

Renewable energy in Europe

E-turn 21 workshop
Cologne, 10 May 2006

Content

1. Introduction to Essent

2. EU policy

3. Support for renewable energy

4. Success factors

5. Outlook and recommendations

Content

1. Introduction to Essent

2. EU policy

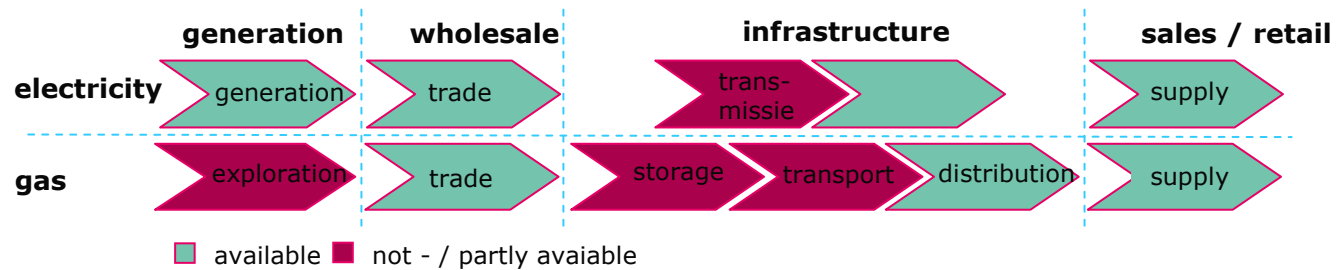
3. Support for renewable energy

4. Success factors

5. Outlook and recommendations

Key characteristics Essent

- largest Dutch integrated utility, active throughout energy value chain



- 5.000 MW conventional generation capacity (23 % total capacity NL)
- 500 MW renewable generation capacity in The Netherlands, 350 MW in Germany;
- 2,5 million customers E & 1,9 million customers G
- 10.900 employees
- Turnover 2005 7,4 billion euros

