



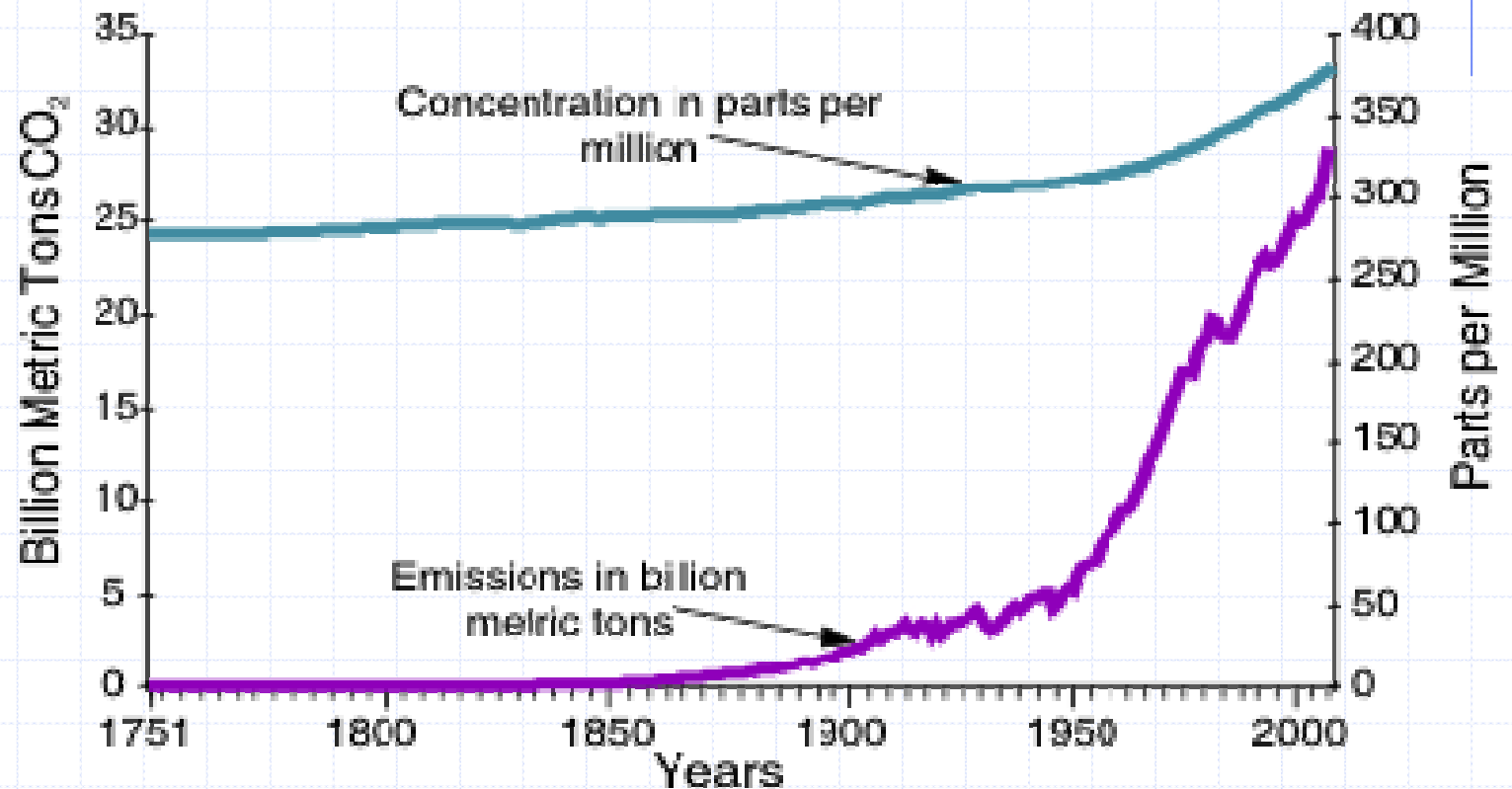
The way towards 20 % Renewables by 2020 in Europe 27



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Global Dioxide Emissions and Carbon Dioxide Concentrations (1751-2004)



Source: Oak Ridge National Laboratory, Carbon Dioxide Information Analysis Center

The objectives of Modern Energy Policies

- **The ultimate goal: avoid the cost of climate change impacts: 5-20% of global GDP (Stern)**
- **Rapid Deployment of renewables globally in parallel phasing out of incumbent technologies**
- **Large scale innovation in the energy sector**
- **Significant energy efficiency improvements**
- **Energy security: reduction of oil and gas import (EU : €50 billion per year (at \$61 per barrel of oil))**
- **Reduced air pollution giving significant health benefits**
- **Reduced need for air pollution control measures: €11 billion per year in 2020 in EU**
- **Worldwide energy gap in 2020 calls for min. ~5TW of Renewables (IPCC)**

Renewable Industries' Pride and Challenge

- Globally, renewable power capacity expanded to 280 GW in 2008
 - = 75-percent increase from 160 GW in 2004, excluding large hydropower.
- Top SIX:
 - China (76 GW),
 - United States (40GW),
 - Germany (34 GW),
 - Spain (22 GW),
 - India (13 GW), and
 - Japan (8 GW).
- The capacity in developing countries grew to 119 GW, or 43 percent of the total, with China (small hydro and wind) and India (wind) leading the increase.

