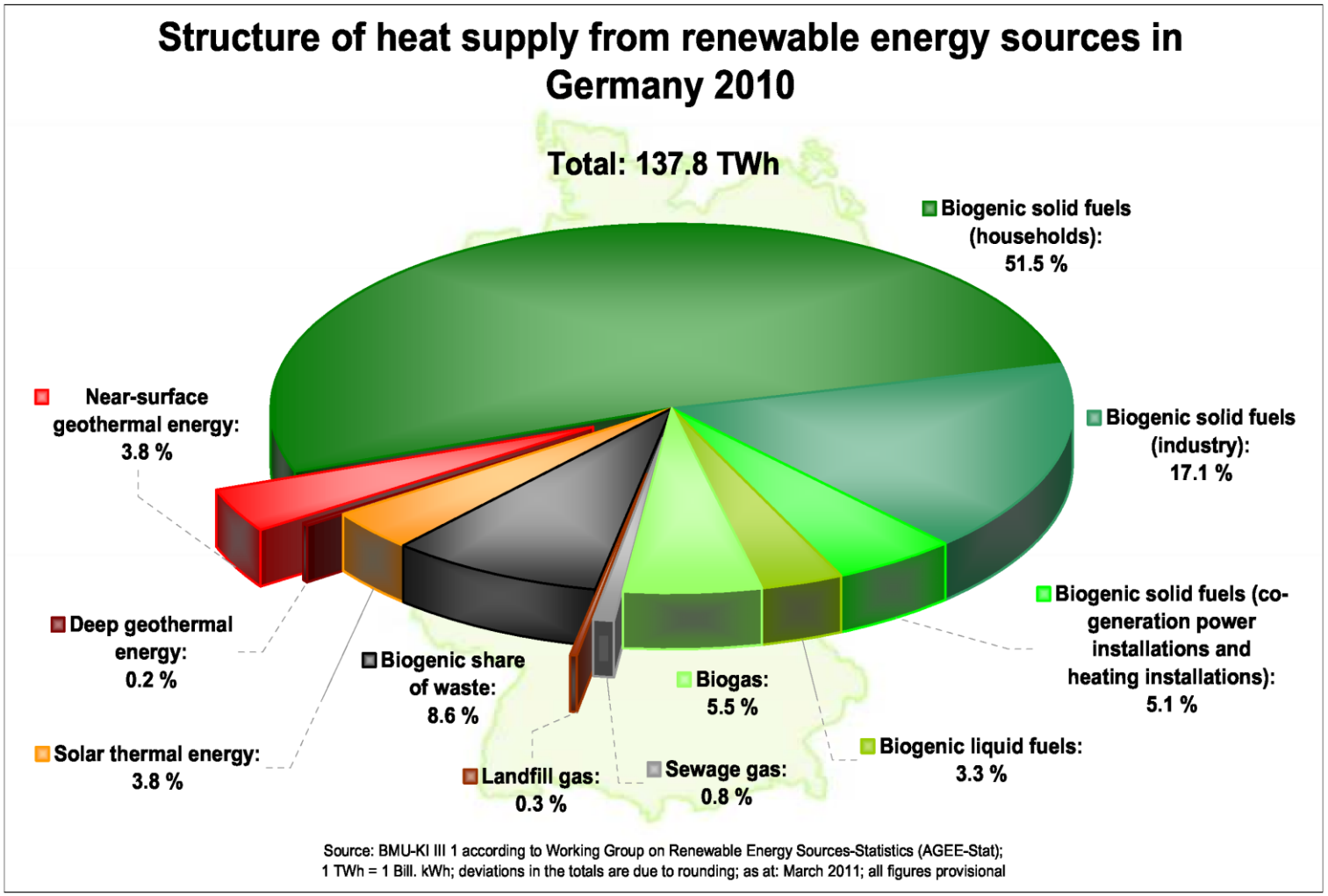
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources - Statistics (AGEE-Stat);

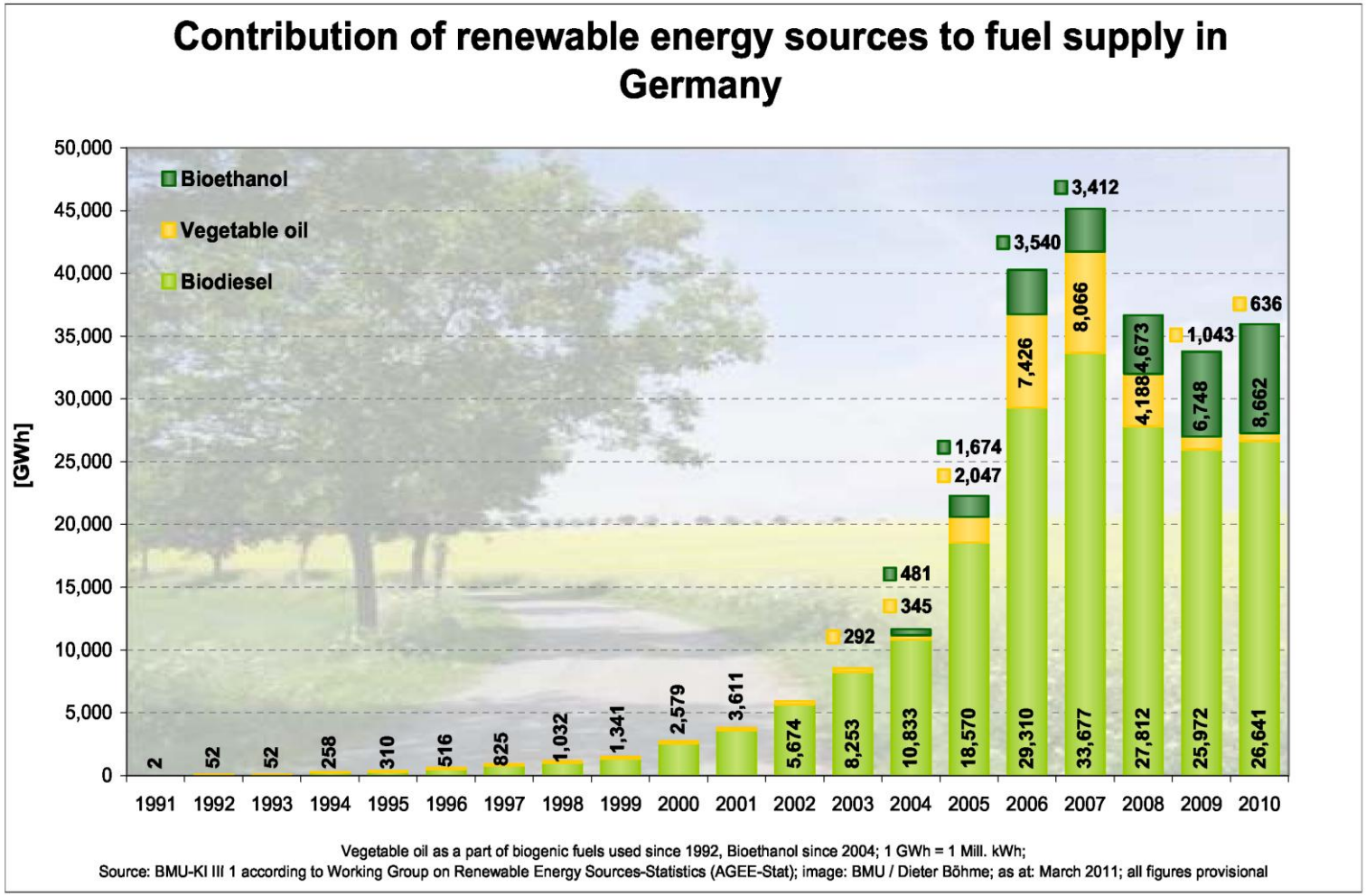
as at: March 2011; all figures provisional

Contribution of renewable energy sources to heat supply in Germany



* Solid and liquid biomass, biogas, sewage and landfill gas, biogenic share of waste; 1 GWh = 1 Mill. kWh; RES: Renewable energy sources;
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); Image: BMU / Brigitte Hiss; as at: March 2011; all figures provisional


Structure of heat supply from renewable energy sources in Germany 2010
Total: 137.8 TWh
Biogenic solid fuels (households): 51.5 %
Biogenic solid fuels (industry): 17.1 %
Biogenic solid fuels (co-generation power installations and heating installations): 5.1 %
Biogenic liquid fuels: 3.3 %
Sewage gas: 0.8 %
Landfill gas: 0.3 %
Biogas: 5.5 %
Biogenic share of waste: 8.6 %
Solar thermal energy: 3.8 %
Deep geothermal energy: 0.2 %
Near-surface geothermal energy: 3.8 %
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat);
1 TWh = 1 Bill. kWh; deviations in the totals are due to rounding; as at: March 2011; all figures provisional


Contribution of renewable energy sources to fuel supply in Germany
[GWh]
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Bioethanol
Vegetable oil
Biodiesel
2
52
52
258
310
516
825
1,032
1,341
2,579
3,611
5,674
8,253
292
10,833
481
345
18,570
1,674
2,047
29,310
3,540
7,426
33,677
3,412
8,066
27,812
4,188
4,673
25,972
6,748
1,043
26,641
8,662
636
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Vegetable oil as a part of biogenic fuels used since 1992, Bioethanol since 2004; 1 GWh = 1 Mill. kWh;
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); image: BMU / Dieter Böhme; as at: March 2011; all figures provisional

BIO-Fuel - Biodiesel

Market share is stable on a still dissatisfying level

Tax exemption was cancelled August 1st, 2006

Production capacity is down today (factories closed after insolvency)

Gouvernment is not willing to change tax burden

Taxwise treated same way as traditional fuel

Consumer interest is down today (no benefit compared to traditional diesel but risk of engine damage etc.)