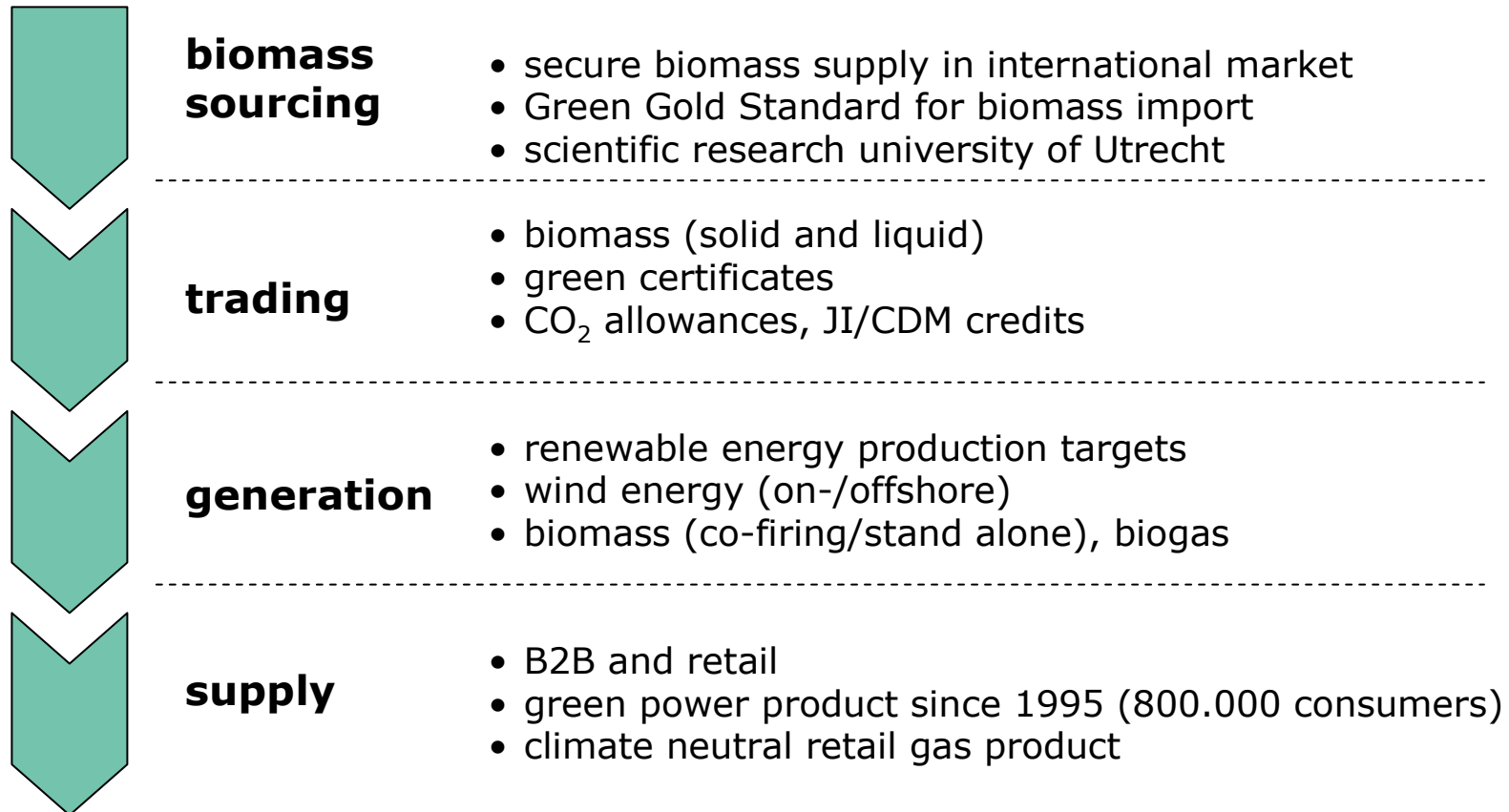


with its activities
Essent acts in various
roles within society

Essent is at the forefront of renewable energy

- Sustainability always high on Essent agenda; part of our mission and corporate core values
- Why are we active in renewable energy:
 - Environmental and social responsibility, minimize environmental burden (e.g. CO2 emissions)
 - Security of supply and fuel mix diversification
 - Added value from profitable renewable energy activities
- Inventor of “Groene Stroom” (Green Power, 1995) and market leader in renewable energy in the Benelux
- Essent is a first mover, frontrunner and large investor in biomass co-firing
- Essent is a large developer and operator of wind energy in The Netherlands and Germany

Sustainability in the Essent supply chain



Generation and supply of renewable energy

Generation of renewable energy

Essent Group (in GWh)	2005	2004
wind	672	511
hydro	29	31
solar pv	0.05	0.1
landfill gas and biogas	65	103
stand-alone clean biomass	174	171
co-firing clean biomass	2,525	989
other biomassa	285	290
	total 3,750¹⁾	2,095
Off which in The Netherlands	3,196²⁾	1,698

Supply of renewable energy (official fuel mix)

Essent Group	23%	21%
wind	3%	4%
hydro	8%	1%
solar pv	0.01%	0.004%
biomass	12%	16%

Source: Annual report 2005

- 1) 14% of production of Essent Group,
- 2) app. 45% of renewable electricity production in The Netherlands in 2005,
30% of renewable electricity target of The Netherlands in 2010



Content

1. Introduction to Essent

2. EU policy

3. Support for renewable energy

4. Success factors

5. Outlook and recommendations

European policy designed to support renewable energy

Main international drivers for renewable energy:

- Climate change policy
- Security of supply

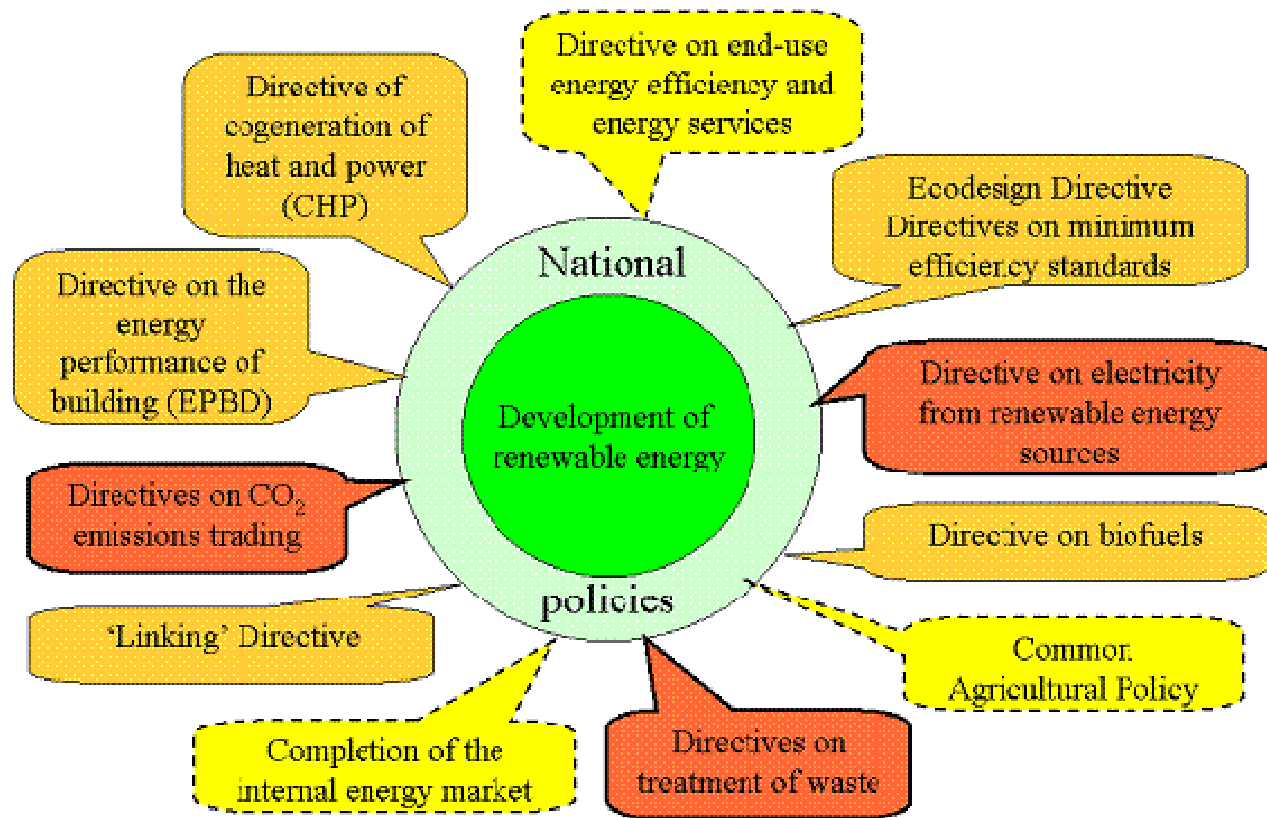
Ambitious EU 25 targets are a basis for growth

- Renewable electricity:
 - Target is 21% in 2010
 - Expected growth from 400 TWh (2005) to 650 TWh (2010) = 18%
- Bio transport fuels:
 - Target is 5,75% in 2010
 - Expected growth from 1 Mtoe in 2004 to 15 Mtoe in 2010

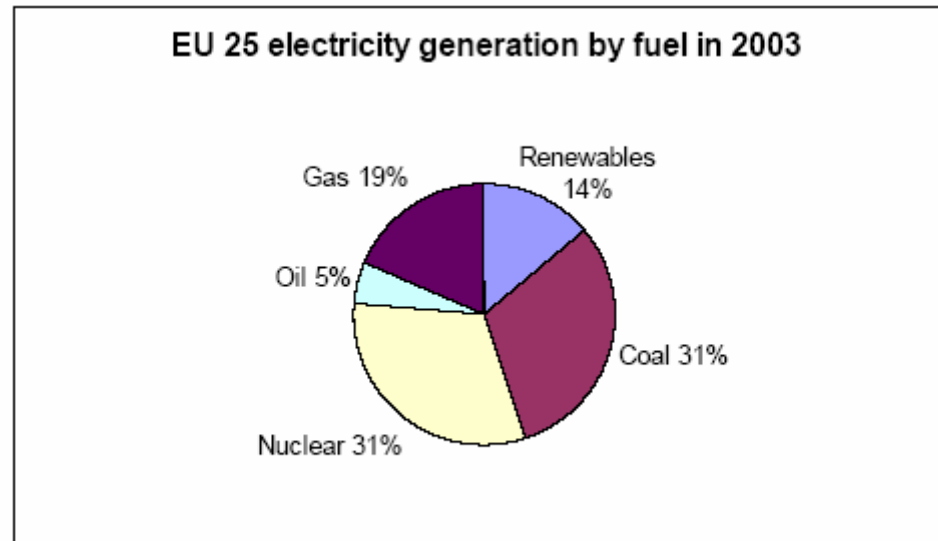
EU Emissions trading scheme

- High value of CO₂ allowances supports renewable energy opportunities
- Trading opportunities, fast developing JI and CDM market