Milestone in 2008

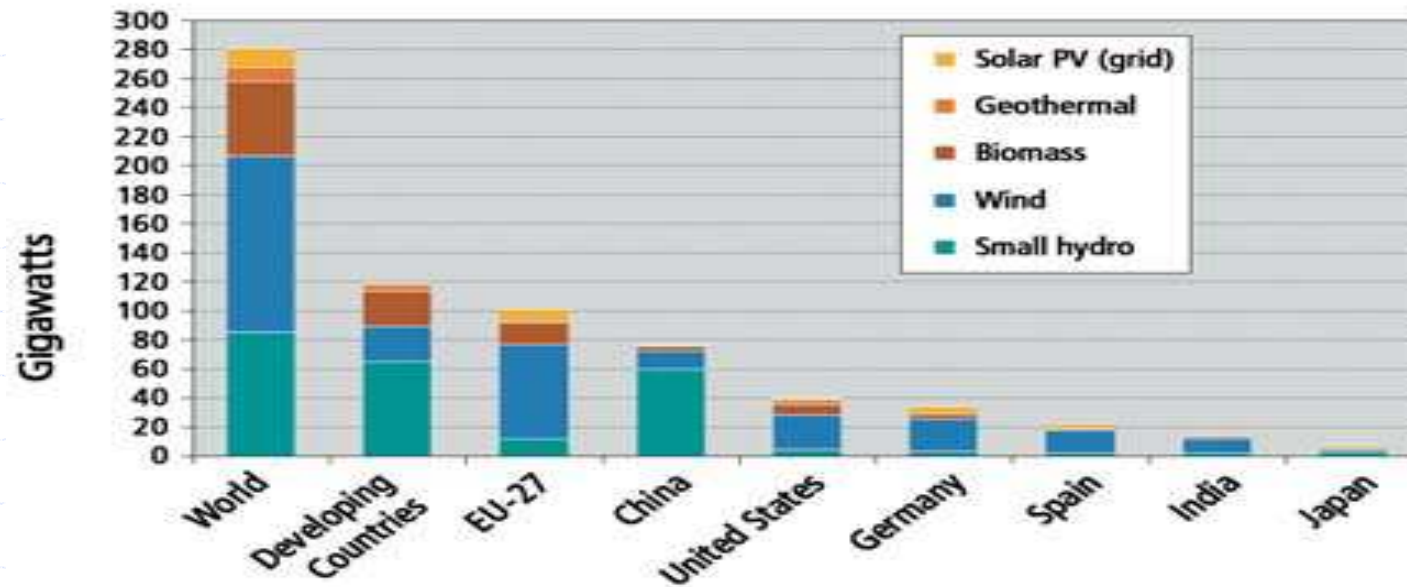
- Added power capacity from renewables in both the United States and the European Union exceeded added power capacity from conventional power (e.g. gas, coal, oil, and nuclear).
- That is, renewables represented more than 50 percent of total added capacity. (Including large hydropower, global renewable power capacity reached an estimated 1,140 GW in 2008.)
- Investment in Infrastructure worldwide crucial

Renewable Industry- global player

- Among new renewables (excluding large hydropower), wind power again largest addition to renewable energy capacity.
- Existing wind power capacity grew by 29 percent in 2008 to reach 121 gigawatts (GW), more than double the 48 GW that existed in 2004.
- The 2008 increase was led by high growth in the strongest markets of the United States (8.4 GW added), China (6.3 GW), India (1.8 GW), and Germany (1.7 GW).
 - (REN21 , Global Status Report 2009 Update)

Success is not limited to the richer world

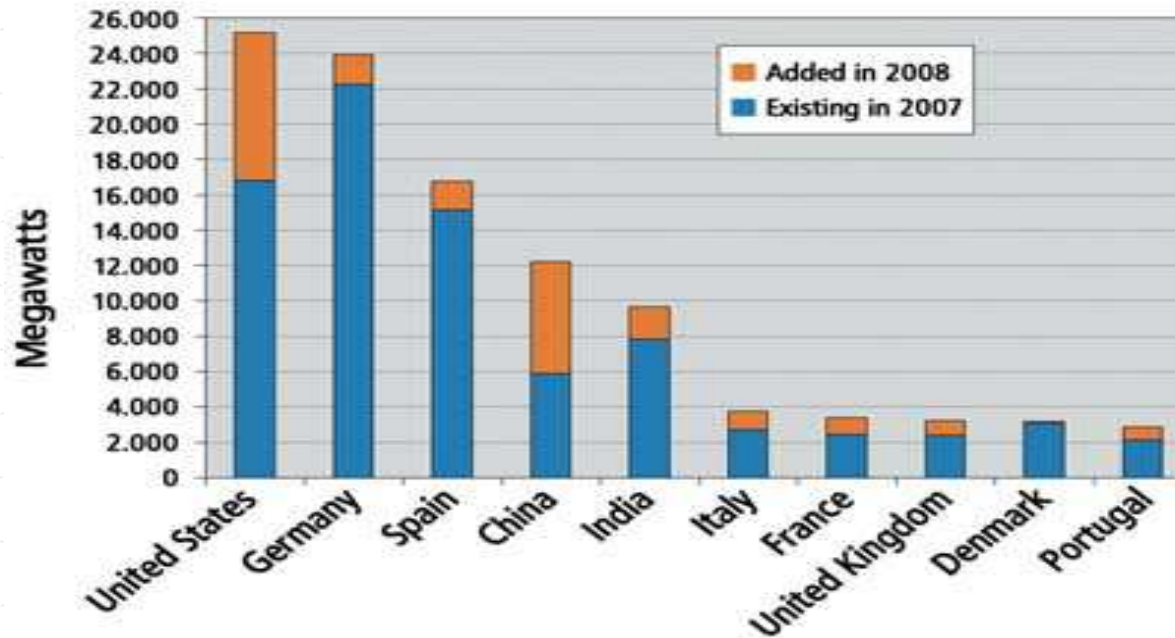
Figure 4.
Renewable Power Capacities, Developing World, EU and Top Six Countries, 2008



