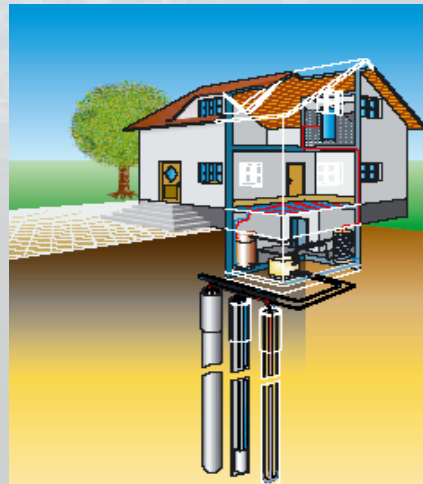


Environmental Green Policies in Germany and Europe

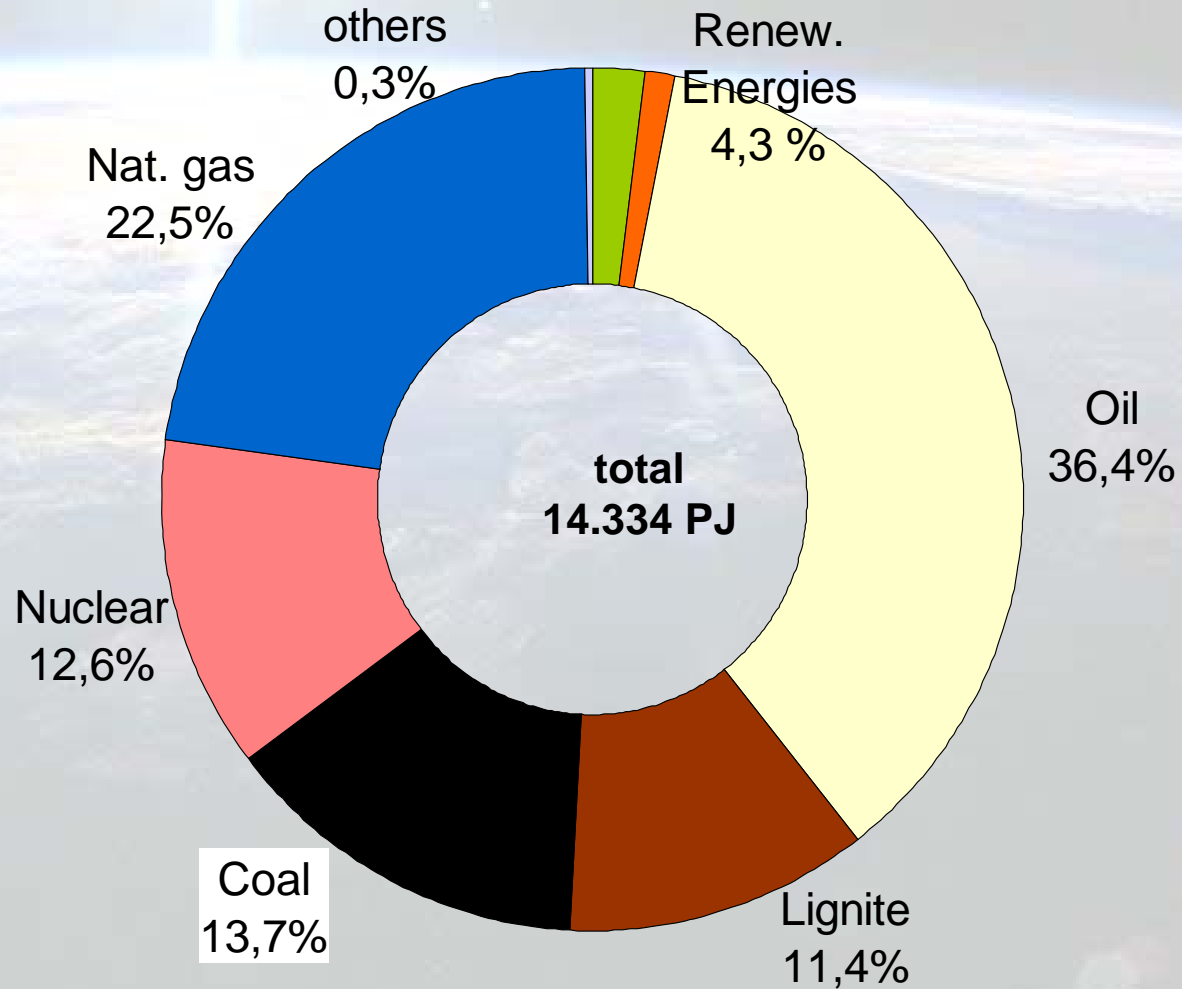
EnerKey Experience Exchange Meeting,

Stuttgart, 14. July 2006

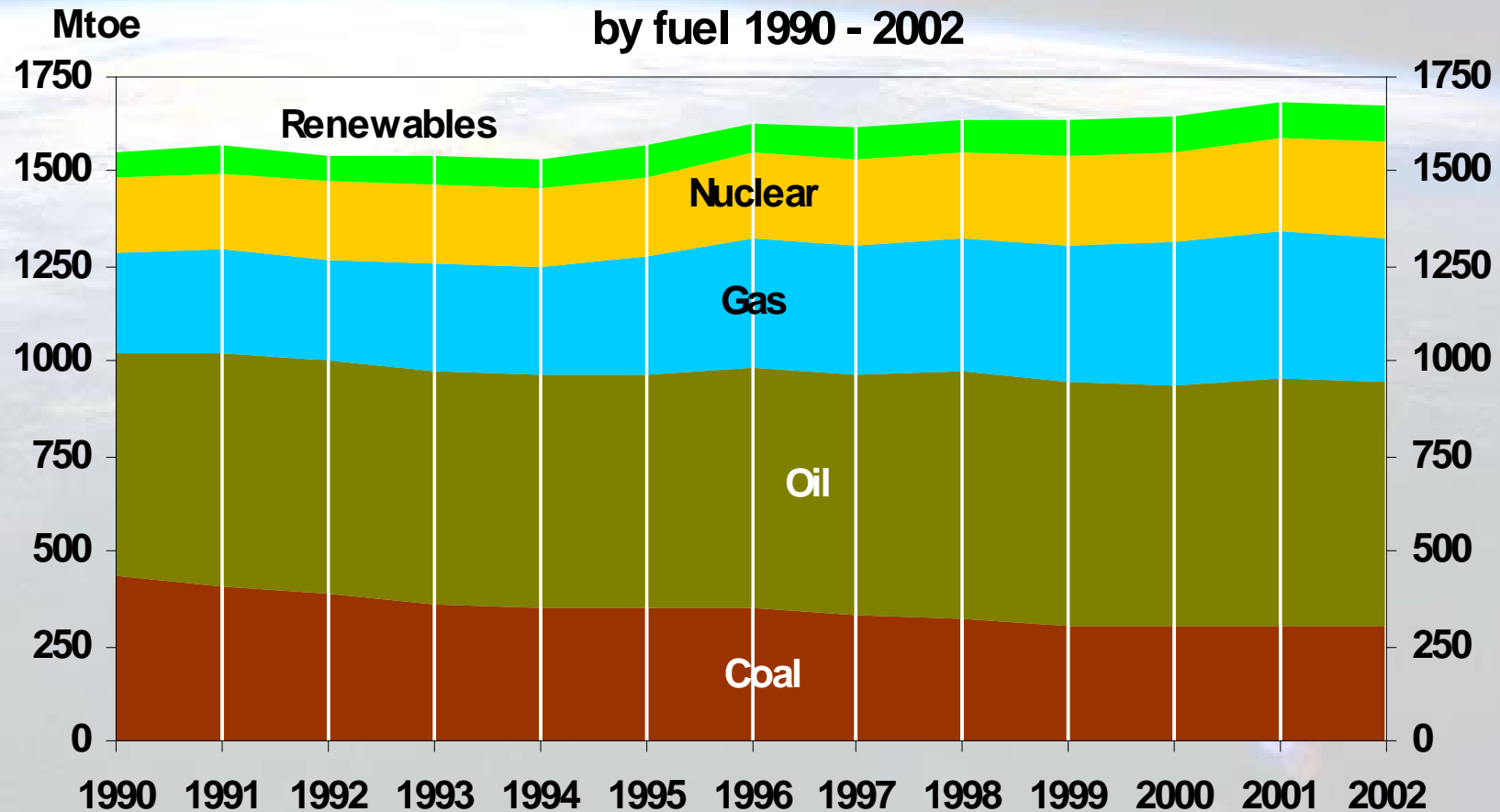
Dr. Ludger Eltrop



Distribution of Primary Energy Utilisation in Germany 2003



Gross energy consumption by fuel, EU 25, 1990 - 2002



EU Policies and Targets: Energy (1)



- **RES White paper 1997:** increase share of RES from 6% to 12% of gross consumption by 2010 (~ 6% in 2002, of which 2/3 is from biomass/waste - mainly heat: EU15 expected to reach 10% by 2010)
- **To reduce greenhouse gas emissions** (meet the commitments made by the EU under the 1997 Kyoto Protocol)