EU Directives influencing renewable energy markets within EU Member States



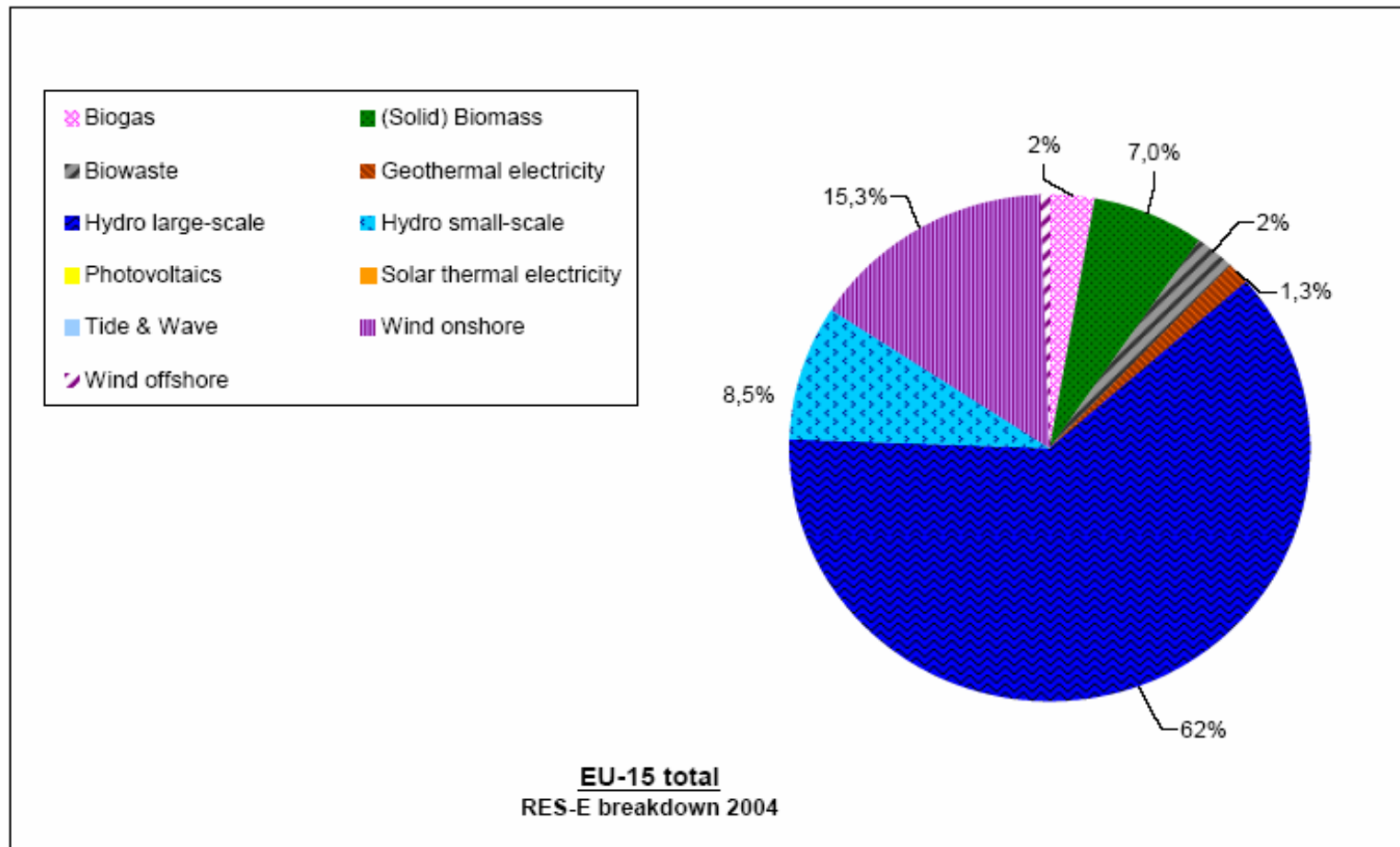
EU: sources of electricity generation



- **EU electricity generation relies heavily on nuclear, coal and gas**
- **14% renewable electricity in 2003, of which 70% hydro (2010 target 22%)**
- **Potential for expanding hydro electricity capacity very limited (10%?)**
- **Main renewable energy sources for next decades will be biomass and wind energy**
- **Solar, tidal, geothermal play marginal role in EU energy supply in next decade**