Tax Burden on Fuels

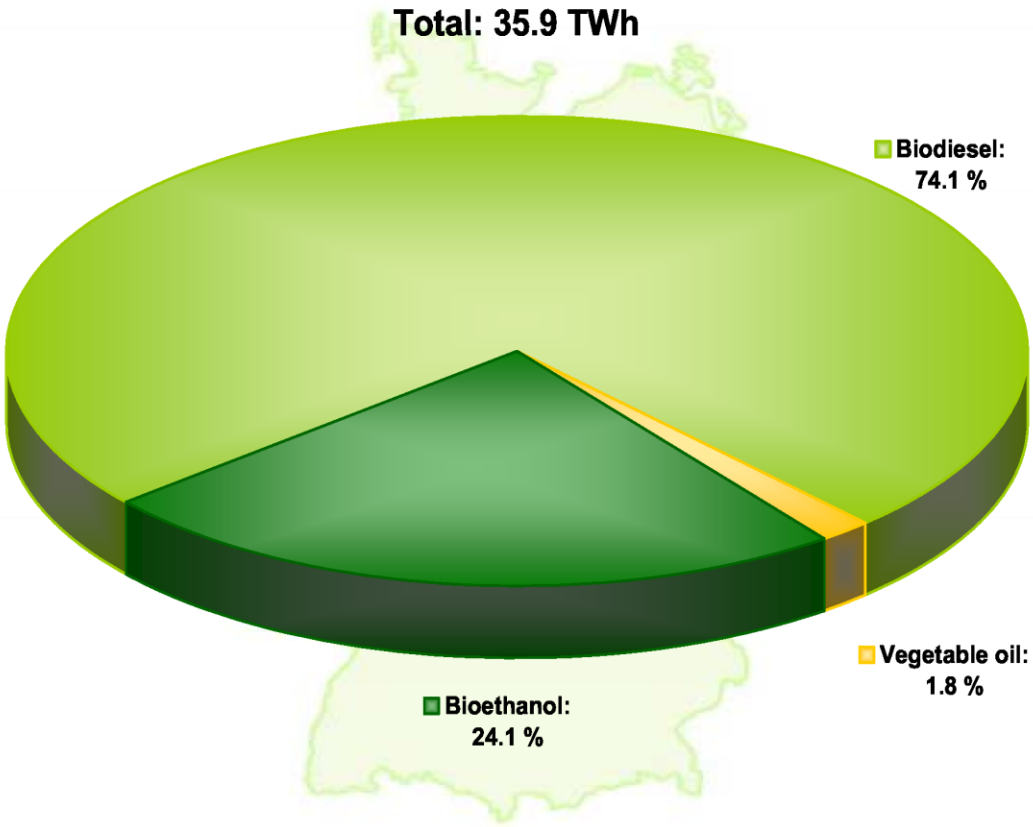
Taxes on fuels today:

- petrol 60%
- diesel 50%; Biodiesel was 9% less till 2006!

Petrol (EuroSuper95) prices without taxes are among the lowest in Europe:

1.	Denmark	**74,40** – 164,30
3.	Ireland	**70,29** – 153,20
26.	Germany	**62,03** – 151,70
27.	Estonia	**59,72** – 122,40

Structure of biogenic fuels in Germany 2010



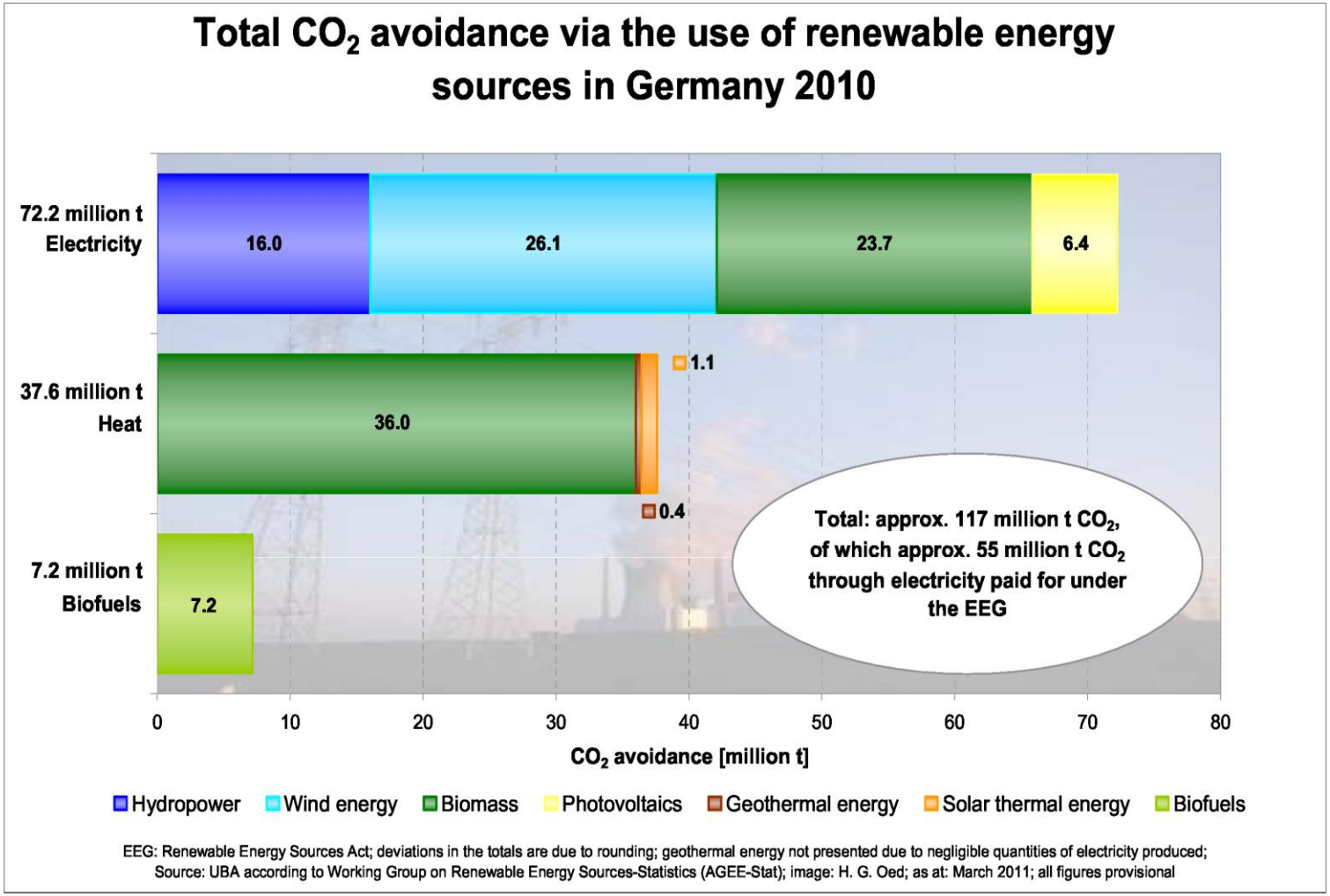
Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat);
1 TWh = 1 Bill. kWh; deviations in the totals are due to rounding; as at: March 2011; all figures provisional

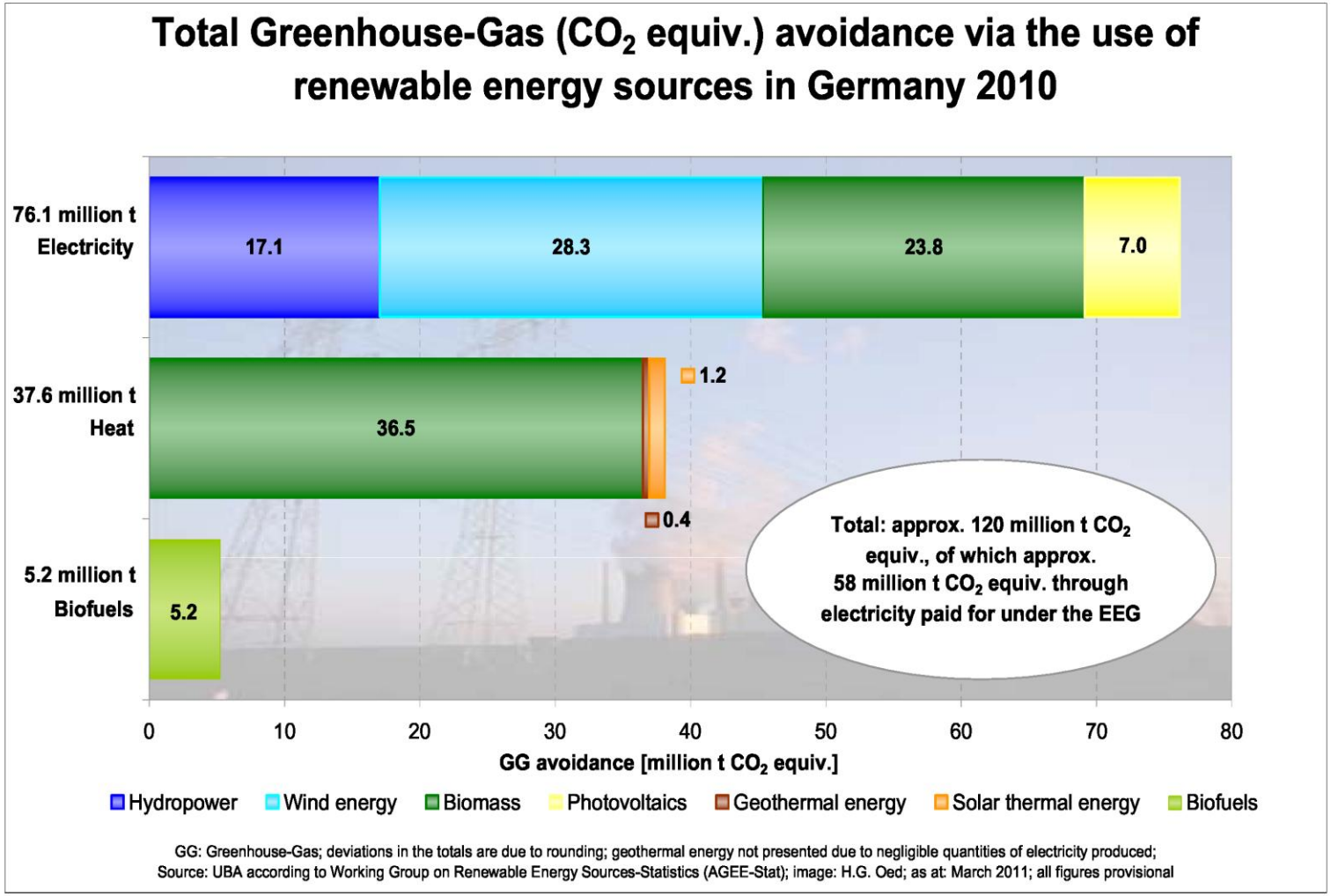
BIOFuel - BioEthanol

Introduction of so called Super E10 flopped totally; E10 Summit in Mai 2011 tried to find solutions, information campaign now at > 75% level, public opinion is scratchy, customers are still doubtful and remain reserved, difficult to revitalize the market! Ministry for Transport confessed failures June 10th!