- **Greenhouse Gas Emissions Trading Directive** (2003/87/EC) (ETS, CDM, JI)
- **To contribute to Security of Supply** [COM(2000)769 – C5-0145/2001]

EU Policies and Targets: Energy (2)

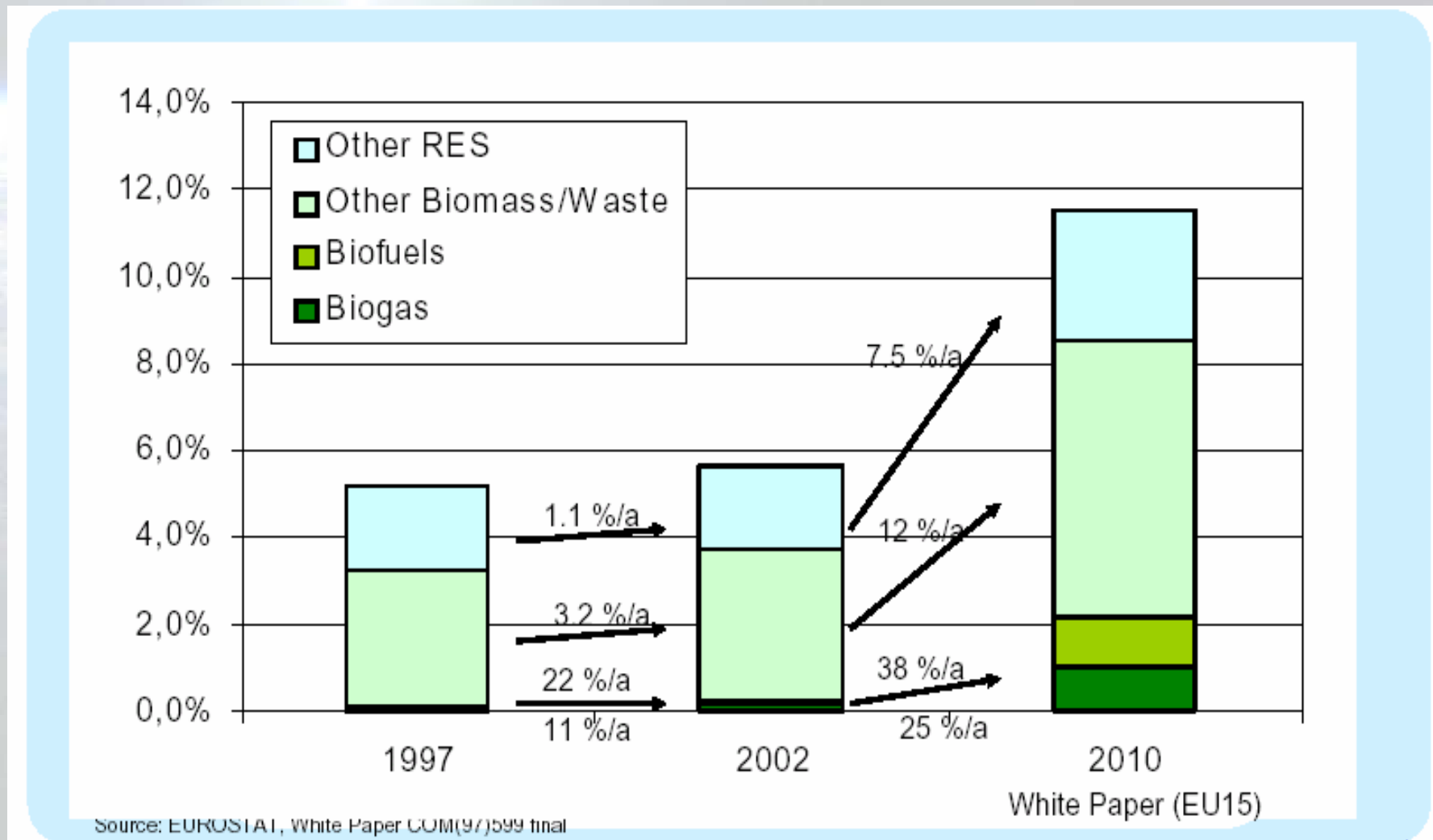


- **Directive 2003/30/EC of 08.05.2003 on the promotion of liquid and gaseous biofuels for transport: targets: 2% by 2005; 5.75% by 2010**
- **Directive 2001/77/EC of 27.09.01 on RES-e : to increase the share of green electricity from 14% to 21% of gross electricity consumption by 2010 (expected to reach 18-19% by 2010)**
- **Directive 2004/8/EC on cogeneration of heat and power: target: 18% by 2010**
- **Heat Directive: under preparation**