Source: European Commission, 2005

Renewable electricity sources EU 15



Source: European Commission, 2005

Content

1. Introduction to Essent

2. EU policy

3. Support for renewable energy

4. Success factors

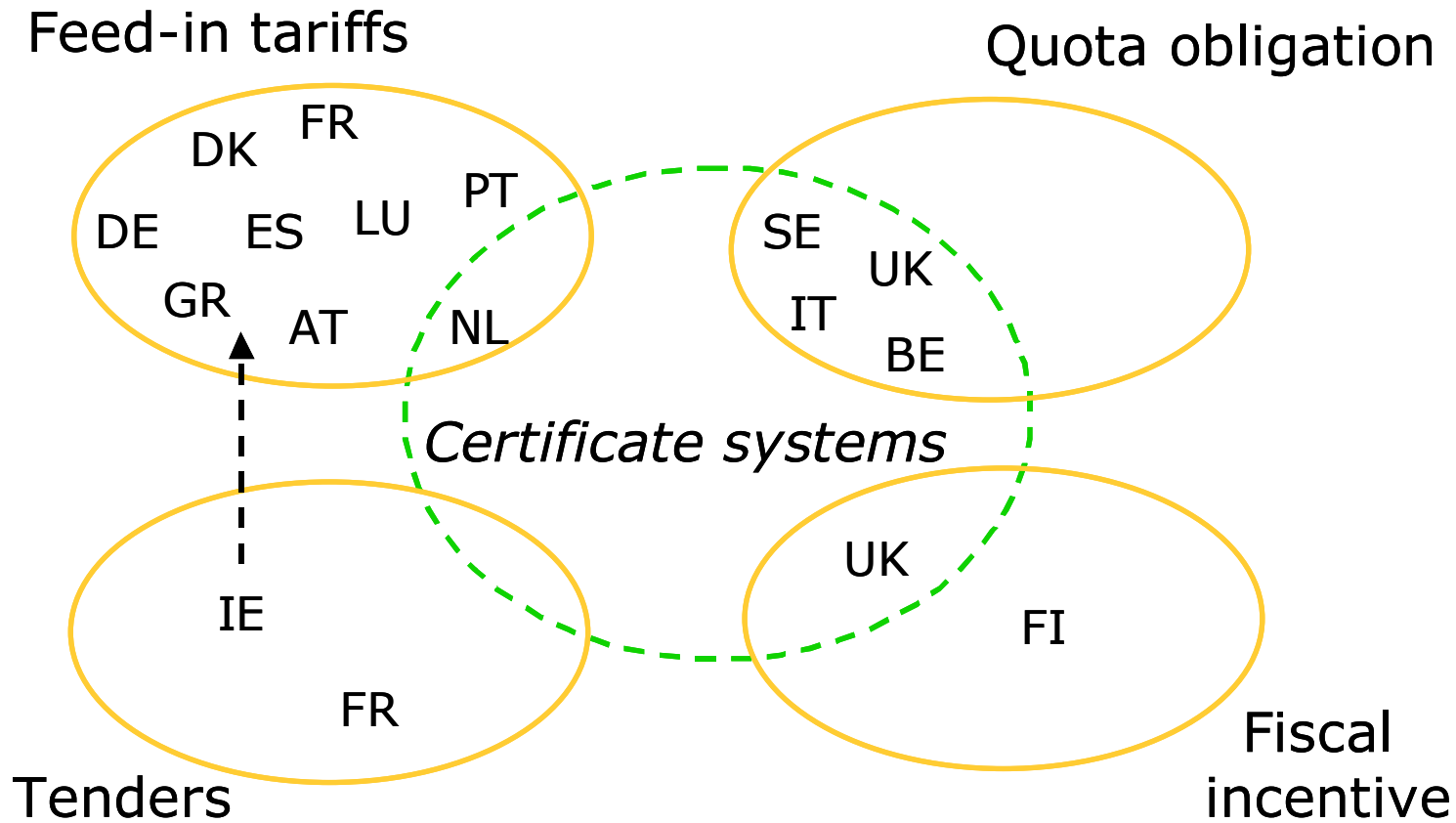
5. Outlook and recommendations

Support systems for renewable energy

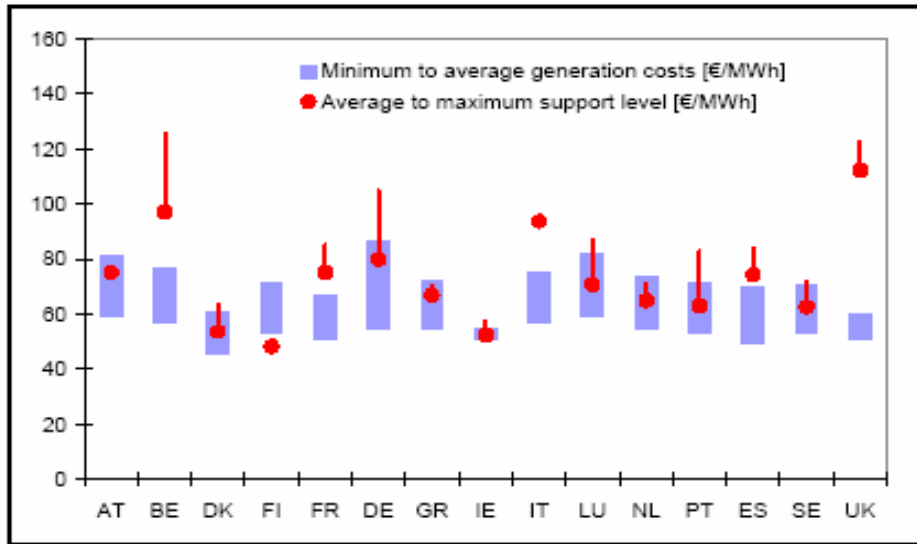
Observations

- The EU has set (indicative) **targets** for renewable energy production, driven by it's policy regarding **climate change** and **security of energy supply**
- The current support systems differ among the 25 member states, resulting in **25 RE markets** in different maturity stages
- There is currently **no level playing field** in Europe, which hampers cost-efficient development of RE production (e.g. biomass flows to highest bidder)
- The European Commission states it's **premature** to introduce a **harmonized system** and first wants to learn from the diversity of policy approaches
- Market players recognize the need to **diversify** and **invest** in clean technology
- Only a few countries offer long term **certainty** and **stability** for investors in RE, combined with **sufficient support levels** and well functioning **administrative procedures**

Current support instruments EU15

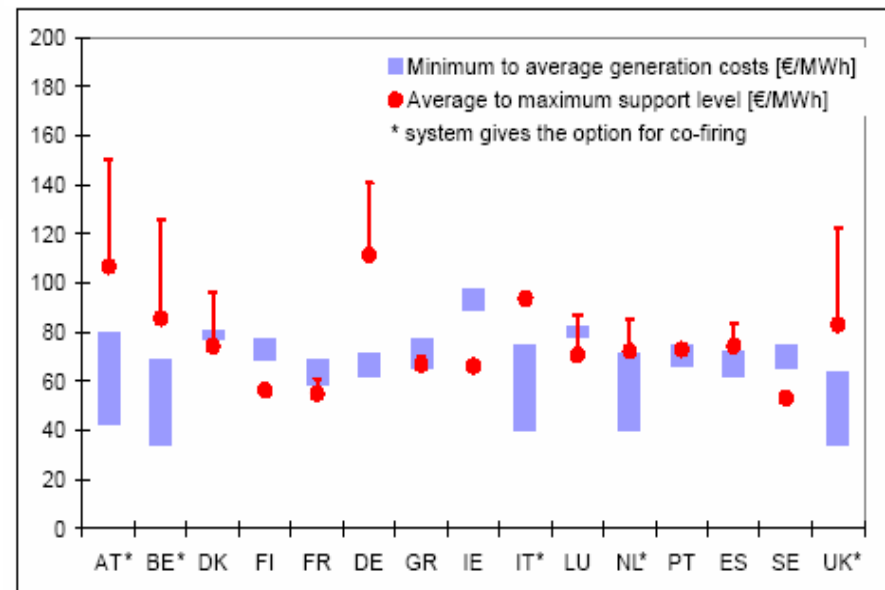


Support vs. costs differs widely across EU Member States



Direct support for electricity production from wind onshore (EU 15)

Direct support for biomass electricity production from forestry residues (EU 15)



Source: European Commission, 2005

Some thoughts on market based systems

In principle, a market based EU wide system is preferred:

- Single EU wide renewable energy market (transparent), more stable prices