Note: Excludes large hydropower

United States Nr. 1 in Wind

Figure 2.
Wind Power Capacity, Top Ten Countries, 2008



The new RES Directive – A fine tool for progress

- Sets **mandatory national targets** for renewable energy shares, including 10% biofuels share in transport, in 2020
- Requires **National Action Plans**,
- **Gives flexibility** for Member States to reach part of their target through
 - **Statistical** transfer
 - **Joint projects** between Member States and third countries with existing or planned interconnector capacity (under certain conditions and provided RES energy reaches the EU)
- Encourages **joint Support mechanisms between MS**
- **Sets clear rules** for disclosure quality of **Guarantees of origin**
- Requires **reduction of administrative and regulatory barriers**, improvements in provision of information and training and improves renewables' access to the electricity grid
- Creates a **sustainability regime** for biofuels

Europe's new Commitment

- **20% GHG reduction compared to 1990**
 - **Independent commitment**
- **30% GHG reduction compared to 1990**
 - **In context of international agreement**
- **20% renewables share of final energy consumption**
- **10% bioenergy in transport, with**
 - **production being sustainable**
 - **second generation biofuels commercially available**
 - **Electricity from RES**

EU 27's homework

- National overall targets for the share of energy from renewable sources in gross final consumption of energy in 2020* (ANNEX I of RES Directive)

	2005 (1)	2020 (2)		2005	2020
Belgium	2,2 %	13%	Lithuania	15,0 %	23%
Bulgaria	9,4 %	16%	Luxembourg	0,9 %	11%
Czech Republic	6,1 %	13%	Hungary	4,3 %	13%
Denmark	17,0 %	30%	Malta	0,0 %	10%
Germany	5,8 %	18%	The Netherlands	2,4 %	14%
Estonia	18,0 %	25%	Austria	23,3 %	34%
Ireland	3,1 %	16%	Poland	7,2 %	15%
Greece	6,9 %	18%	Portugal	20,5 %	31%
Spain	8,7 %	20%	Romania	17,8 %	24%
France	10,3 %	23%	Slovenia	16,0 %	25%
Italy	5,2 %	17%	Slovak Republic	6,7 %	14%
Cyprus	2,9 %	13%	Finland	28,5 %	38%
Latvia	32,6 %	40%	Sweden	39,8 %	49%
United Kingdom	1,3 %	15%			

- (1) Share of energy from renewable sources in **gross** final consumption of energy,
- (2) Target for share of energy from renewable sources in **gross** final consumption of energy

Europe needs a fast track towards RE – stable support systems and infrastructure deployment are key

- The by far most successful systems for support and most applied mechanisms are the Feed-in Systems
- Quota and tradable Certificate Mechanisms (TGC) were fairly limited to trigger growth and price digression and only applied by a small number of MS
- TGC – A target for RE penetration is set by public authorities seeking to minimise cost for achieving this target. The certificate price is set by the market.
- In a FiT system, public authorities set an effective price but are not limiting the quantity installed.
- FiT systems - “venture capital investor’s best friend”, - “risk-minimizing market-pull policies such as feed-in tariffs for renewable energy over CO2 emissions trading and certificate trading systems”.

Source: Dr. Rolf Wüstenhagen, Vice Director , Institute for Economy and the Environment (IWÖ-HSG), University St. Gallen, Marktchancen durch Innovation bei den erneuerbaren Energien, 2007

Price Disparity

- According to data from the German Ministry of Environment under the German FiT scheme a premium for 1 kWh onshore wind is in 2008 paid at the order 5.3 eurocent as lowest tariff and 8.4 eurocent for the highest tariff whereas under the UK Quota scheme the price lies at present between 12.0 and 14.0 eurocent per kWh.
- Source: BMU

European success in RES too much in the hands of very few MS

- Example – Germany:
 - **2007:**
 - Indicative **12,5 % target** of gross electricity consumption **for 2010 already passed** (14.2 % in 2007)
 - 9,8 % share of total end energy consumption (Electricity, heating, fuel) (2006:8,1 %)
 - 278.000 people working in RES in 2008 (170.000 in '05)
 - Gross Turnover: 28,7 bio. Euro in 2008 (18,1 in '05)
- More than 6 % of this growth in RES in electricity was reached in only 6 years; 90 % of this increase comes from IPP
- *Forward Estimate by Germany:*
- 2050: **77 % share feasible**
 - Source: (German Ministry of the Environment, BMU, Press Service 055/07, 27.02.2007 and "Erneuerbare Energien in Zahlen, (BMU,Internet Update 2009); press declaration of 5th of July 07, BWE, Germany)
- 10 Years of Cap and Trade Mechanism in the United Kingdom:
 - RES share below 2%
 - Only restricted technology spread (wind, co-firing of –imported- biomass)
 - UK will not be able to reach indicative target in 2010