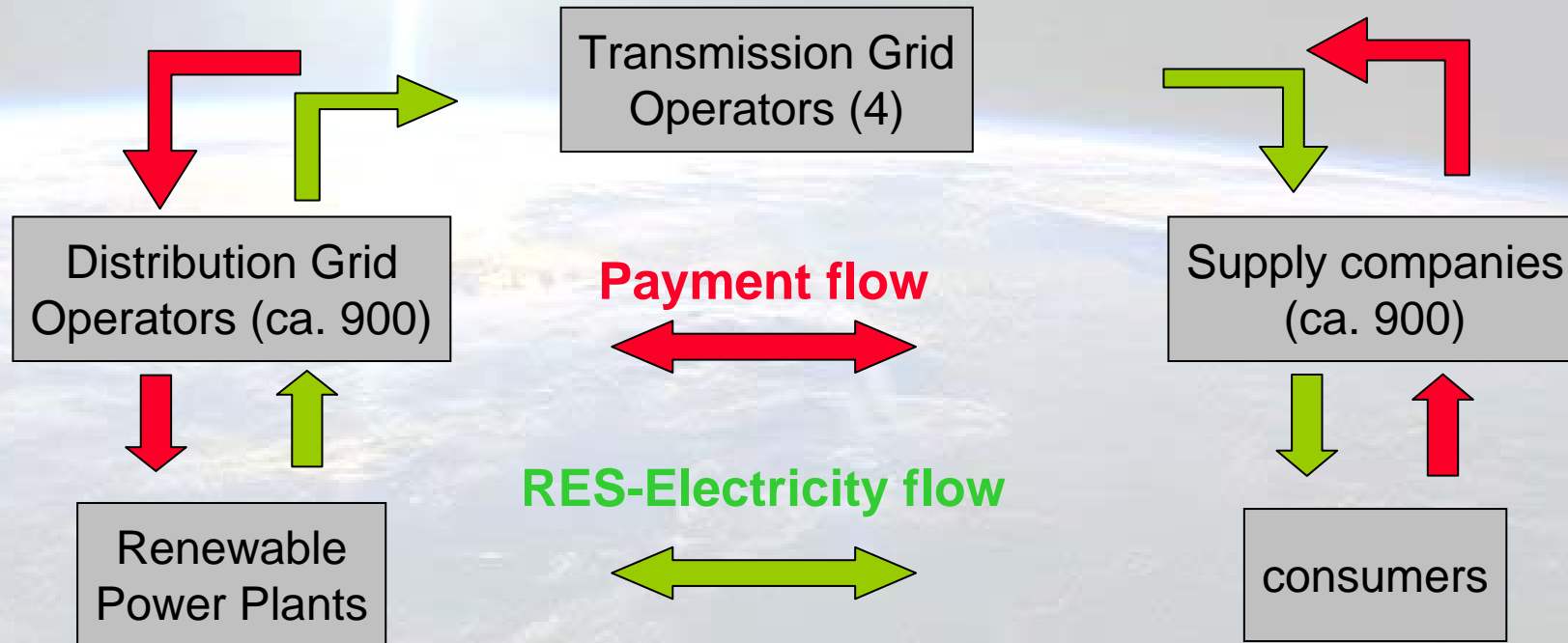
Ambitions Targets for Energy Efficiency + Renewables in G.

	2000	2005	2010	2020
Primary Energy Consumption	2,1 %	4,6 %	4,2 %	...
Electricity production	6,7 %	10,2 %	12,5 %	...
Biofuel consumption	0,3 %	3,4 %	5,75 %	...

Targets for the EU 15 (EU White Paper)



The Renewable Energy Source Act 2000/2004



- Priority for RES-electricity feed-in and transmission in the grid
- Fixed price („tariff“) paid by grid operator to producer
 - long term price security (20 years)
 - Degressive rates from year to year as incentive for improvements
 - tariffs differentiated by source and size of plant
- Nation wide equalisation of costs between grid operators and electricity suppliers

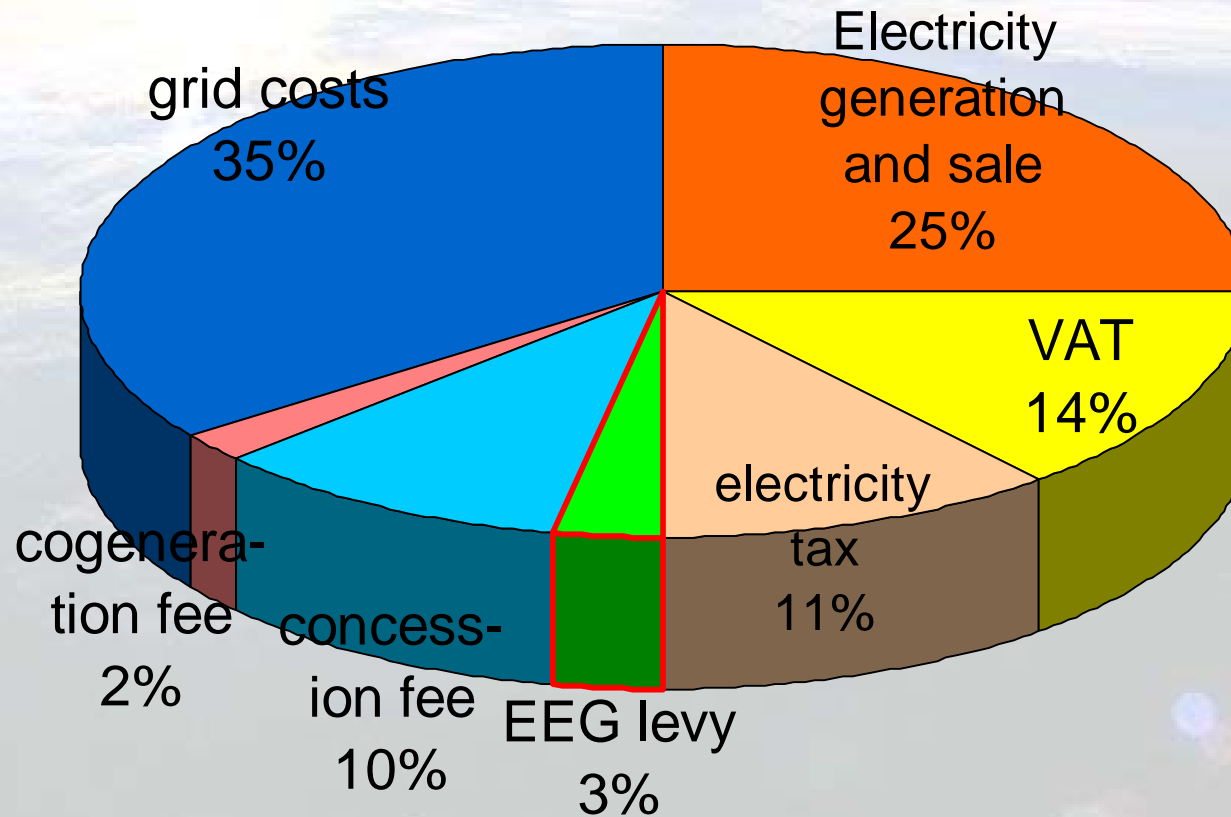
Feed-in Tariffs for Electricity from Renewables 2005