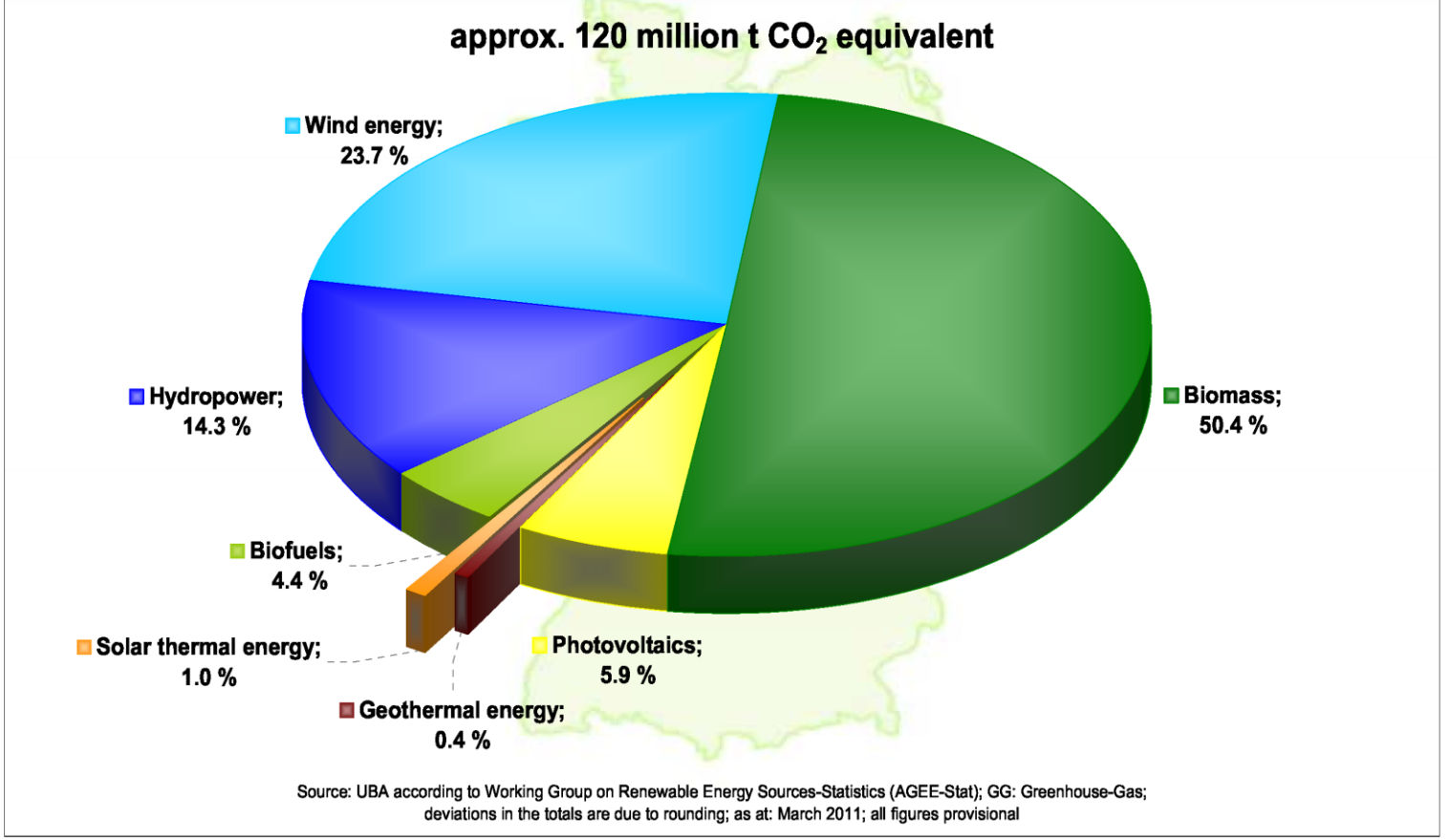
Background: Customer is not informed properly about engine risks, car producers will not guarantee use of E10, so substantial mistrust in using E10 fuels remains vital. Given potential risks for engine breakdowns – where is the advantage of using E10, only substantial price cuts will pay! Today just 3 ct (was 8 ct), 1 of 4 drivers using E10, 1 of 2 stations offers E10

All other fuel (E5 types) remain in market – demonstrates dilemma and deadlock situation

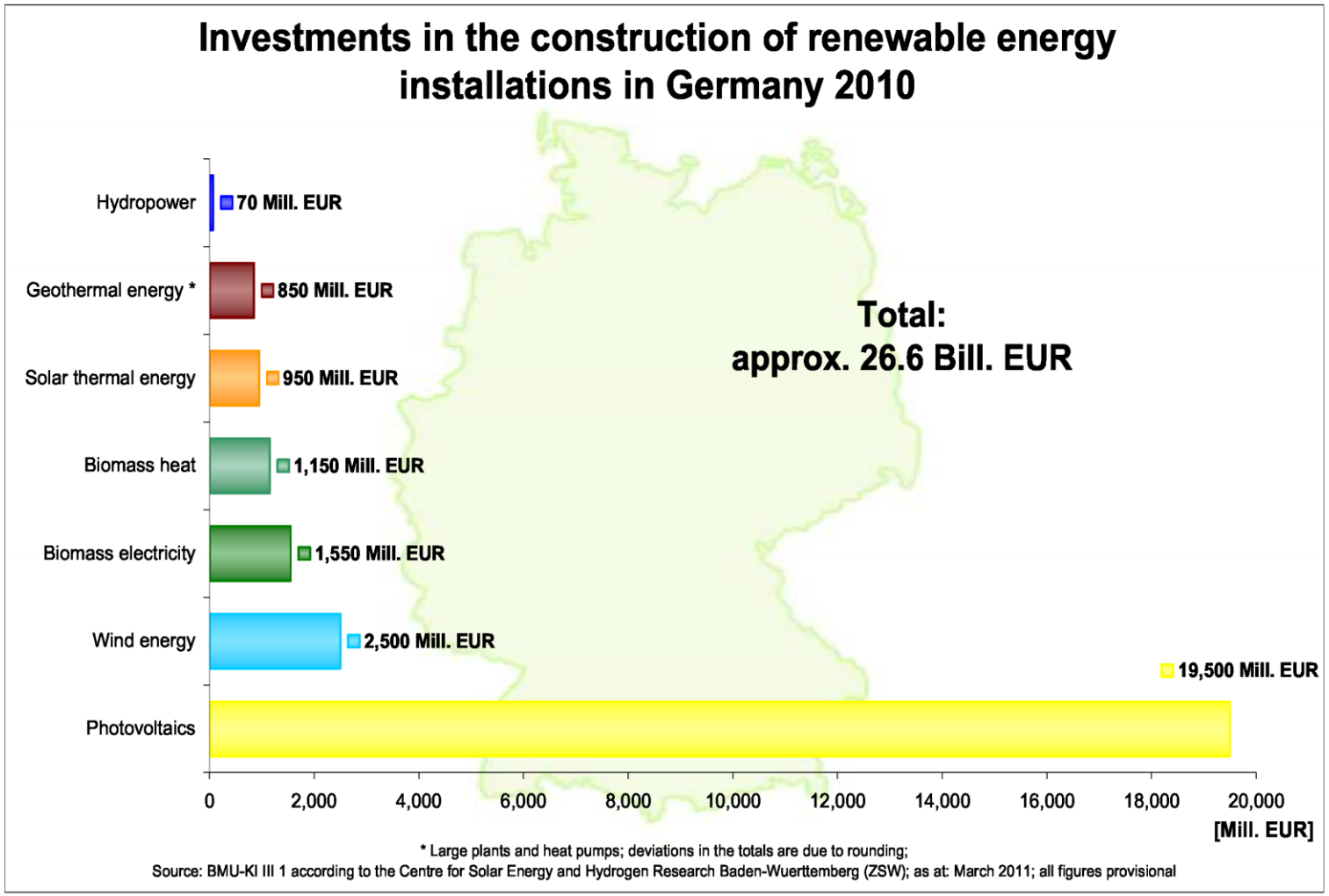

Total CO_2 avoidance via the use of renewable energy sources in Germany 2010
72.2 million t Electricity
16.0
26.1
23.7
6.4
37.6 million t Heat
36.0
1.1
0.4
7.2 million t Biofuels
7.2
Total: approx. 117 million t CO_2, of which approx. 55 million t CO_2 through electricity paid for under the EEG
0
10
20
30
40
50
60
70
80
CO_2 avoidance [million t]
Hydropower
Wind energy
Biomass
Photovoltaics
Geothermal energy
Solar thermal energy
Biofuels
EEG: Renewable Energy Sources Act; deviations in the totals are due to rounding; geothermal energy not presented due to negligible quantities of electricity produced;
Source: UBA according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); image: H. G. Oed; as at: March 2011; all figures provisional