- Highest cost efficiency, lowest cost in achieving RE target
- Level playing field
- No burden sharing issues

Based on feed in tariffs, obligations, or other instruments?

- Feed in systems support wider variety of technologies, but require extensive insight in cost structure of renewable energy technologies and are less market oriented (burden sharing?)
- Obligations are easier to govern, cost-efficient, but may result in only a few technologies being commercially developed
- A future harmonized system should combine the best of both

Markets function only under certain conditions

- Market system functioning is optimal without intervention
- Market players need stable conditions and a level playing field
- Renewable energy support will come at a cost, there will be winners as well as losers
- Are policy makers prepared to accept this? Energy is a primary good..
- Analogy with emissions trading CO₂ allocation process/windfall profits

RE Certificate trading: status

Guarantees of Origin

- Member States are obliged to implement a system of Guarantees of Origin (consumer transparency)
- Only 9 of the 25 Member States have fully transposed GoO into national legislation¹

Trading of certificates

- Separate trade of physical power from green value
- Fuel mix disclosure increases green value of renewable electricity
- Cross border certificate trading is happening, but no transfer yet of green electricity from one country to meet target in other country
- International system for redemption of used certificates is necessary (RECS)

Status Netherlands

- GoO's used for fuel mix disclosure
- GoO's not used to meet RE target (no bilateral agreements)
- Imported green certificates not eligible for support