Feed-in Tariff for Plants Put Into Commission in 2005

	Duration [Years]	Base rate for new plants [€-Cents/ kWh]	Degression [%]
Small Hydropower	30	6,65/ 9,67	-
Landfill, Sewage & Mining Gas	20	6,55/ 6,55/ 7,55	1,5 %
Biomass	20	8,27/ 8,77/ 9,75/ 11,33	1,5 %
Geothermal Energy	20	7,16/ 8,95/ 14,00/ 15,00	1,0% (starting 01/01/ 2010)
Wind Energy	(Onshore)	20	5,39/ 8,53
	(Offshore)	20	6,19/ 9,10 2,0 % (starting 01/01/ 2008)
Photovoltaic	(Roofs)	20	51,30/ 51,87/ 54,53
	(Facades)	20	56,30/ 56,87/ 59,53
	(Others)	20	43,42

Components of Electricity Price in Germany

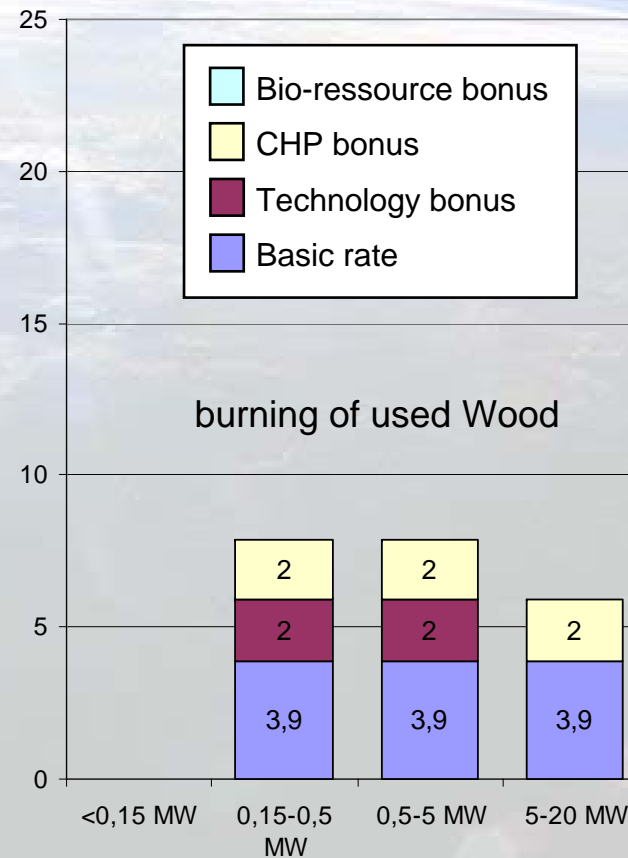
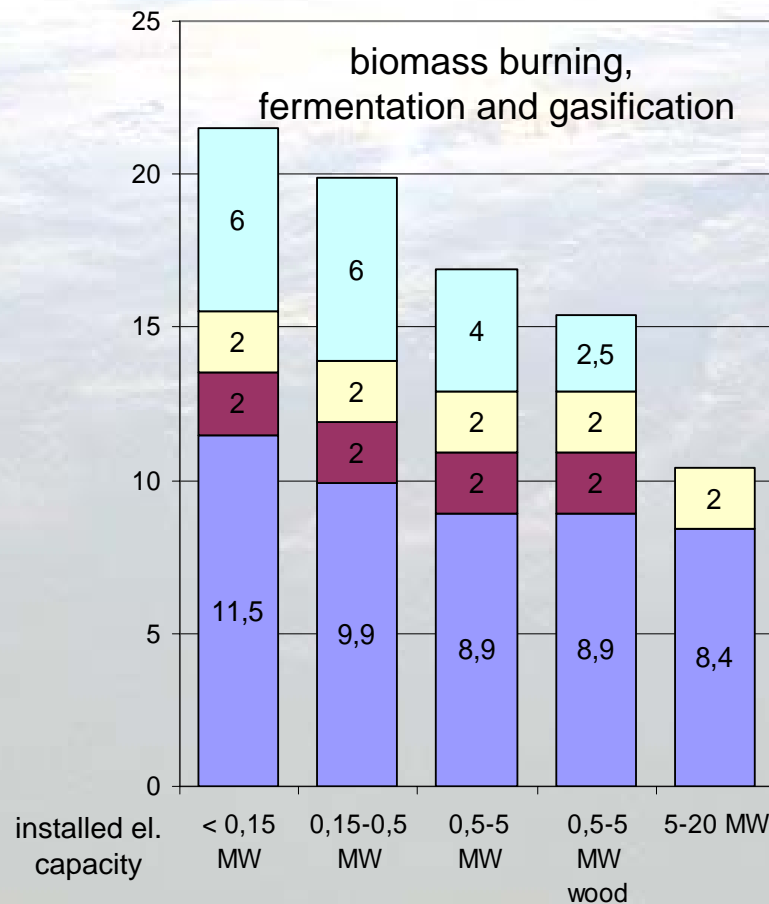
18,7 EUR-Ct/kWh



Bioenergy Promotion 1: Renewable Energy Source Act

fixed reimbursement / prices for electricity from bioenergy and RE

- Degressive rates (1,5% per year), taking into account technological improvement
- Minimum rate, guaranteed for 20 year



Rates 2005

Bioenergie-Promotion 2: Investment-Subsidies (MAP)

- Investment subsidies for boilers and small heating plants
- for private, public and SME-investors

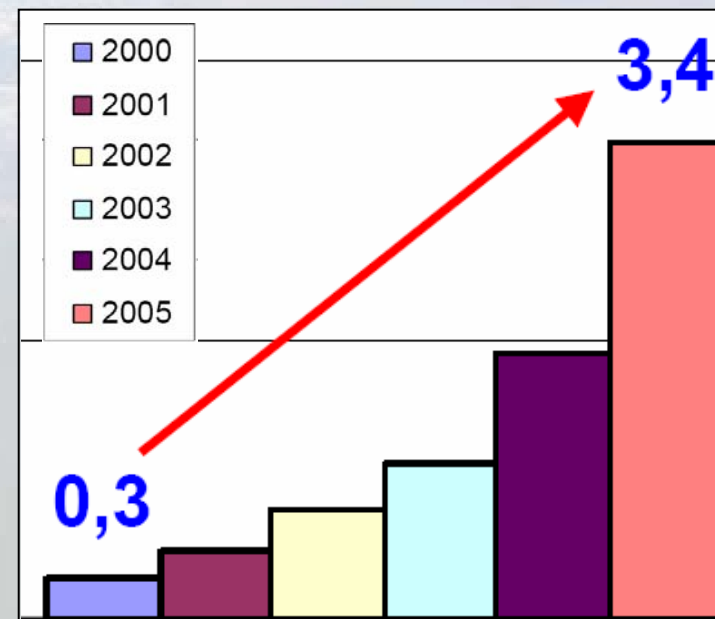
Subsidy amounts and conditions:

- for automatic heating systems with solid biomass - 100 kW:
 - 48 (60) EUR/kW (efficiency > 88%) or
 - 1.360 (1.700) EUR / heating system with efficiency > 90 %
 - 800 (1.000) EUR / furnaces with efficiency > 90 %
 - limits for CO and particle emissions
- for manually fed gasification boilers - 100 kW:
 - 40 (50) EUR/kW (efficiency > 88%) or
 - 1.200 (1.500) EUR / heating system with efficiency > 90 %
- for biogas plants (< 70 kW) 15.000 EUR/plant and low interest credits

Bioenergy Promotion 3 for liquid fuels

1. Tax preference/reduction for all liquid biogenic fuels until 2009
2. Beginning in August 2006 reduced tax rate for biodiesel (10 ct/l) and biodiesel blends (15 ct/l)
3. Beginning in 2007 obligatory blending of biodiesel/diesel (5%) and ethanol/petrol (2%)
4. Agriculture is exempted from tax

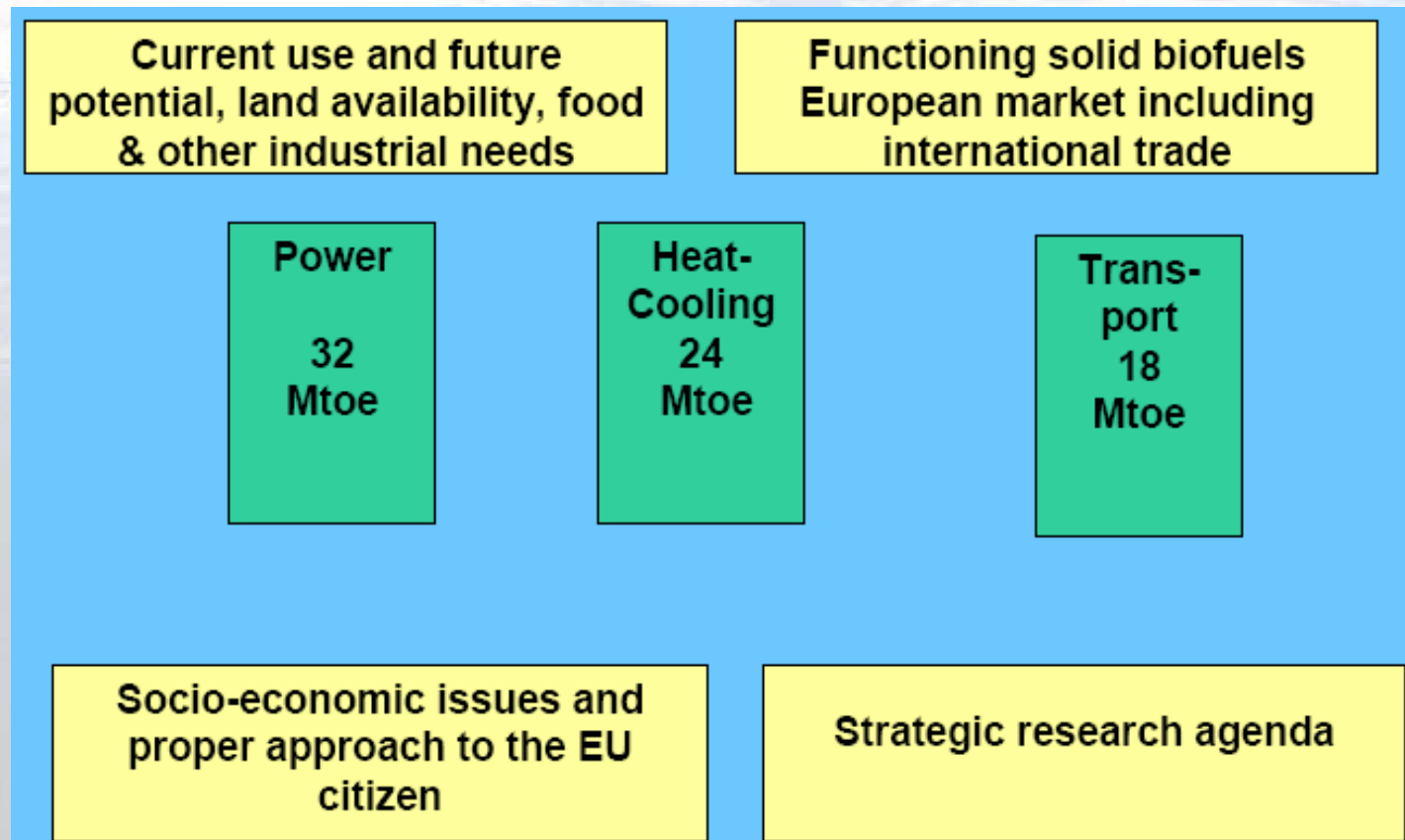
In 2010 a 6%
 biofuel share
 Exceeding the EU
 aim of 5,75%



Biofuel share [%] of total fuel demand in G.

The Biomass Action Plan of the EU

To increase the use of biomass from 56 Mtoe to 74 in order to reach the 12% RES target in 2010