Total Greenhouse-Gas (CO_2 equiv.) avoidance via the use of renewable energy sources in Germany 2010
76.1 million t Electricity
17.1
28.3
23.8
7.0
37.6 million t Heat
36.5
1.2
0.4
5.2 million t Biofuels
5.2
Total: approx. 120 million t CO_2 equiv., of which approx. 58 million t CO_2 equiv. through electricity paid for under the EEG
0
10
20
30
40
50
60
70
80
GG avoidance [million t CO_2 equiv.]
Hydropower
Wind energy
Biomass
Photovoltaics
Geothermal energy
Solar thermal energy
Biofuels
GG: Greenhouse-Gas; deviations in the totals are due to rounding; geothermal energy not presented due to negligible quantities of electricity produced;
Source: UBA according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); image: H.G. Oed; as at: March 2011; all figures provisional

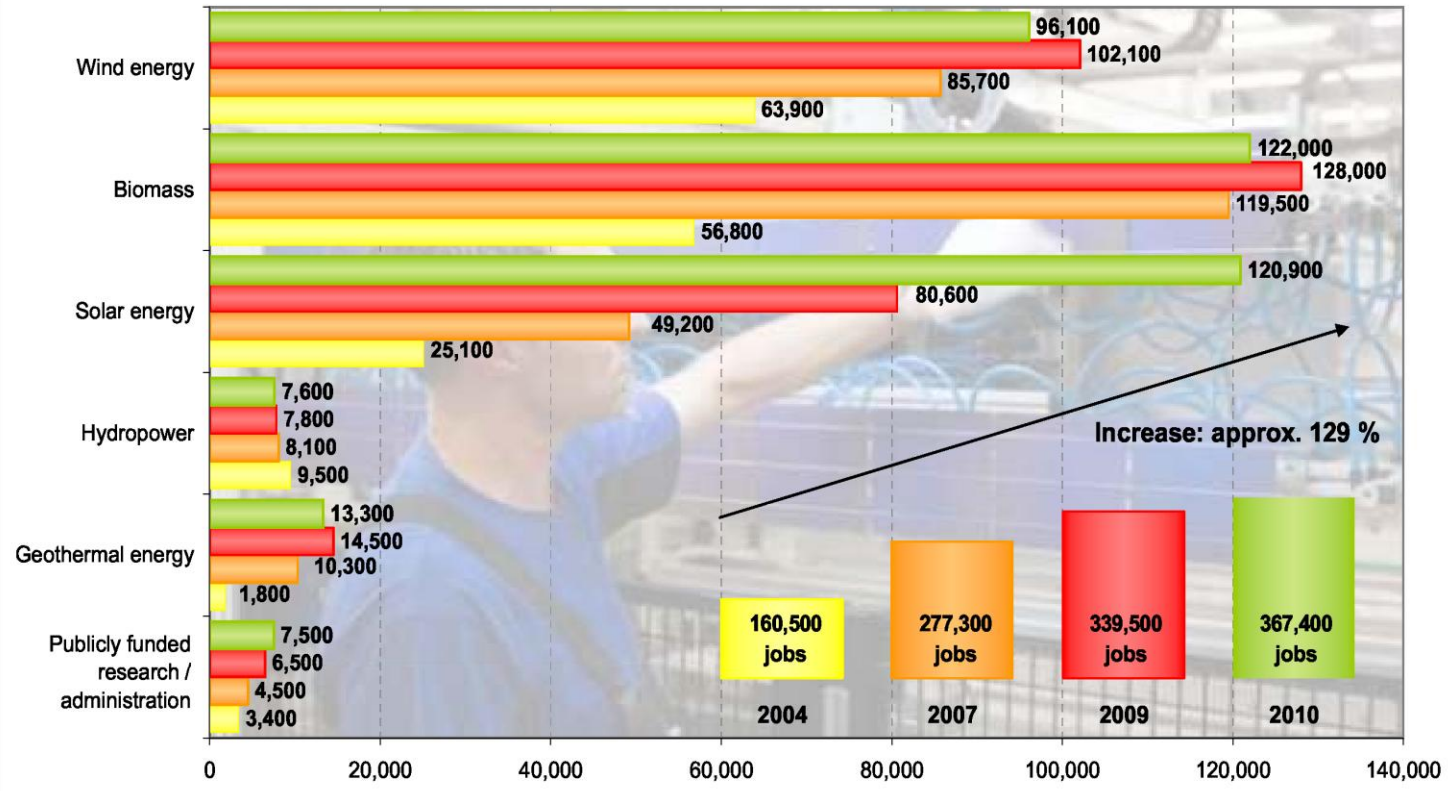
Structure of Greenhouse-Gas (CO_2 equiv.) avoidance via the use of renewable energy sources in Germany 2010



Source: UBA according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); GG: Greenhouse-Gas; deviations in the totals are due to rounding; as at: March 2011; all figures provisional

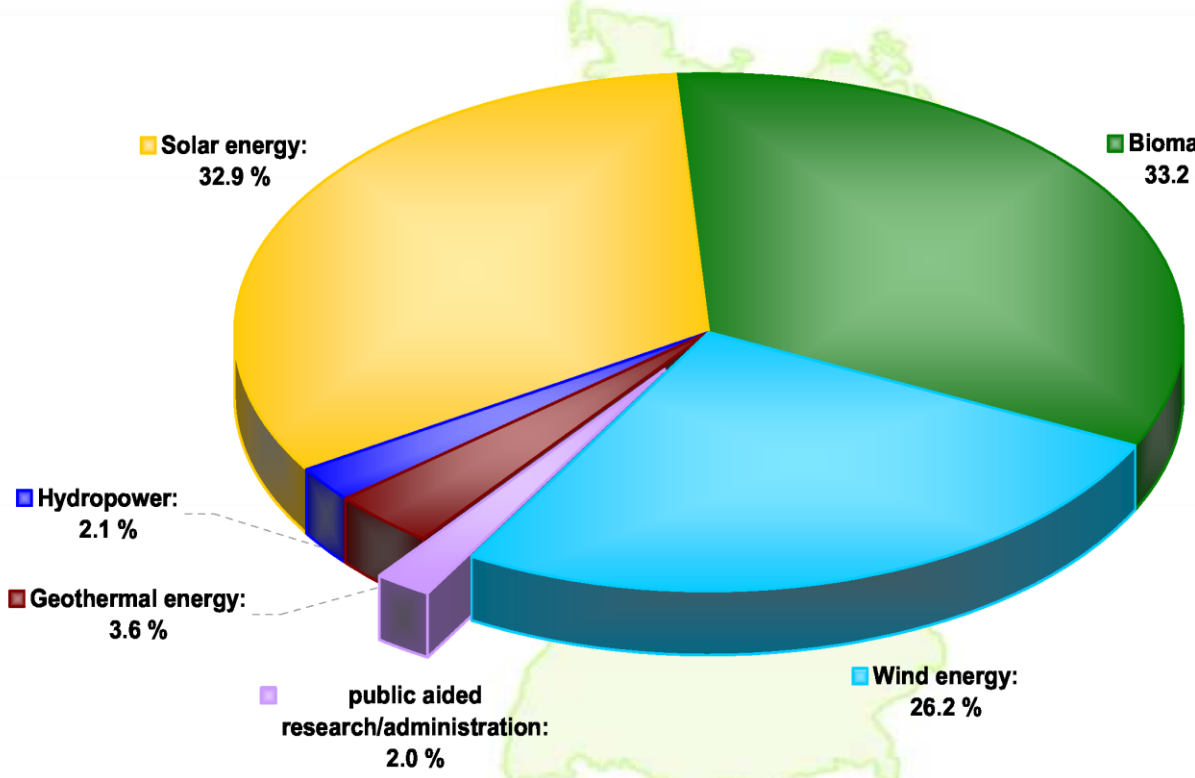

Investments in the construction of renewable energy installations in Germany 2010
Hydropower
70 Mill. EUR
Geothermal energy *
850 Mill. EUR
Solar thermal energy
950 Mill. EUR
Biomass heat
1,150 Mill. EUR
Biomass electricity
1,550 Mill. EUR
Wind energy
2,500 Mill. EUR
Photovoltaics
19,500 Mill. EUR
Total:
approx. 26.6 Bill. EUR
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
[Mill. EUR]
* Large plants and heat pumps; deviations in the totals are due to rounding;
Source: BMU-KI III 1 according to the Centre for Solar Energy and Hydrogen Research Baden-Wuerttemberg (ZSW); as at: March 2011; all figures provisional

Jobs in the renewable energy sources sector in Germany



Figures for 2009 and 2010 are provisional estimate; deviations in totals are due to rounding;
Source: O'Sullivan/Edler/van Mark/Nieder/Lehr: "Bruttobeschäftigung durch erneuerbare Energien im Jahr 20010 – eine erste Abschätzung", as at: March 2011; interim report of research project „Kurz- und langfristige Auswirkungen des Ausbaus erneuerbarer Energien auf den deutschen Arbeitsmarkt"; image: BMU / Christoph Busse / transit

Spread of the approx. 367,400 jobs in the renewable energy sources sector in Germany 2010



Figures for 2010 are provisional estimate; deviations in totals are due to rounding;
Source: O'Sullivan/Edler/van Mark/Nieder/Lehr: "Bruttobeschäftigung durch erneuerbare Energien im Jahr 20010 – eine erste Abschätzung", as at: March 2011; interim report of research project „Kurz- und langfristige Auswirkungen des Ausbaus erneuerbarer Energien auf den deutschen Arbeitsmarkt"

Trends

Biofuel has a difficult future in Germany (lack of acceptance „E10 case", tax burden still too high, guaranty issue with car industry, biodiesel factory capacities are down today)

Biogas has already increased a lot. problems arise due to increasing prices for maize etc., monoculture issue, competition to agricultuaral use of products, heavily depending on imports in future

BioHeating Government pushing heating systems in private households (e.g. pellet driven – prices for raw materials are more or less stable compared to maize and rapes

Government: Pushing Off-Shore Wind Energy (5 Billion Kfw-Programme), private households, grid improvements, BioEnergy just one among others

Trends

Massive incentives for E-cars and E-mobility (goal is more than 1 million E-cars till 2020)

R&D and KfW-Bank incentives for Storage/Battery, Off-Shore and Grid

Challenge: to reach the nuclear free goals Germany has to solve the base load electricity issue (Grundlast) – RES enough powerful to match expectations in due time?