Average 11 % RE increase per year in Germany 1997 -2007

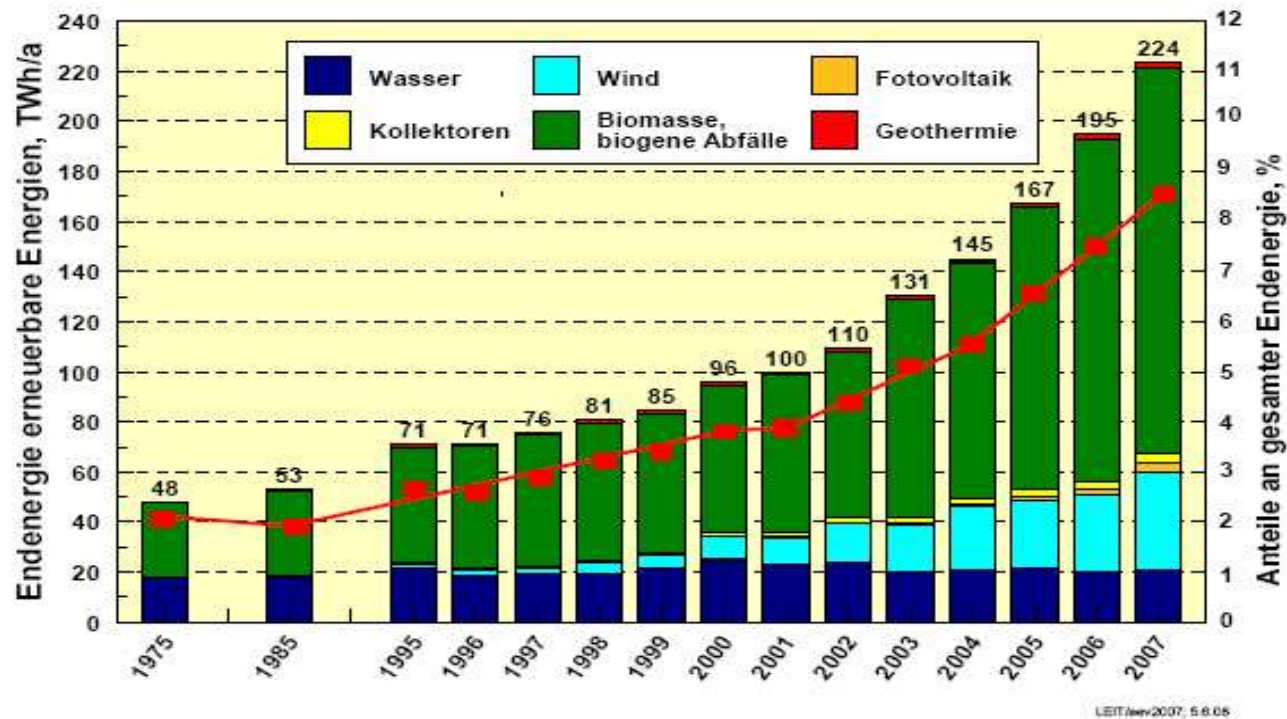
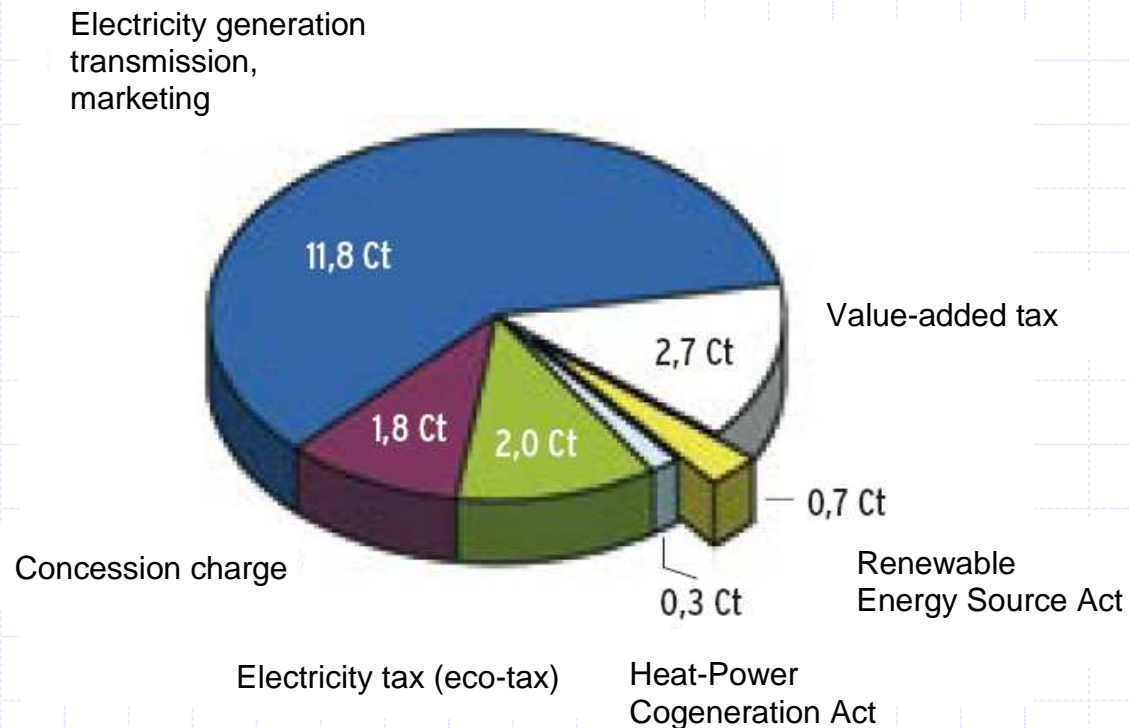


Abbildung 1: Endenergiebeitrag erneuerbarer Energien nach Energiequellen 1975 – 2007

Leitstudie 2008, BMU

EEG: Share of costs for one kWh of electricity in private households (19,4 €-Cent), 2006.