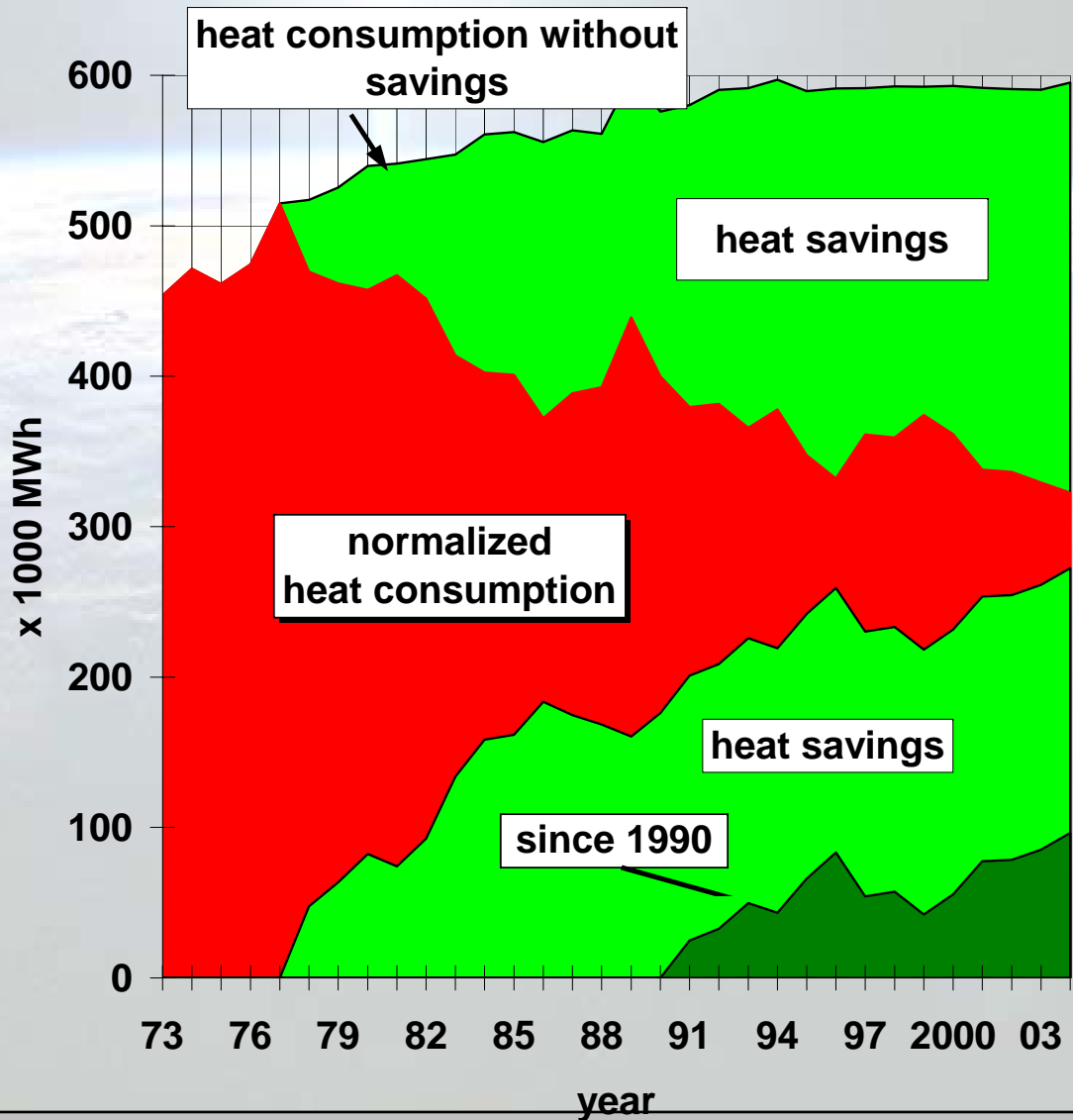
RES promotion programs and measures in the EU15

	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain	Sweden	UK
Special programme to promote RES	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Green certificates for RES-e and/or emissions		X	X		X		O		X				X	
Special tariffs or production support for electricity from RES	X	X	X	X	X	X	X			X	X	X	X	X
Obligatory purchase of electricity from RES		X	X		X		X	X		x			X	X
Deregulation of electricity markets		X	X	X	X	X	X	X	X	X	X	X	X	X
CO2, NOx and /or sulphur tax, ecotax			X	X	X			O	X	X			X	
Tax refunding/reliefs for RES	X		X	X	X	X	X	X	X	X		X	X	X
Investment subsidies, support for RES	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Emission limits for boilers	X		X	X		X			X			X	X	
Environmental permit system/impact assessment				X		X		X					X	
Support for sustainable forestry				X										X
Support for biomass harvesting				X										
Regulations on cultivation of renewable resources			X		X	X	X				X	X	X	
Special regulations for small producers			X		X	X	X				X	X	X	
Guidelines about using natural resources		X		X		X							X	
Restrictions to landfilling				X		X								

X=already implemented

O = to be implemented in the near future

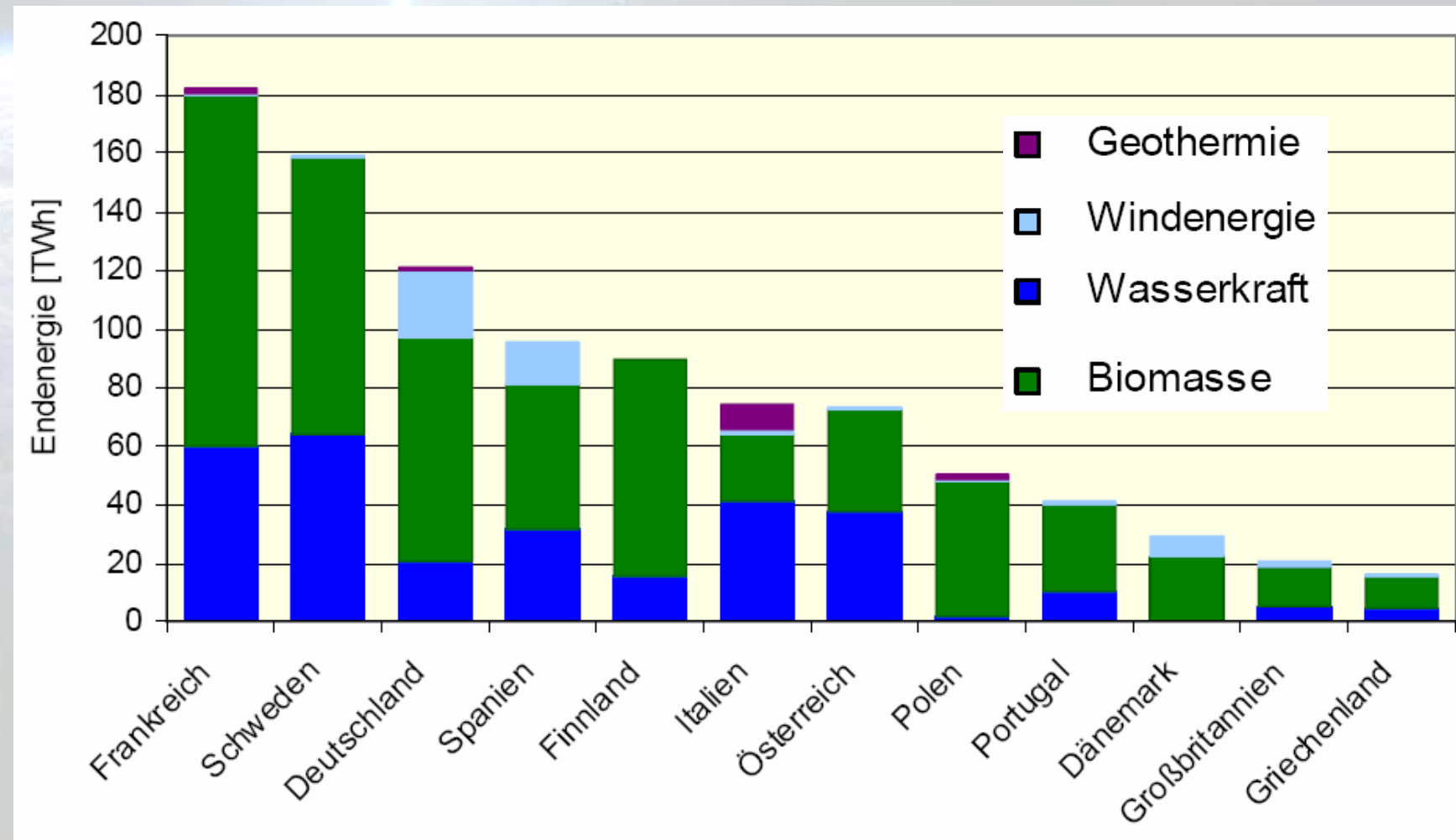
Energy management: Development of heat consumption