„Green Mittelstand" surprisingly tends to Bond-Financing (IBO s) and increasing M&A activities

Need more information?

Please feel free to contact me: wbj.popkes@rsmgermany.com, +49 491 97880168 secretary mrs. Tibina Rattin)

Government: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety „BMU" www.bmu.de/english/renewable_energy

Funding: Market Incentive Programme for Renewable Energy (MAP) www.erneuerbare-energien.de/inhalt/47282/3860/ (in english), www.kfw.de/kfw/en/index.jsp

IBO News: www.bondguide.de

RSM Germany Flyer „Green Energy - Die Herausforderung des 21. Jahrhunderts. Ihr starker Partner für eine grüne Zukunft" is on it s way! Please ask for english version!

Back to itinerary

The Business of Bio-Energy

– A Farming Perspective

Jer Bergin IFA Climate Change & Renewables Project Team Chairman

Overview

- Policy Drivers
- Biomass Resource
- BioEnergy Scheme
- Renewable Energy Feed In Tarrif (REFIT)
- Biofuels Obligation Scheme
- Opportunities for Farmers

Policy Drivers

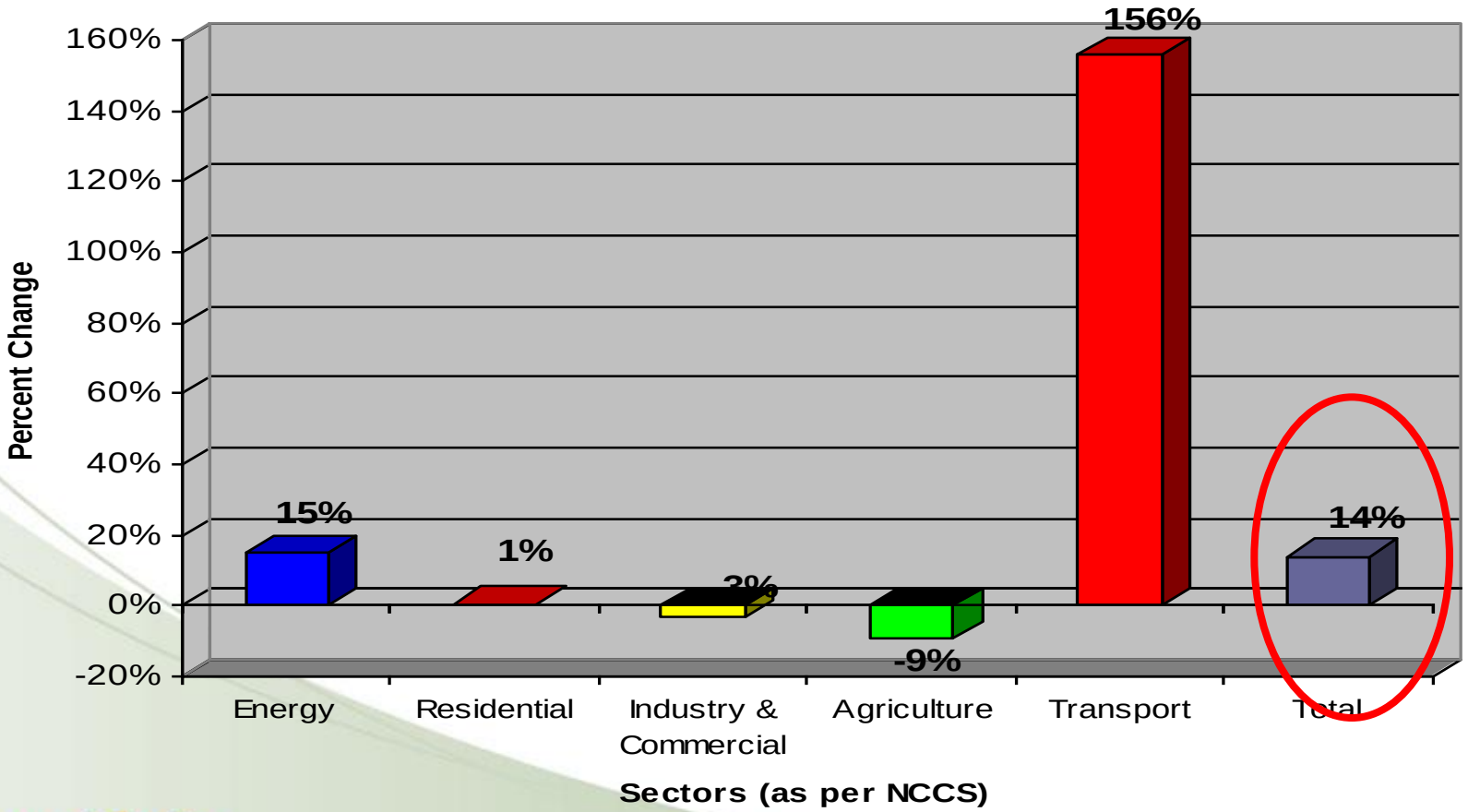
EU Climate Change Target

- 20% reduction in greenhouse gas emission by 2020
  - Substitute Fossil Fuel Use

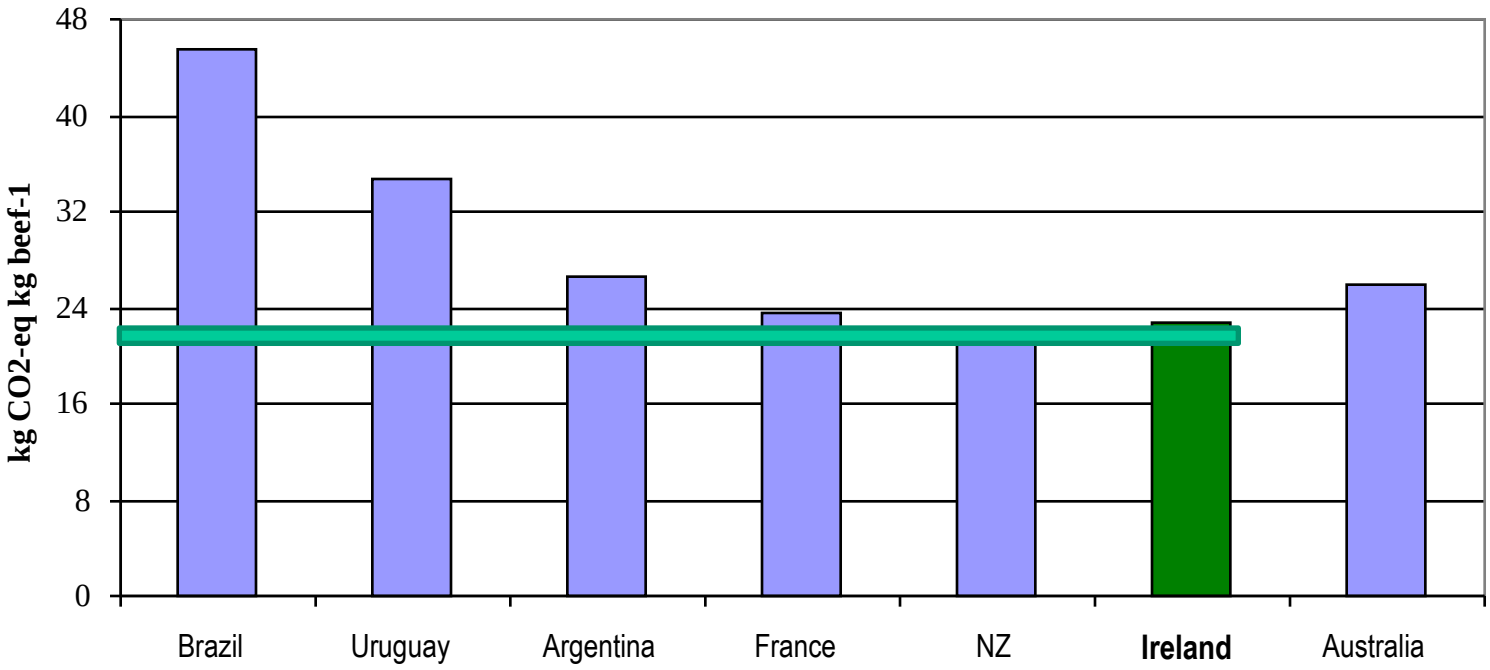
EU Renewable Energy Directive

- Published in April 2009
- Set the mandatory targets for 2020:
  - **16% of total energy requirement must be sourced from renewable energy**
  - **10% biofuel share in transport**

The Challenge
Sector Emission Changes Since 1990



Carbon Leakage – Emissions per kg Beef



Source : Teagasc

Policy Drivers

White Paper on Energy

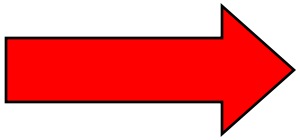
Delivering a Sustainable Energy Future for Ireland

Specific bioenergy targets include:

- Minimum 5% market share of renewables in the heat market by 2010 and 12% by 2020
- Increase use of biomass in transport fuel to 5.75% by 2010 and 10% by 2020
- 30% co-firing with biomass at three peat power plants by 2015
- 800 MegaWatt Combined Heat & Power (CHP) target by 2020

Annual demand of 4.3 million tonnes

Biomass Resource



Annual demand of 4.3 million tonnes of biomass by 2020

- There is a significant shortfall of available biomass resources to meet bioenergy targets
- Estimated that at least **170,000 hectares** of energy crops are required to satisfy the bioenergy target
- There is currently approx. **4,000 hectares** established under the BioEnergy Scheme
  - ~3,000 hectares of miscanthus
  - ~1,000 hectares of willow

BioEnergy Scheme

- Once off capital grant to establish miscanthus or willow
- Up to 50% grant aid to a maximum of €1,300 per hectare
- The grant is paid in two instalments:
  - 75% once the crop is established
  - 25% a year after payment of 1st instalment
- The allowable area is 3 to 30 hectares
- The crops must be managed and maintained as biomass crop for 7 years

BioEnergy Scheme (contd)

- Applications are prioritised according the selection criteria:
  - Expertise/knowledge of growing crops
  - Suitability of site
  - Evidence of end-use supply contract etc.