1: Austria, Belgium, Denmark, Finland, Germany, Italy, Netherlands, Sweden, UK

The link between renewable energy and CO₂

- Internalisation of CO₂ costs leads to higher costs for fossil fueled power generation
→ narrows the financial gap between renewable and conventional power sources

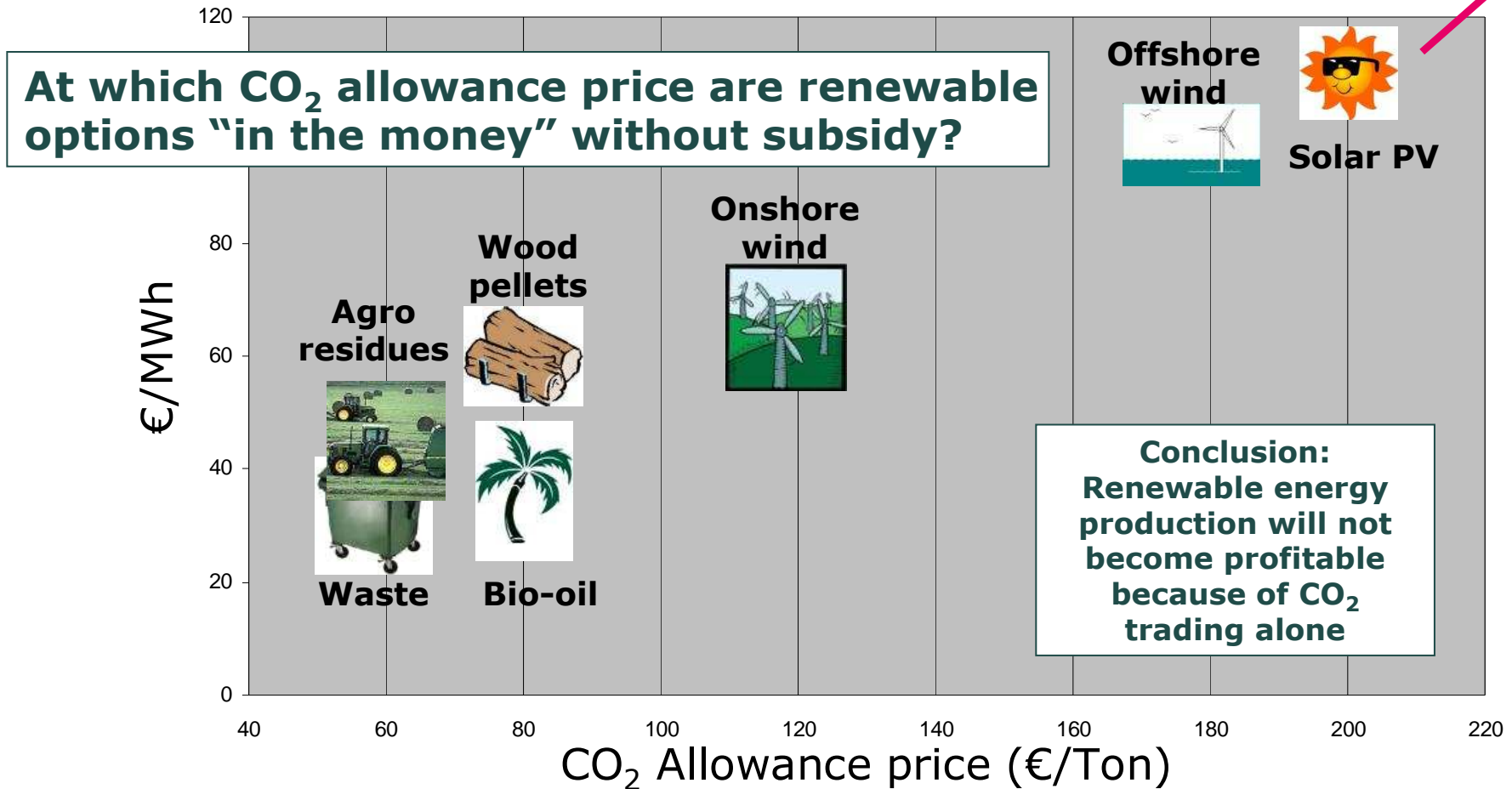
But:

- CO₂ policy development is very uncertain (what happens post-2012?)
- Member States policies have a great impact on the CO₂ market
- Renewable energy has more merits, besides CO₂ reduction (security of supply, fuel mix diversification)

→ Renewable energy needs more support than CO₂ trading alone

→ The “market” can never solve this by itself, government policy will always be necessary

CO₂ emission trading helps, but...