Source: BMU 2006

Benefit beyond the technology - Macro economy

- **Societal benefit of FiT law, ex: German EEG**
- + Merit-Order-Effect of renewable electricity generation on spot market prices in Germany 5,0 Mrd. Euro
- + avoided environmental damage 3,4 Mrd. Euro
- + avoided fuel import 1,0 Mrd. Euro
- - EEG- difference costs 3,2 Mrd. Euro
- - Increased costs for balancing (Regelenergie) 0,1 Mrd. Euro
- **Overall benefit 6,1 Mrd. Euro**
- (Source: German Ministry for Environment BMU 2006)

Cost Digression Capability

- Example PV: First Solar thin film producer is driving towards grid parity at \$2.50/W (System) and \$0.08/kWh before 2012
 - Source: Thin Film Technology: the pathway to Grid Parity, 2009 (Benny Buller, Director of Device Improvement First Solar)
- Support mechanisms in general contain review clauses and digression obligations
- *Mike Ahearn, CEO, First Solar, quoted in: Thomas Friedman, Hot, Flat and Crowded, p 389:*
- “Every year- and this was really smart- new solar projects coming on line in Germany have a feed-in tariff that is 5 percent lower than the previous year’s tariff to account for, and to stimulate improvements in efficiency. Research around learning curves says that when sales double, you usually get a roughly 20 percent reduction in price. So volume matters here. The more volume, the quicker and further you move down the learning curve toward the price that will scale in China and India. After we made the initial market test in Germany, we realized that the feed-in program had created a centre of technological excellence, with a lot of budding innovators..”

The new Directive and barriers for RES

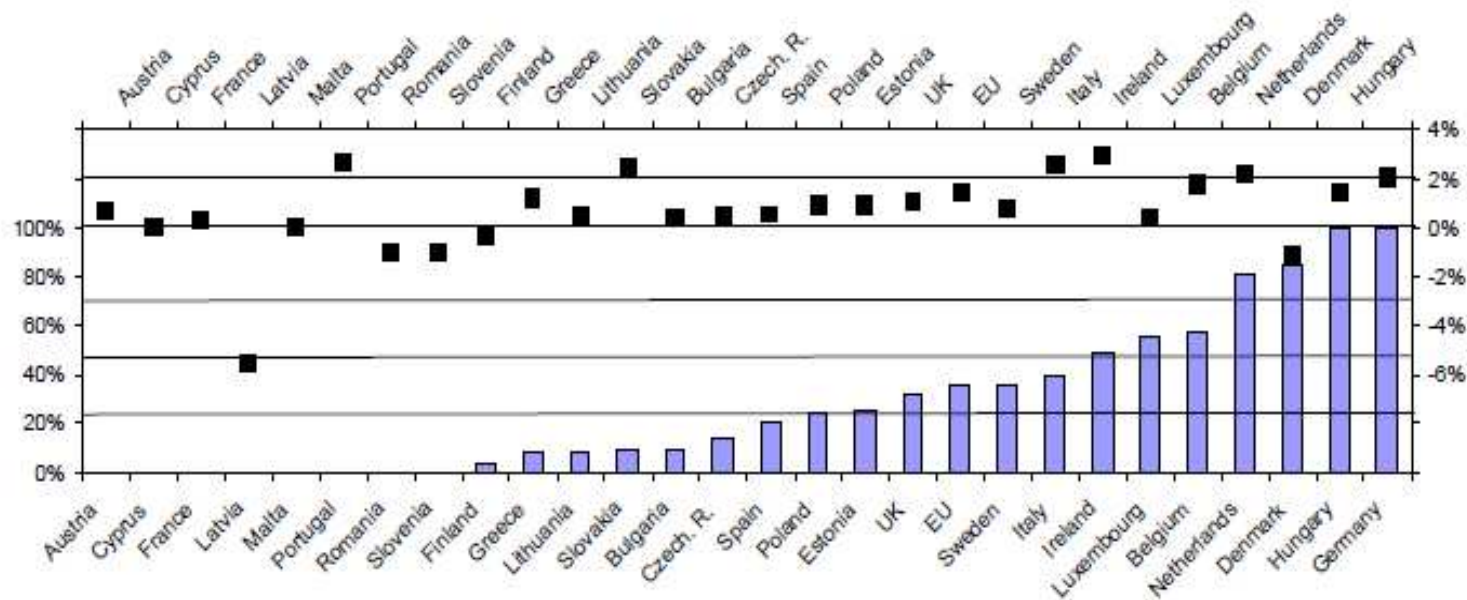
- Reforms, or requires reforms of administrative and regulatory barriers to the growth of renewable energy
- Grid enforcement necessity established
- Simplified and streamlined procedures
 - planning authorities to consider renewable energy and district heating and cooling systems
 - Too low but - minimum levels of renewable energy in building codes for new or refurbished buildings
 - Certification regimes for installers; mutual recognition

National Renewable Action Plans

- Policy action required in all Member States to achieve the ambitious RES targets. Commission will publish a template by June 2009
- The following criteria, independent of the support instrument applied in a certain country, are recommended:
 - The RES policy framework needs to respect the full basket of RES technologies as allowed for target compliance.
 - An adequate level of financial support level should be provided – i.e. slightly higher than the marginal generation costs (in the case of a quota system the level of penalty is relevant).
 - Financial support for the operation of a RES plant needs to be guaranteed but clearly restricted to a certain time frame.
 - Any adaptation or change of the policy framework should be targeted to assure deployment of new RES capacities.

Trust in Delivery ?

The progress made towards the 2010 target (columns and left hand axis) and the change in Member State's renewable electricity shares 2004-2006 (points, right hand axis).