Miscanthus

- Miscanthus is a tall perennial grass
- Plant 15 - 20,000 roots (rhizomes) per hectare in spring
- Harvest annually in winter
- Can grow up to 4 metres in one season
- Average yields 16+ tonnes per hectare (6.5 per acre) per annum
- Moisture content of approx. 20%
- Low tolerance to frost
- Up to 20 year rotation

Estimated Establishment Costs

INPUTS	€/ha
Glyphosate	70
Ploughing & Cultivation	215
Rhizomes & Planting	2,000
Fertiliser	0
Herbicide	85
Total	3,040
Less BioEnergy Grant	-1,300
Net Establishment Cost	**1,155**

Willow SRC

- Plant 15,000 sticks per hectare
- Cut back after year 1
- Harvest in 2 year cycles
- Mature willow can grow to 8 metres
- Yield 13 tonnes per hectare (5 tonnes per acre) per annum
- Moisture content at harvest 50%+
- 20 year plus rotation

Estimated Establishment Costs

INPUT	€/ha
Ploughing & Cultivation	160
Cuttings & Planting	2,000
Fertiliser	150
Herbicide	120
Cut back	100
Total	2,530
Less BioEnergy Grant	-1,300
Net Establishment Cost	**1,230**

REFIT

- The Renewable Energy Feed in Tariff (REFIT) is the main tool for to stimulate the growth of the renewable energy in the electricity sector.
- A new co-firing REFIT tariff for Bioenergy Crops of 9.5 cents per kWh has been announced.
- The REFIT tariff is for 15 years and indexed link.
- This equates to a maximum price of:
  - €136 per tonne for miscanthus or €2,176 per hectare
  - €182 per tonne of willow or €2,366 per hectare
- This is assuming that the full REFIT tariff paid to the electricity generator is paid to the farmer.

Bioenergy REFIT tarrifs

Technology		Price
AD – CHP	≤ 500 kW	€0.15/kWh
AD – CHP	> 500 kW	€0.13/kWh
AD (non-CHP)	≤ 500 kW	€0.11/kWh
AD (non-CHP)	> 500 kW	€0.10/kWh
Biomass CHP	≤ 1500 kW	€0.14/kWh
Biomass CHP	> 1500 kW	€0.12/kWh
Biomass Combustion (including co-firing in existing plants)		
Energy Crops		€0.095/kWh
Other Biomass		€0.085/kWh

Biomass Co-firing Market

- Target is 30% co-firing with biomass at three peat power plants by 2015:
  - Edenderry Power Limited (Edenderry)
  - West Offaly Peat-Fired Power Station (Shannonbridge)
  - Lough Ree Peat-Fired Power Station (Lanesboro)
- The power plants annual fuel demand is 3 million tonnes of peat
- 0.9 million tonnes of peat to be replaced by 2015
  - This is the equivalent to **45,000 hectares of bioenergy crops**
- The preferred biomass product is wood as it has a similar chemical composition to peat

Edenderry's Biomass Experience

- Bord na Mona has been testing a range of biomass products
- In 2009 the power plant used 70,000 tonnes of biomass mainly wood biomass
- The plant intends to use 100,000 tonnes in 2010 increasing to 300,000 tonnes by 2015
- There is a ceiling to the volumes of miscanthus the power plant can consume due to chlorine (Cl) levels.
  - Approximately 30,000 tonnes per annum by 2015
- There is no ceiling for wood chip
- The miscanthus must be delivered chipped not shredded to the plant due to the feed system in plant

Renewable Heat Market

- REHEAT programme closed since end of 2010.
- No support for renewable heat projects presently.
- IFA propose the introduction of a Renewable Heat Incentive scheme.
  - Similar to the one recently launched in the UK.
  - Offers guaranteed price per kwh for a agreed term i.e. 15 years.

Liquid Biofuels

Meeting Bioenergy 10% Transport Target	**2020**
Diesel Usage	140 PJ*
Petrol Usage	82 PJ
Bioenergy Substitution	14 PJ (Diesel) 8.2 PJ (Petrol)
OSR (Diesel Substitute)	**370,000 hectares**
Wheat (Petrol Substitute) or Sugar Beet	**130,000 hectares** **86,000 hectares**

* Petajoules are a metric measurement unit for energy

Biofuels Obligation Scheme

- Biofuels Obligation Scheme (BOS) replaces the Mineral Oil Tax Relief Scheme (MOTR) support scheme.
- The scheme gives Government authority to mandate a certain percentage of biofuels.
- From 2011 supplier will be obligated to supply certificates to prove 4% of biofuels is included in transport fuel mix.
- Under the scheme obligated suppliers can choose to
  - buy imported fuel mix
  - buy indigenous biofuel
  - pay penalty

Biofuels Obligation Scheme (contd)

- The new BOS provides no supports for indigenous producers and threatens sustainablity of industry.
- Cheaper and less administration to import blended transport fuels directly into Ireland or pay penalty.
- IFA want Government to guarantee a minimum price for indigenous biofuels certificates.
- Indigenous biofuels industry very important for security of supply
- Provide a good break crop for farmers.
- IFA have sought urgent meeting with Minister to protect indigenous biofuels sector.

Opportunities for Farmers

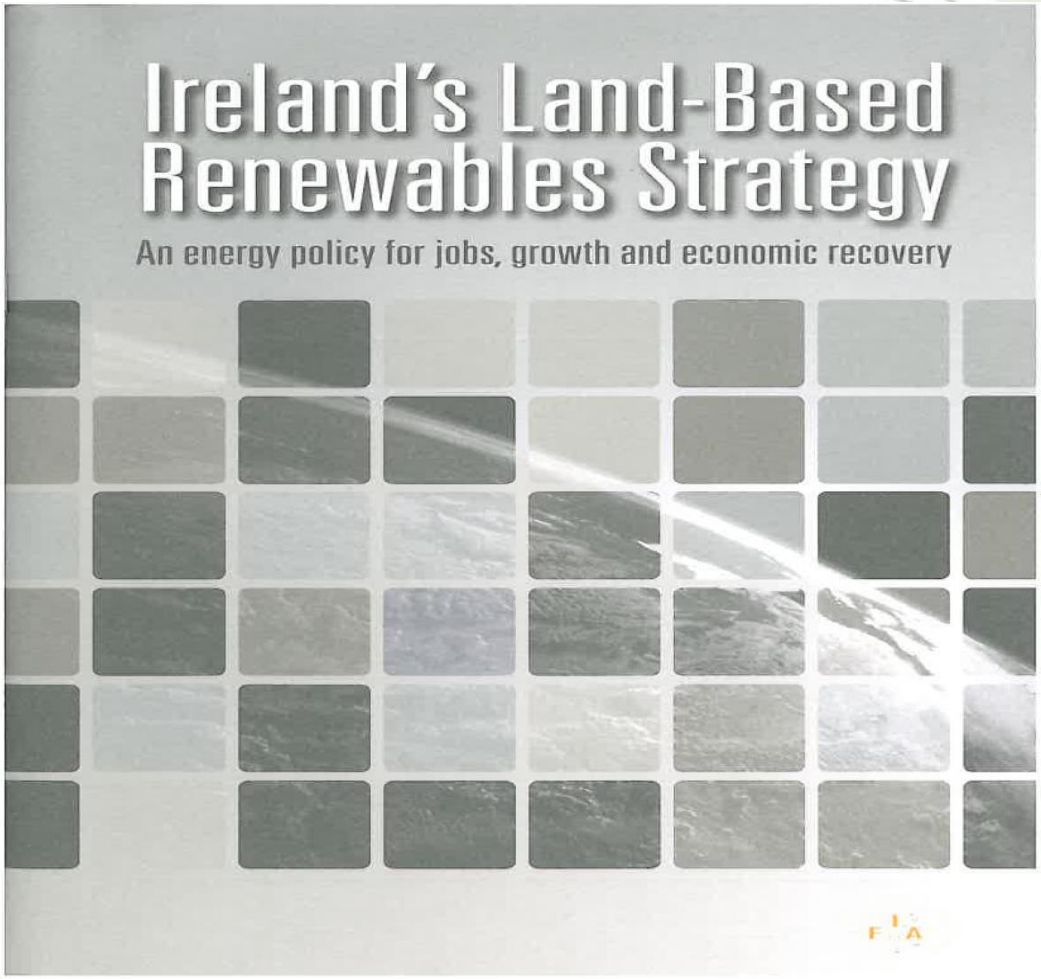
- Biggest opportunity is the increased demand for biomass from power plants.
- In 2011 Edenderry has demand for 130,000 tonnes of biomass both willow and miscanthus.
- IFA in negotiations with Bord na Mona to develop long-term biomass supply contracts for willow.
  - The contracts will be indexed linked and for 20 years
  - There will be an exit clause that a farmer can easily activitate
  - Farmer can generate additional income via biofiltration etc. that will not impact on agreed supply contract.
  - Negotiation are ongoing at present.

Major Barriers to Market Development

- Lack of clarity in relation to the bioenergy REFIT tariffs:
  - Government have promised REFIT for over 2 years.
  - Eventually announced in May 2010 - still awaiting introduction!!!!
- REFIT tariffs need to be increased or restructured as *"energy only"* payment to provide fair return to farmers, for example:
  - Less than 60% of the REFIT is paid to the farmer.
  - REFIT is used to cover operational, maintenance, capital investment costs etc.
- The bioenergy REFIT's need to be increased if farmers are to diversify at scale that is required to achieve the targets.