savings
 2004: 272 449 MWh

since 1977:
 4 988 908 MWh

Utilisation of Renewables in some European Countries 2004



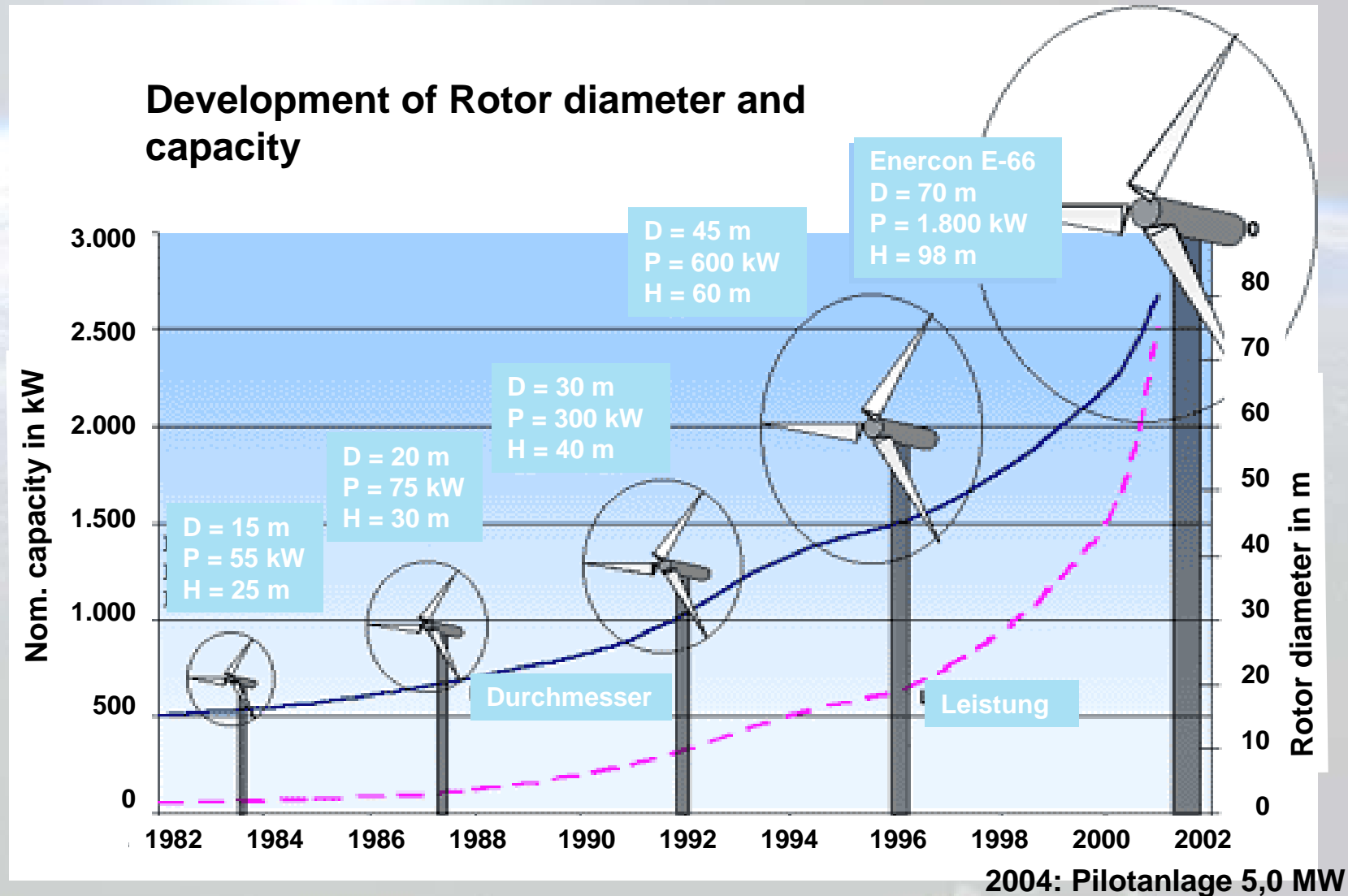
Utilisation of RES in Germany 1995 - 2004

	Primary energie [PJ/a]		Electricity [GWh/a]	
	1995	2004	1995	2004
Hydro	77	76	21.600	21.000
Wind	6	90	1.800	25.000
Biomass	185	332	2.020	9.356
Geothermal	1	6	--	0,4
Solar radiation	6	11	11	500
total	275 (1,9 %*)	516 (3,6 %*)	25.431 (4,7 %**)	55.856 (9,2 %**)