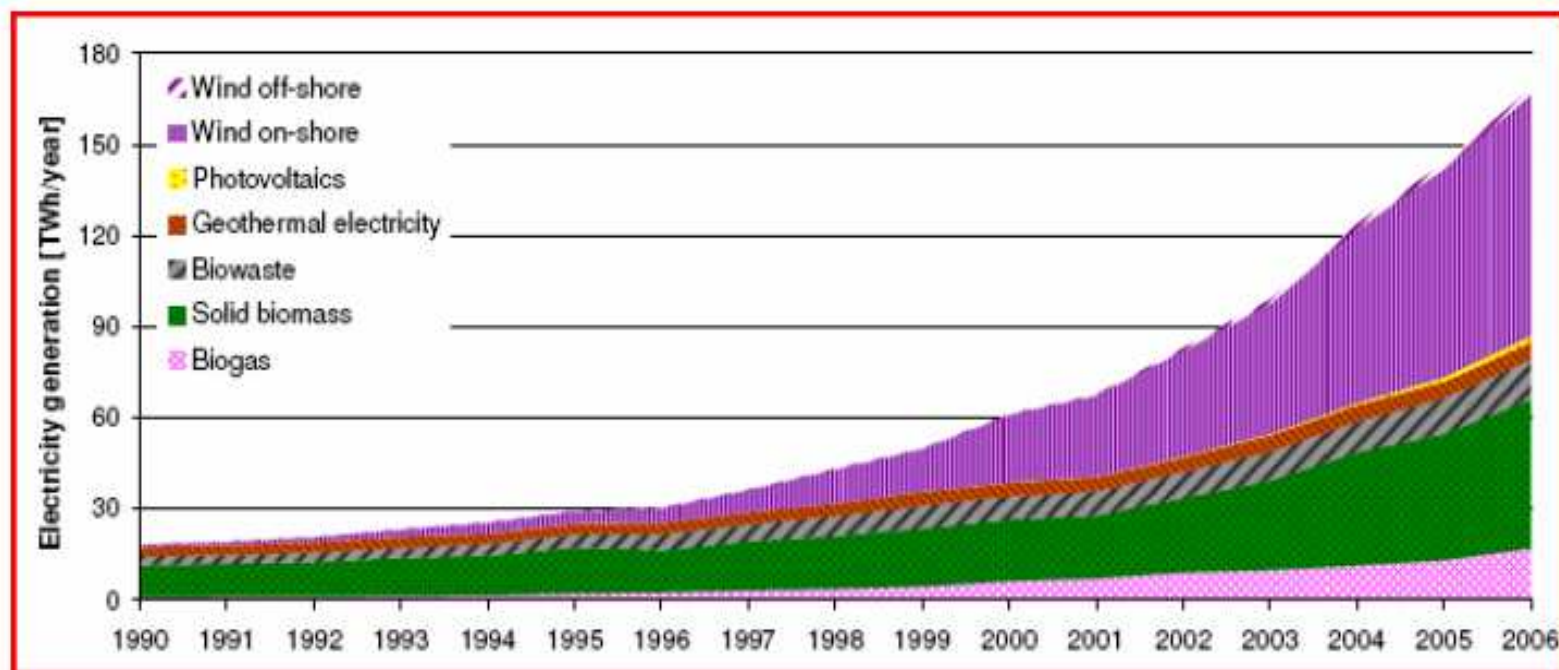


Source: based on normalised Eurostat 2006 data and 2010 targets

Source The Renewable Energy Progress Report: Commission Report in accordance with Article 3 of Directive 2001/77/EC, Article 4(2) of Directive 2003/30/EC and on the implementation of the EU Biomass Action Plan, COM(2005)628

Poor spread of technologies and MS performing

The growth of renewable electricity has been driven by a small number of Member States and the range of technologies used¹³ has also been limited:



Source: "Promotion and growth of renewable energy sources and systems" Final Report, Ecofys et al. (hydropower excluded)

From the Commission's Evaluation 2009 on Performance of MS for RE

- "Commission analysis still suggests the 2010 21% target will not be reached without significant additional effort."
- Several MS still have to make all their efforts in the next two years, highlighting the need to take quick and effective action to begin development.
- "With six member States increasing their shares by over 2 percentage points (Germany, for instance, increasing from 10.6% to 12.6%), over the last two years the EU share of renewable electricity has increased by almost 1.5 percentage points (14.4% to 15.7%). However this disguises the poor recent efforts of some seven countries whose shares have stagnated or actually declined."

Commission's evaluation

- Reasons for the slow progress in developing renewable electricity "are not new".
- Since 2004 61 legal proceedings against Member States for non-compliance with the Directive..
- Italy - 13
- Spain - 6
- Austria - 4
- Czech Republic - 3
- France - 3
- Latvia - 3
- Poland - 3
- -16 cases still pending
- European Commission continues monitoring and will "open infringement cases wherever necessary".
- "However the poor progress and number of infringement proceedings also implies that the legal framework is not sufficiently strong. This is one reason for the new Directive on renewable energy."