Major Barriers to Market Development contd

- The cost and time associated with developing bioenergy projects must be reduced:
  - Planning permission
  - Connection to the grid
  - Environmental survey etc.
- The lack of clarity in relation to the REFIT has made it very difficult to finance potential projects.
- IFA propose the introduction of fast-track system for bioenergy projects. (Strategic Infrastructure Act 2006).
- **Closure of the Targeted Agricultural Modernisation Scheme for bio-energy crops last week – further uncertainty.**


Ireland's Land-Based Renewables Strategy
An energy policy for jobs, growth and economic recovery

www.ifa.ie

Thank You

If you have any additional questions please contact:

Thomas Ryan

IFA Environment & Infrastructure Executive Secretary

01 4500 266

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The Biofuels Obligation Scheme

Shane Malone BE, MIE
Chartered Engineer

15th June 2011

Introduction

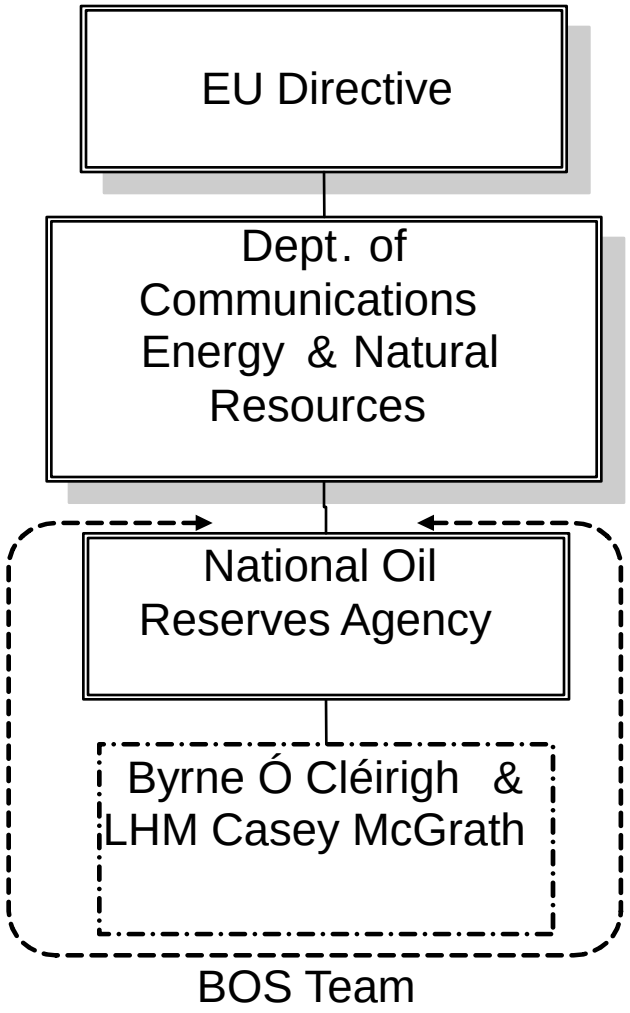
- Byrne Ó Cléirigh (BÓC) is an engineering and management consultancy
- LHM Casey McGrath is a firm of Chartered Certified Accountants
- Appointed to assist the National Oil Reserves Agency (NORA) with the implementation and administration the Biofuel Obligation Scheme (BOS)

Presentation Outline

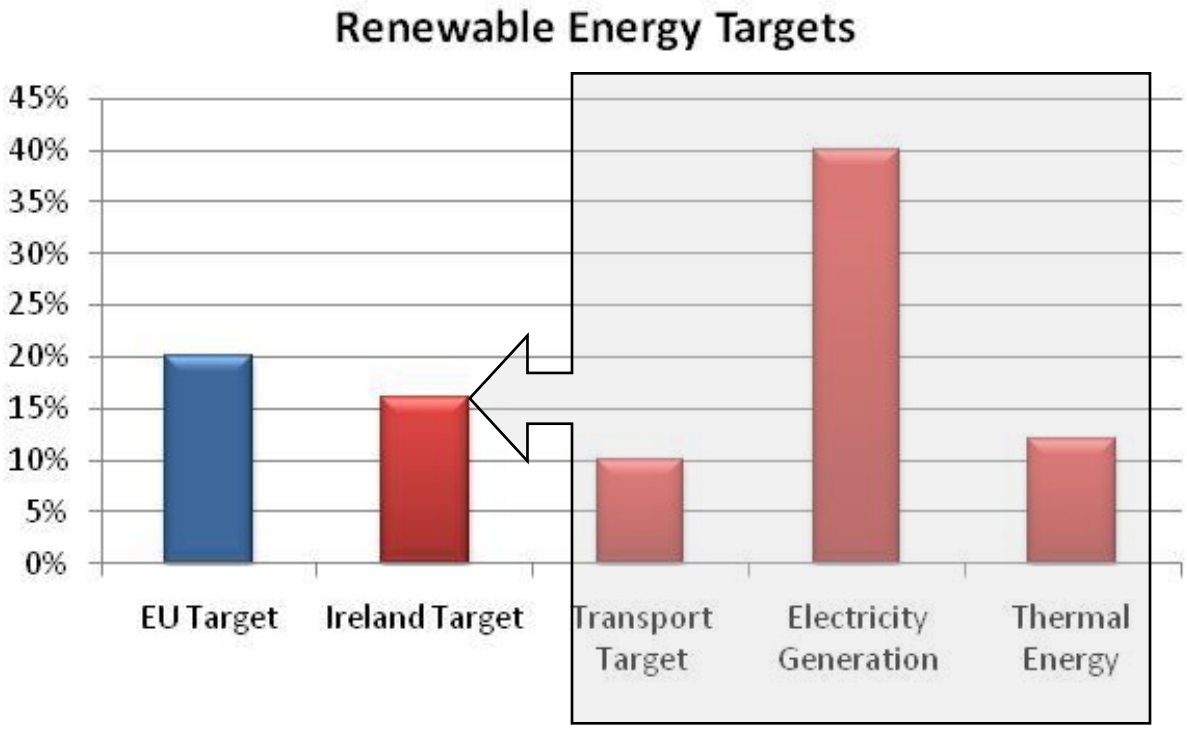
- Background to the Biofuel Obligation Scheme (BOS)
- What is the Biofuel Obligation?
- Overview of the Scheme
- Applying for BOS Certificates
- BOS Accounts
- Articles 17 & 18 – sustainability of biofuels
- Biofuels in Ireland

Biofuel Obligation Scheme - Background

- Renewable Energy Directive (2009/28/EC).
- Certain provisions of the Directive enacted by the Energy (Biofuel Obligation and Miscellaneous Provisions) Act in July 2010.
- The National Oil Reserves Agency (NORA) responsible for administering the Biofuel Obligation Scheme.
- NORA is the State Agency responsible for managing Ireland's national strategic oil stocks.



Biofuel Obligation Scheme - Background

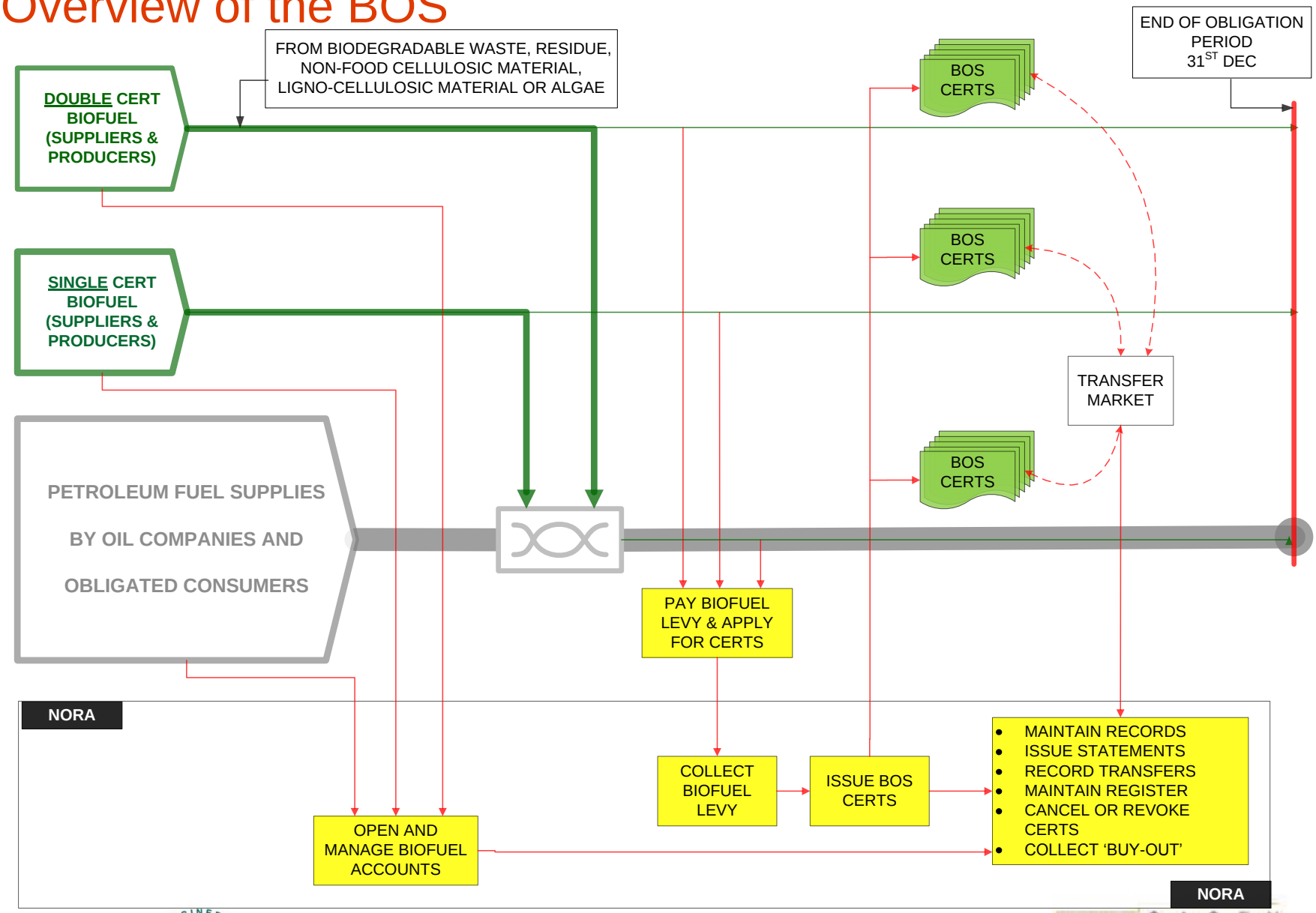


- The BOS is one component in Ireland's strategy for achieving the transport and wider renewable energy targets.