* Share of Primary energy utilisation

** share of electr. production

Developments of Renewable Energies in G.: Wind energy



Wind energy 2005 pilot installation: 4.5 MW Enercon E 112



Rotordurchmesser 114 m



Turmkopfmasse 500 t

Developments of Renewable Energies in Germany

Solar heat and electricity



Biodiesel – Plant Oil / Fatty Acid Methylene Ester - FAME

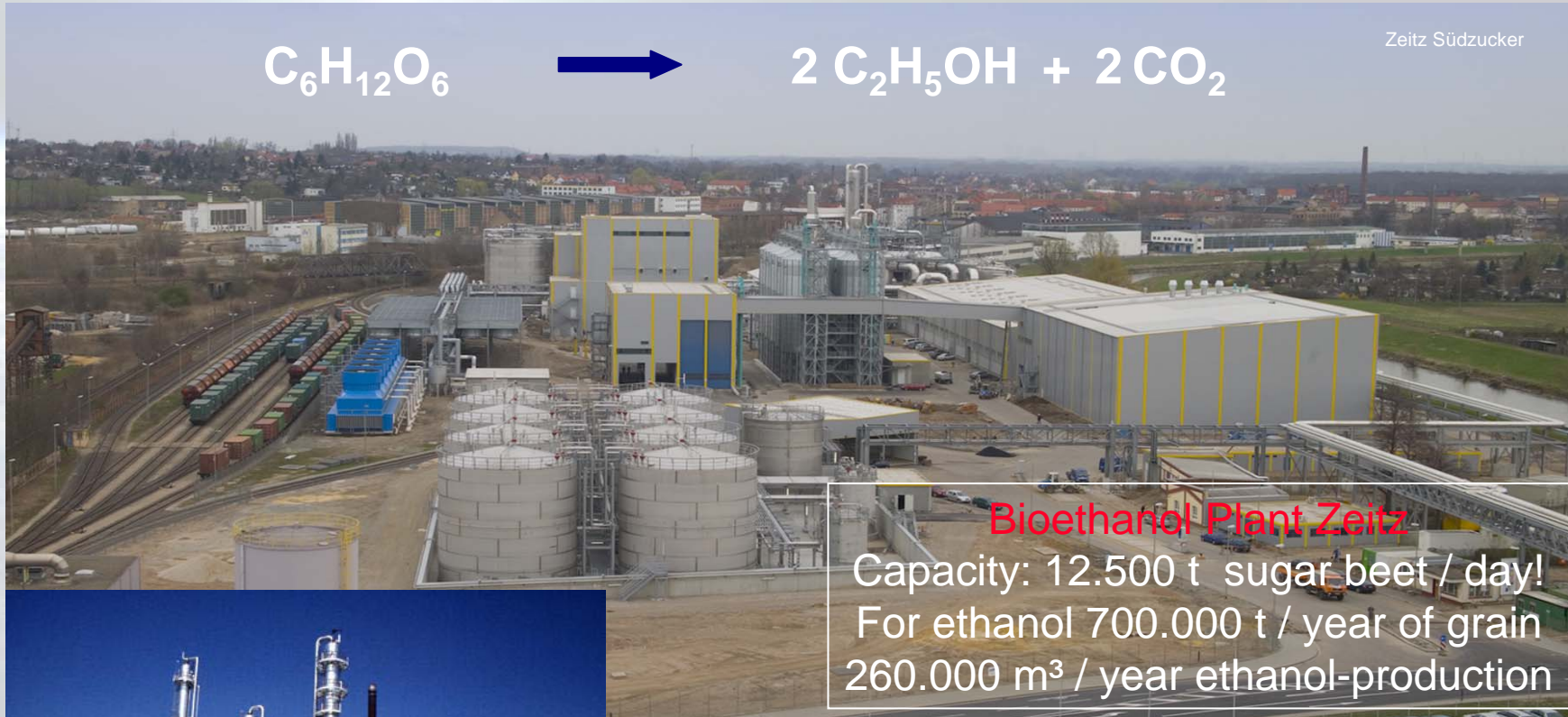


- *Production per ha:* ca. 3,5 t rape → 1,4 t Plant oil → 1.500 l PME
- *Production Capacity 2004:* ca. 1 Mio. ha and 1.2 Mio. t PME, ca. 1.500 biodiesel filling stations
- *Productions cost:* 0,25 - 0,40 (Plant Oil), 0,45 - 0,60 (PME) EUR/l;
Market-Price: 0,50 - 0,60 (Plant Oil), 0,65 - 0,80 (PME) EUR/l
- *Legislation:* 5% blends eligible without declaration (since 01/04)

Bio-Ethanol from Sugar Beet and Grain as Liquid Fuel



Zeitz Südzucker



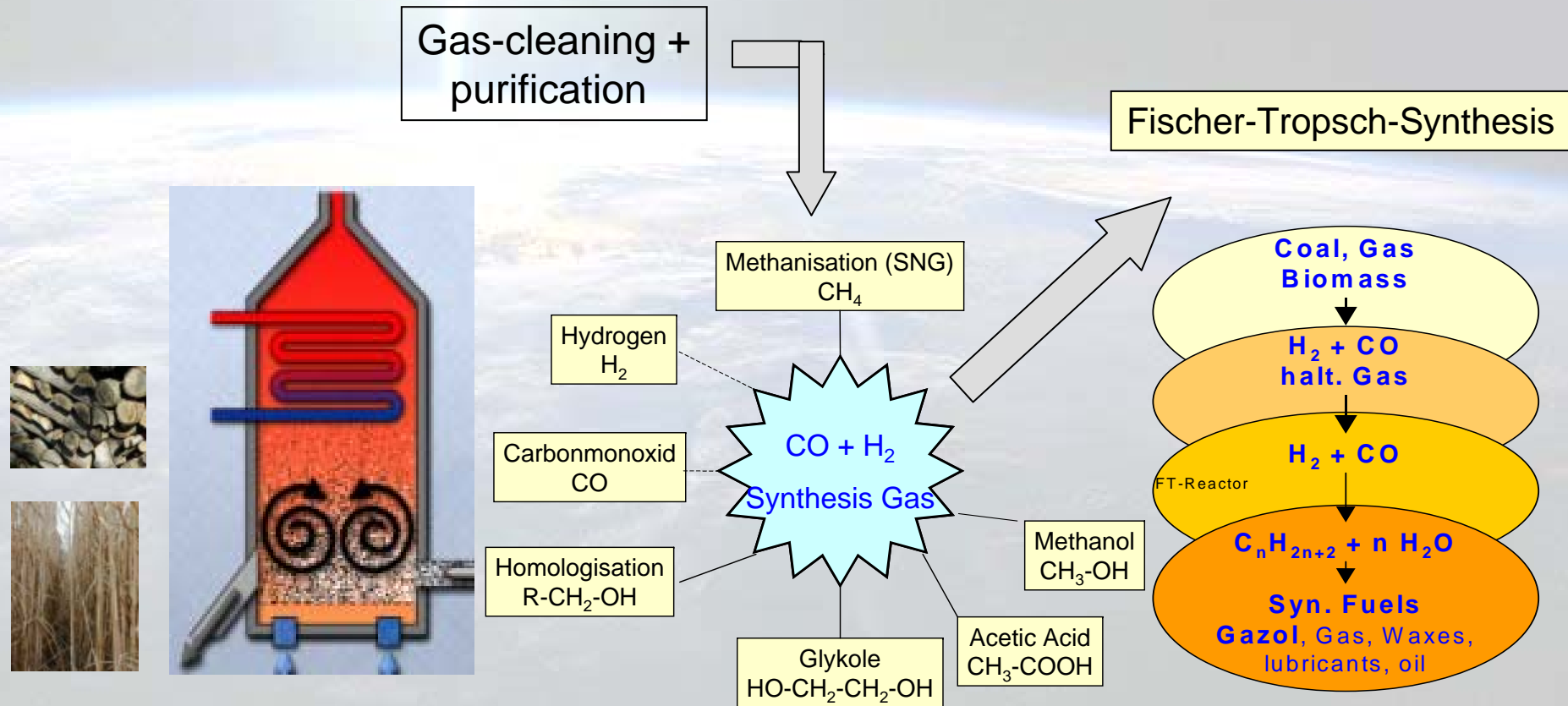
Bioethanol Plant Zeitz
 Capacity: 12.500 t sugar beet / day!
 For ethanol 700.000 t / year of grain
 260.000 m³ / year ethanol-production



EtOH Production Plants in Nebraska, USA

Production capacity for
 Bio-Ethanol in Germany
 590.000 t/year

Synthetic fuels from biomass – The BTL-Path



Rate of Yield (BTL): around 4 t/ha (Choren Ind.)
 Potential 2010: up to 8% of total liquid fuels (Daimler-Chrysler)





***THANK YOU
FOR YOUR KIND
ATTENTION***

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