The binding character

- Binding targets for 2020- Insufficient to trigger confidence
- Europe failed to give direct penalty mechanism to Commission
- Interim targets not binding
- Even early infringement procedures will drag on for years:
- The duration of litigation and pre-court procedure esp. in cases of environment can take 80 to 89 months (average 7 years) s. Ludwig Krämer, Environmental Judgements by the Court of Justice and their duration, JEEPL (2008) 263-280)

All eyes on Action

- Crucial to push governments for clear and progressive National Renewable Energy Plans
- Crucial that the Commission gives clear notes on delivery capability
- Monitoring is of utmost importance
- Change in Energy System and view on Energy
- Grids need to be able to actively ensure the process towards change

Risk of Slowness and Waiting for GODOT

- National governments need to be pushed to primarily deploy RES at home and as regional development planning for the Arabic countries and region and that these countries are not taken as primary source of imports to Europe see
- Such attitude alone could prevent real progress in Europe

The absurdity of inertia

- RE is decentralised, disruptive energy
- RE has in general and since long left the kindergarden
- By 2015 most RE technologies are at price parity with average consumer price
- But: Wrong Signals, wrong directions and unclear policies may still do a lot of bad

The Lemming Syndrome revisited or “plus ca change, plus c'est la meme chose”

- **CCS Euphoria:**
- “Transitional Community-wide rules for harmonised free allocation” as last minute introduction into ETS via the Council:
- *"8. Up to 300 million allowances in the new entrants' reserve shall be available until 31 December 2015 to help stimulate the construction and operation of up to 12 commercial demonstration projects that aim at the environmentally safe capture and geological storage (CCS) of CO2 as well as demonstration projects of innovative renewable energy technologies, in the territory of the Union.*
- *The allowances shall be made available for support for demonstration projects that provide for the development, in geographically balanced locations, of a wide range of CCS and innovative renewable energy technologies that are not yet commercially viable. Their award shall be dependent upon the verified avoidance of CO2 emissions.*
- Shopping list for CCS with concrete figures of 12 projects whereas the link to renewable energies remains very vague

EU Recovery Plan – Some injection for Renewable energy but...

- **€ 5 billion new investment in energy and Internet broadband infrastructure in 2009-2010, in support of the EU recovery plan - meaning**
- **For energy projects:**
- **Regulation to grant Community support to strategic energy projects:**
- **A total of € 3.5 billion for investment in carbon capture and storage (financial envelope: €1,250 million),**
- **offshore wind projects (ca €500 million), concrete list of projects (but the vast majority owned by E.ON, Vattenfall and Dong)**
- **gas and electricity interconnection projects (€1,750 million; from that €705 million for Electricity interconnection).**
- **Question marks in view of polluter pays principle, market balance, recovery quality short term**