Biofuel Obligation Scheme – What is the Obligation?

- Companies liable to pay the NORA Levy (the 'Obligated Parties') must, in each obligation period, ensure that not less than 4 litres in every 100 litres of road transport fuel is biofuel. This is called the 'biofuel obligation'.
- Meet the obligation by:
  - Supplying 4% biofuels and claiming Biofuel Obligation Certificates
  - Acquiring Certificates from other Obligated Parties
  - Paying a 'Buy-out Charge' of €0.45 per litre in respect of a shortfall.

Overview of the BOS



How to Fulfill the Obligation?

- Paying the Biofuel Levy does not, *of itself*, ensure compliance.
- Obligated Parties must accumulate sufficient BOS Certs to set off against the obligation.
- BOS Certs can be transferred (value of Certs is a commercial matter).
- 4% target was reached in 2010 and there was some carry-over of Certs.
- Any shortfall in BOS Certs results in an Obligated Party incurring a liability for a Buy-out Charge.

Applying for BOS Certificates

- Applications for Certs made at any time during the obligation period.
- BOS Certs can only be claimed in respect of biofuels on which the Biofuel levy has been paid.
- **Double Cert Applications** – Two Certs awarded for biofuels derived from biodegradable waste, residue, non-food cellulosic material, ligno-cellulosic material or algae.
- NORA makes a 'Determination' on the eligibility of biofuels for two Certs.

Online BOS Accounts

- BOS Account Holders provided with online accounts
- Using Computershare's Viewpoint system
- System allows Certs to be managed in a similar fashion to company share certificates
  - ***Biofuel Certificate*** ≡ ***Company Share***
  - ***Biofuel Obligation Certificate Voucher*** ≡ ***Share Certificate***
- ***Vouchers*** may be issued in respect of a single Certificate or for millions of BOS Certificates

Articles 17 & 18 of the RED – Sustainability & Verification

- Ireland not yet implemented Articles 17 & 18
- Biofuels must be sourced according to set of criteria:
  - Reduction of greenhouse gas (GHG) emissions
  - Feedstocks may not be grown on land with a high biodiversity value or on land of high carbon stock
- Biofuels which satisfy the *sustainability criteria are* deemed to generate a net GHG saving with no negative impact on biodiversity or land use.
- Required to document the chain of custody and arrange for an adequate standard of independent auditing

Articles 17 & 18 – Sustainability & Verification

- BOS Act provides for Articles 17 & 18.
- Work underway by the Department of Communications Energy & Natural Resources.
- Currently no requirement for biofuels to meet Articles 17 & 18.
- Expect to be introduced in Q4 2011.
- Coincide with the introduction of the UK legislation.
- Plan in place for public and industry consultation.

Articles 17 & 18 – Sustainability & Verification

- In Ireland, future routes to compliance with sustainability criteria:
  - Voluntary Schemes
  - Bilateral or Multilateral Agreements
  - Ireland's National Scheme
  - National Schemes in other Member States
- Anticipate biofuel imported to the State will be part of a Voluntary Scheme.
- Majority of biofuel feedstock produced in Ireland will be cross compliant.

Biofuels in Ireland

- MOTRII Scheme
- Imported blends
- Demand for Double Cert feedstocks
- National target

The Biofuels Obligation Scheme

Shane Malone BE, MIE
Chartered Engineer

15th June 2011

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ENTERPRISE IRELAND

The Business of BioEnergy

15th June 2011

Market Drivers

- **Security of energy supply**
- **Requirement to reduce CO_2 emissions**
- **Rising energy/raw material costs**
- **Consumer and corporate awareness**
- **Dwindling potable water resources**

What is Renewable Energy

Is energy for sustainable sources and includes products and services relating to…

- **thermal and photovoltaic solar panel**
- **wind farms (offshore/onshore)**
- **wave and tidal energy devices**
- **hydro-electricity stations**
- **biomass (boilers, gasifiers and harvesting equipment)**
- **biogas (anaerobic digestion)**
- **biofuel production**
- **waste-to-energy (WTE) plants..**

- CleanTech is now seen as a mainstream industry with potential for significant profit/value creation. It is a sector expected to reach €1.2 trillion globally by 2017

- In 2009 Ireland's indigenous CleanTech sector employed almost 12,000 and had exports of €370m

- 1/3rd of all start-ups in 2010 were from the CleanTech sector.

Biofuel Companies
Name
Green Biofuels
Emo

Biomass Companies
Name
Imperative
Kedco
CCS
Clearpower
Bedminster
Bord na Mona
Arigna
Biomass Heating Solutions
Renetech Ltd.
RES
Natural Power Supply
Annevalley
biotricity
Kilogen
Farrelly Bros.
HDS

Waste to Energy Companies
Name
OMC
Cynar
Greenstar
Greyhound
Panda
CCS
CES
Genergy
SNC
Biomass Heating Solutions

Impact on EI clients

- Increase in wood and other sustainable fuel production
  - Harvesting machinery
  - Production plant
    - Civil, structural, machinery, control systems
  - Distribution systems
- Increase in market for wood and other sustainable fuel boilers
  - Boilers and control systems
  - Fuel feed and storage systems
- Increased investment in R&D
  - Mycanthus harvesting and pellet production
  - Boilers efficiency and heating controls

Impact on EI clients

- **Biofuel production**
  - Production plant
    - Civil, structural, pipework, tanks, pressure vessels, control systems
  - Harvesting and transport
    - Agricultural machinery, road/rail transport
- **LNG technology**
  - Production plant
  - Distribution systems
  - installation
- **Electric/hybrid vehicles**
  - Control systems
- **Increase in R&D investment**
  - Crop research
  - Harvesting technology research
  - Production technology research
  - Battery technology research

Core Service Offering

Individual Client Work

- Validate Opportunities
- Determine Distribution Channels
- Identify Customers
- Competitor Analysis
- Itinerary Building
- Customer Relationships

External Expertise

- International Mentor
- Advisory Boards
- Business Accelerator
- Other Clients
- Business Networks
- VC's

Support Services

- Office Facilities / Incubator Units
- Trade Fairs/Missions
- Buyers to Ireland
- Translation, Regulatory Issues
- Third Party Professional Services
- Recruitment

The Americas
New York
Boston
Silicon Valley
Sao Paulo
Washington DC
Mexico City
Toronto

Northern Europe
London
Glasgow
Paris
Amsterdam
Brussels
Stockholm

Germany, Central & Eastern Europe, Balkans
Düsseldorf
Warsaw
Budapest
Prague
Moscow

Asia
Beijing
Shanghai
Hong Kong
Guangzhou
Singapore
Kuala Lumpur
Tokyo
Sydney
Seoul

Southern Europe, Middle East , Africa
Madrid
Milan
Dubai
Riyadh

31 Offices Globally

Industry Led Networks

PEIG	**Power for Electronics**
WiSen	**Wireless Sensor Networks**
MicroMAN	**Manufacturing at the micron scale**
Manufacturing Productivity	**Management (Business excellence) / Energy**
Composites	**Advanced/Nano Composites**
CCAN	**Applied Nanotechnology**
MIDAS	**Integrated Circuit Design**
IVI	**Innovative Value Institute**
Bio Refining	**Energy from renewable bio resources**

What are we looking for?

- Industry Relevant Research
- Industry Driven Research
- Industry Led research

Exploring Opportunity	Start-Ups	Innovation / Competitiveness	Expansion
Going Global	HPSU/Equity	R&D Fund	Expansion
E-Business	HPSU Feasibility	Key Manager Grant	Leadership for Growth
Mentors online	CORD	Lean Initiative (new)	Market Research Programme (new)
Consultancy online	Business Accelerator	Greentech	Job Expansion Fund (new)
Feasibility online	Mentors	Innovation voucher	Graduate Market Placement (new)
FP7	Trade Fair	Innovation Partnership	
Trade Fair online	Consultancy		
Business Accelerator online			

EI Events 2011… a sample

- US – Ireland Green Build Program 2010, 25 clients, 4 events in 2010
- Going Green, Oct 2010, 11 clients participated, meeting itineraries developed around municipal, smart grid and energy opportunities
- International Cleantech Partnering – international buyers meting clients in Ireland. 2010 & 2011
- Public procurement 'Green Initiative'
- Inward Buyer Visit – Renewable energy
- Ireland Pavilion at "All Energy 2011" Exhibition and Conference, Aberdeen May 18th – 19th
- "Scottish Renewables Opportunities" for Irish Companies – A Seminar in Enterprise Ireland on Thursday 21st April, 2011

Challenges for the sector

- Finance- Need for project funding and investment – to facilitate capital intensive projects
- Working Capital support – Bank overdraft/Invoice Discounting facilities.
- The scale and scope of clients - opportunities for JV's, Clusters etc.
- Need to continue to improve client management capabilities
- The agencies involved (EI, SEAI, IDA) need to create a national Cleantech brand for international markets.
- Public Procurement does not favour SME's or unproven technologies/services particularly in the absence of demonstration sites.
- Need to encourage convergence with other sectors (e.g. Software/ICT and Energy Management)
- Commercialisation of Research (lead-in time can be long i.e. wave energy)

How Enterprise Ireland can help you meet these challenges

- Enterprise is committed to the further development of the CleanTech sector in Ireland.
- We recognise the fundamental importance of the CleanTech global opportunity to the development of Irish Industry.
- To exploit this to the maximum we have embedded CleanTech champions in our engineering , construction and electronics departments.
- The role of the CleanTech champion is to work with existing CleanTech companies and identify additional CleanTech companies that can exploit this global opportunity.
- The CleanTech global team will continue to actively position the Irish CleanTech offer on global markets.

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Panel Discussion

Ian Duffy, RSM Farrell Grant Sparks

BYRNE WALLACE YOUR LEGAL BUSINESS PARTNERS

ENTERPRISE IRELAND

RSM Farrell Grant Sparks