ASSUMPTIONS:

- AVI (power from waste incineration) at 30% efficiency
- 100% pass through of CO₂ cost
- 750 g CO₂/kWh for coal, 450 g/kWh for gas, 550 g/kWh grid average
- Current fossil and bio fuel prices, variable and capital cost

Content

1. Introduction to Essent

2. EU policy

3. Support for renewable energy

4. Success factors

5. Outlook and recommendations

Financial and technical aspects

General:

- External effects conventional generation sources not reflected in costs
→ Renewable energy has lower social costs, but higher private costs than conventional sources
- Many renewable energy technologies in early development stages (wind offshore, biomass gasification, solar pv, tidal and wave energy)

Biomass

- Bio fuels suitable for electricity production are scarce
- Biomass market immature, but developing
- Increasing demand raises prices

Wind

- Grid balancing problems
- High investment costs
- Availability of attractive sites

Political and regulatory impact

General:

- Energy is primary good, affordability and security of supply are important
- High power prices are threat to competitiveness of European industry
- Energy policy is national policy, other interests affect energy policy
- Renewable energy support depends on political will

Policy in EU Member States:

- Myriad of EU Directives, different interpretations and implementation stages
- Different support schemes, (obligation, feed in, tenders, tax incentives)
- Success stories (Germany, Spain) offer best practice examples
- no level playing field, no internal market
- International certificate trading not co-ordinated, risk of double counting

Administrative barriers

- Long lead times for obtaining permits
 - Heavy and non-transparent authorization procedures
 - long response periods
- Many authorities involved in planning process and lack of coordination
- Spatial planning without taking renewable energy into account
- Grid access and grid connection costs

Public awareness and acceptance

- Power is a primary and low interest product
- Consumers not willing to pay higher price for renewable energy, power prices already subject of debate in some countries
- General public has little awareness of environmental impact of energy use
- NIMBY phenomenon hampers wind energy development
- Doubts about sustainability of biomass
- Climate neutral products hard to explain

Content

1. Introduction to Essent

2. EU policy

3. Support for renewable energy

4. Influence areas

5. Outlook and recommendations

Outlook 2050 (I)

What are the goals of energy transition?

1. Security of energy supply

- Less dependency on increasingly scarce fossil fuels
- Less dependency on import of fossil fuels

2. Stop climate change

- Substantial reduction of greenhouse gas emissions

2050:

→ Increase of renewable electricity share from current 14% to 50%?

→ Reduction of greenhouse gas emissions with 50-70% from 1990 level?

Outlook 2050 (II)

How can this energy transition be achieved?

Renewable energy share of electricity mix has to increase substantially

- Large growth in offshore wind, larger scale of turbines and sites
- Large growth in bio-energy, stand alone and co-firing
- Increased growth of energy crops within the EU
- Establishing international biomass supply chain
- Innovation: new renewable sources (tidal, wave, biomass gasification, etc)
- Electricity storage for balancing purposes (pumped storage, flow batteries)

The 2050 energy mix will still have a large share of energy from fossil sources

- Strong development of clean fossil energy (coal gasification, CCS)

Energy policy also aimed at demand side measures, energy efficiency, nuclear energy, bio transport fuels, etc, etc.

Recommendations (I)

- EU energy policy should be based on three pillars: **reliability, affordability** and **sustainability**
- These principles should be translated into an EU energy portfolio that is a well-balanced mix of **fossil fuelled, nuclear** and **renewable** energy production
- For support of RE, move towards an EU wide **harmonized** system, but don't introduce market based instruments half-heartedly. **Consistency** in policy is vital. Establish **liberalised** internal energy market
- **Learn** from current policies, and combine the **cost-efficiency** of obligations with the **diversity** of support provided by feed-in tariffs. Provide sufficient support for large scale technology like **co-firing and offshore wind**, but also for **innovation**
- **Remove administrative barriers** (pre-planning mechanisms, one-stop authorisation, clear and objective authorisation guidelines, better spatial planning)

Recommendations (II)

- **Streamline directives and policies** surrounding renewable energy
- Provide **long term certainty** for investors. Establish long term CO₂ reduction and renewable energy targets. Provide long term certainty for emissions trading, longer allocation periods are needed.
- Competitiveness and leakage issues of CO₂ emissions trading need to be solved; International or even **global climate policy framework** is essential for post-2012 period.
- Move towards **EU wide RE certificate trading**, creating an **EU-wide level playing field**
- **Increase public awareness** about environmental effects of conventional power generation, and thus increase acceptance of renewable energy
- Set clear **sustainability criteria** for biomass

Thank you for you attention!

**Questions?
Discussion!**

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