The Difference

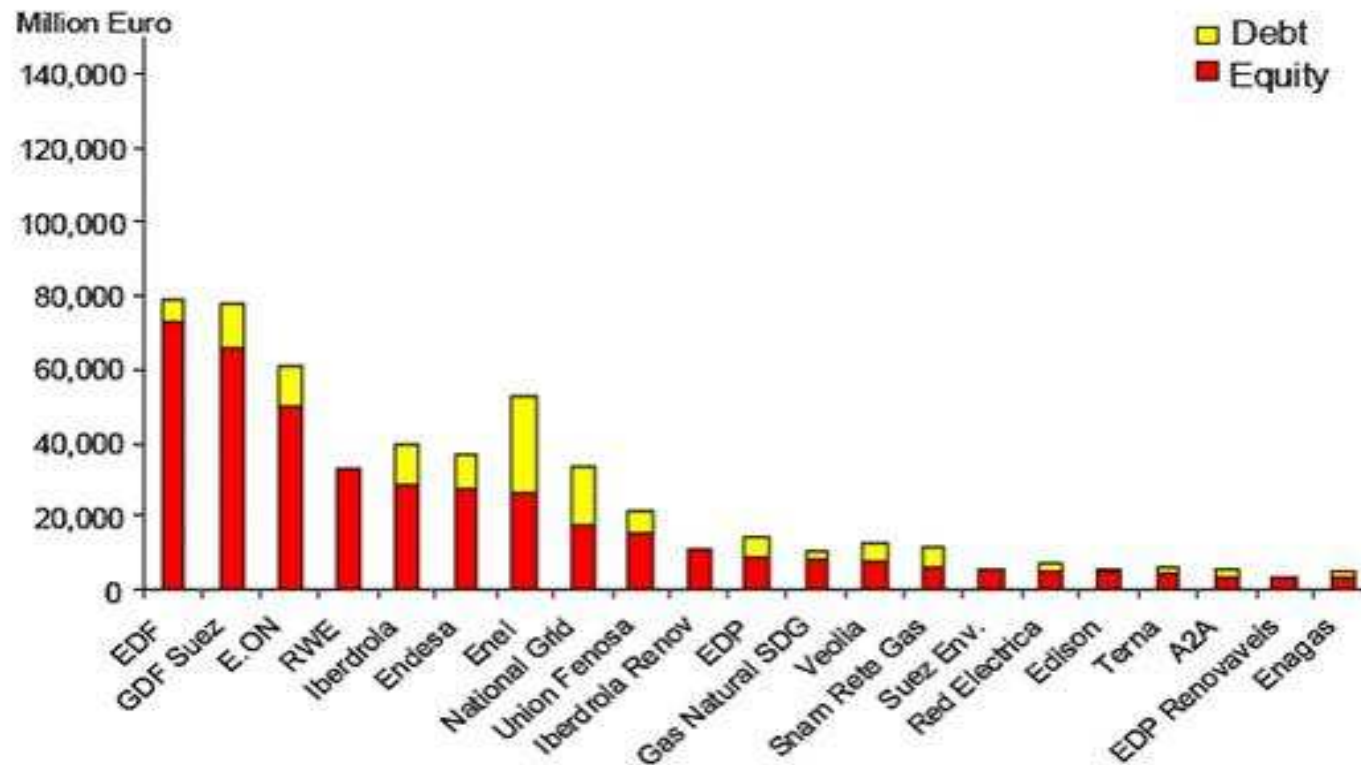


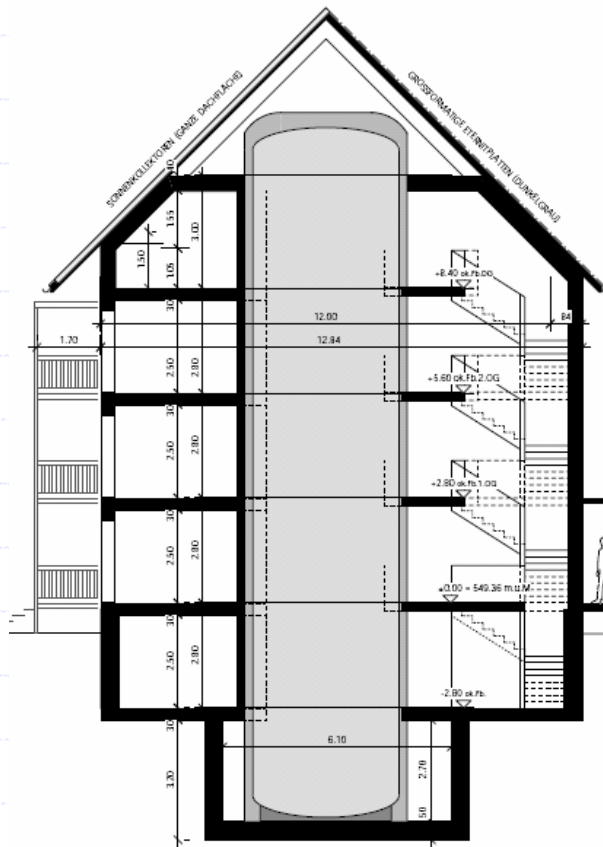
Figure 4. Finance structure of some major European Utilities.

Source: Karsten Neuhoff, Implementing the EU Renewables Directive EPRG Working Paper 0908, Cambridge Working Paper in Economics 0913, March 2009, (Electricity Policy Research Group)

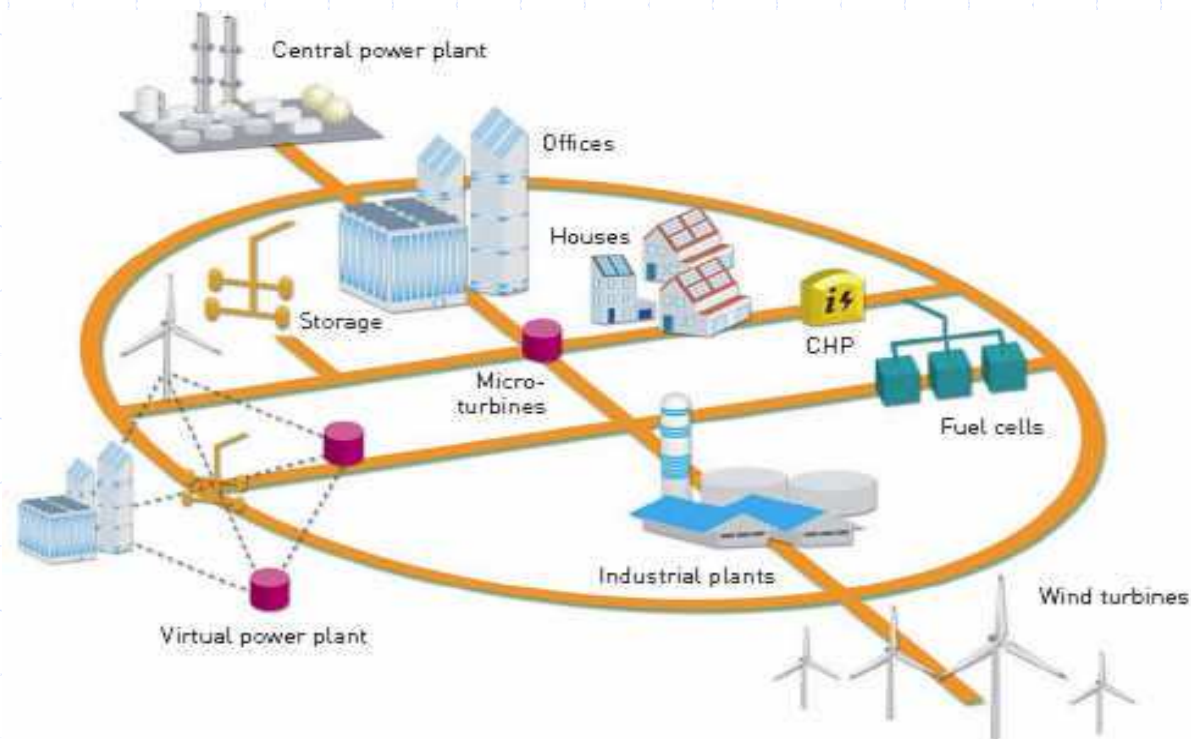
Energy Service Delivery as future

- Utilities have to learn from Independent RE producers and efficiency industry:
 - Business not about delivery of kWh or litres or m³ of fuel but on services
 - To guarantee a 20/21 ° Celsius house is the issue and to be done predominately from RE and with high efficient material for building and technology
 - 26.6 % is the current share of the housing sector alone in energy consumption in EU 27
 - Programmes needed to get the housing sector out of consumption equation as fast as possible (towards: net consumers or energy plus delivery; energy storage capacity of buildings and transport)
 - This is about business

Example: Biggest Solar heated house in Europe without additional heating (Switzerland) housing part 1344 m², 276 m² PV) www.jenni.ch



The future: a combination of big and small or just small vs just big?



Source "Future Energy Systems in Europe" commissioned by EP STOA and carried out by ETAG 2008

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