

WP 4 : Regulatory and Market Framework of Energy Markets

State of affairs & WP evolution

Ronnie Belmans
Karolien Verhaegen

- 4.1 Analysis of the current legislation and regulation of the liberalised market, the directives on renewables and CHP, and on emission trading
- 4.2 Specification of “boundary conditions” and “guidelines” for proper functioning of future energy markets

- Liberalised market
 - Current legislation & regulation
 - Future
- RES, CHP & emission trading
 - Current legislation & regulation
 - Reality show: Belgium
 - Future
- Conclusion & future of WP4

- Directives 96/92/EC and 2003/54/EC
- Directorate-Generals involved in energy
 - DG Energy and Transport (DGTREN)
 - DG Competition and DG Environment
- Florence meeting
 - 2/year in Rome, started in 1998 in Florence
 - Member states, Eurelectric, CEER, ETSO &co
 - Discussing the creation of internal electricity market

- Initially too much freedom and long term deadlines
 - 1st Directive 96/92/EC
- Recently less freedom and shorter term deadlines
 - 2nd Directive 2003/54/EC

| | 1 st Directive | 2 nd Directive |
|----------------------|---------------------------|---|
| Eligible customers | 2003 all > 9 GW | 2007 all households |
| Unbundling regulator | Accounts Vague | Legal Explicit on authorities and duties |
| Cross-border trade | Negotiated | Regulated |

- Entry barriers (-)
 - Free entry to generation and supply

| | 1 st Directive | 2 nd Directive |
|--------------------|---|---------------------------|
| Access to the grid | Regulated TPA Negotiated TPA Single Buyer | Regulated TPA |

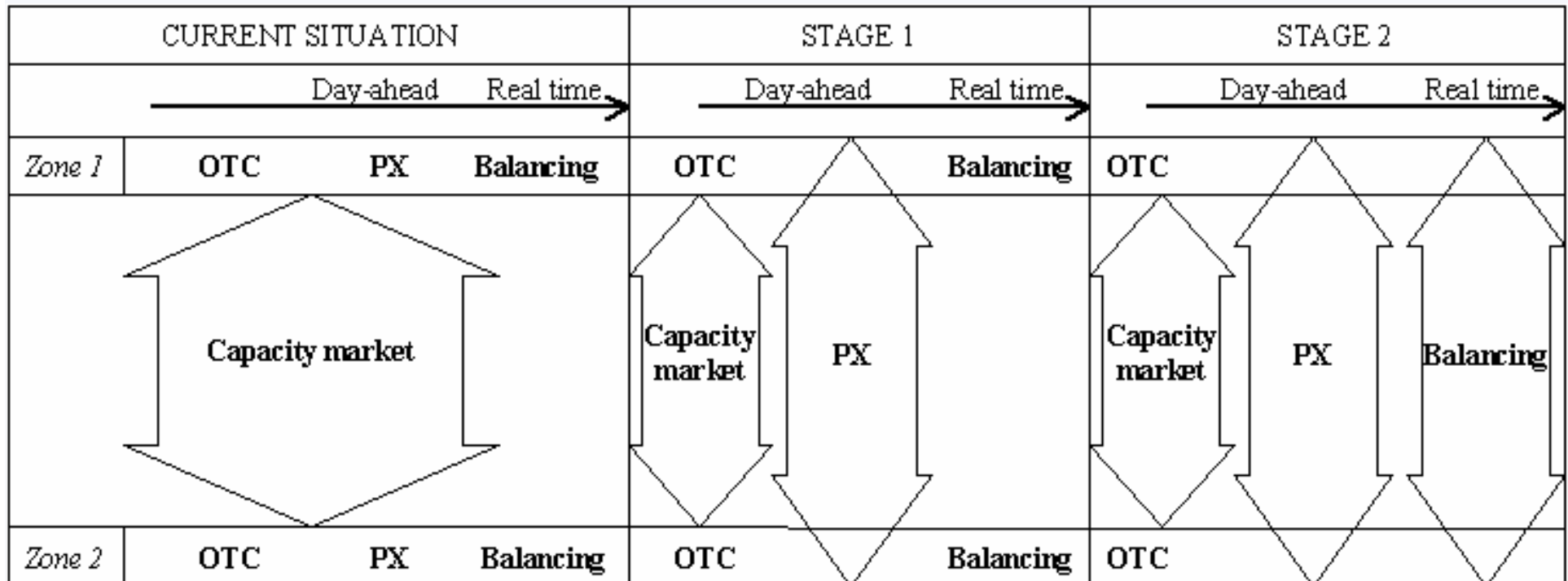
- Germany was only one to use n-TPA

- Liberalised market
 - Current legislation & regulation
 - Future
- RES, CHP & emission trading
 - Current legislation & regulation
 - Reality show: Belgium
 - Future
- Conclusion & future of WP4

Future markets:

Linkage of Member State markets

- **Stop experimenting on Member state basis and consolidate best practices to the European level by gradually improving linkage**
- Stage 1 only PX coordination necessary
- Stage 2 substantial TSO coordination **and harmonization**



- Liberalised market
 - Current legislation & regulation
 - Future
- RES, CHP & emission trading
 - Current legislation & regulation
 - Reality show: Belgium
 - Future
- Conclusion & future of WP4

RES, CHP & emission trading

EC policy framework

- 1997 White paper: Energy for the future – renewable sources of energy
- 2000 Green paper: Towards a European strategy for security of energy supply
- 2001 Directive 2001/77/EC (green policy)
- 2003 Directive 2003/87/EC (Kyoto)
- 2004 Directive 2004/8/EC (CHP)
- 2004 Directive 2004/101/EC (Linking)

- Preliminary indicative action plan 1998-2010
- By 2010: RES 22% of electricity consumption
 - *Only* “Doubling”
 - **very difficult because economic hydro potential already in use**
 - Not legally binding: countries determine own targets and strategies
- Contributions for each type of renewable estimated

- European import dependability problem
 - By 2020 70% of its energy
 - Today 50%
- RES are necessary to increase European security of supply

Directive 2001/77/EC

RES: a lot of freedom

- RES **22%** of electricity consumption by 2010
- *Indicative* targets per country
 - Percentages of total gross electricity consumption
 - **Increase share of RES**
 - **Decrease electricity consumption**
- Transfer into national legislation by Oct 2003

National indicative RES targets

RES-E share of gross electricity consumption



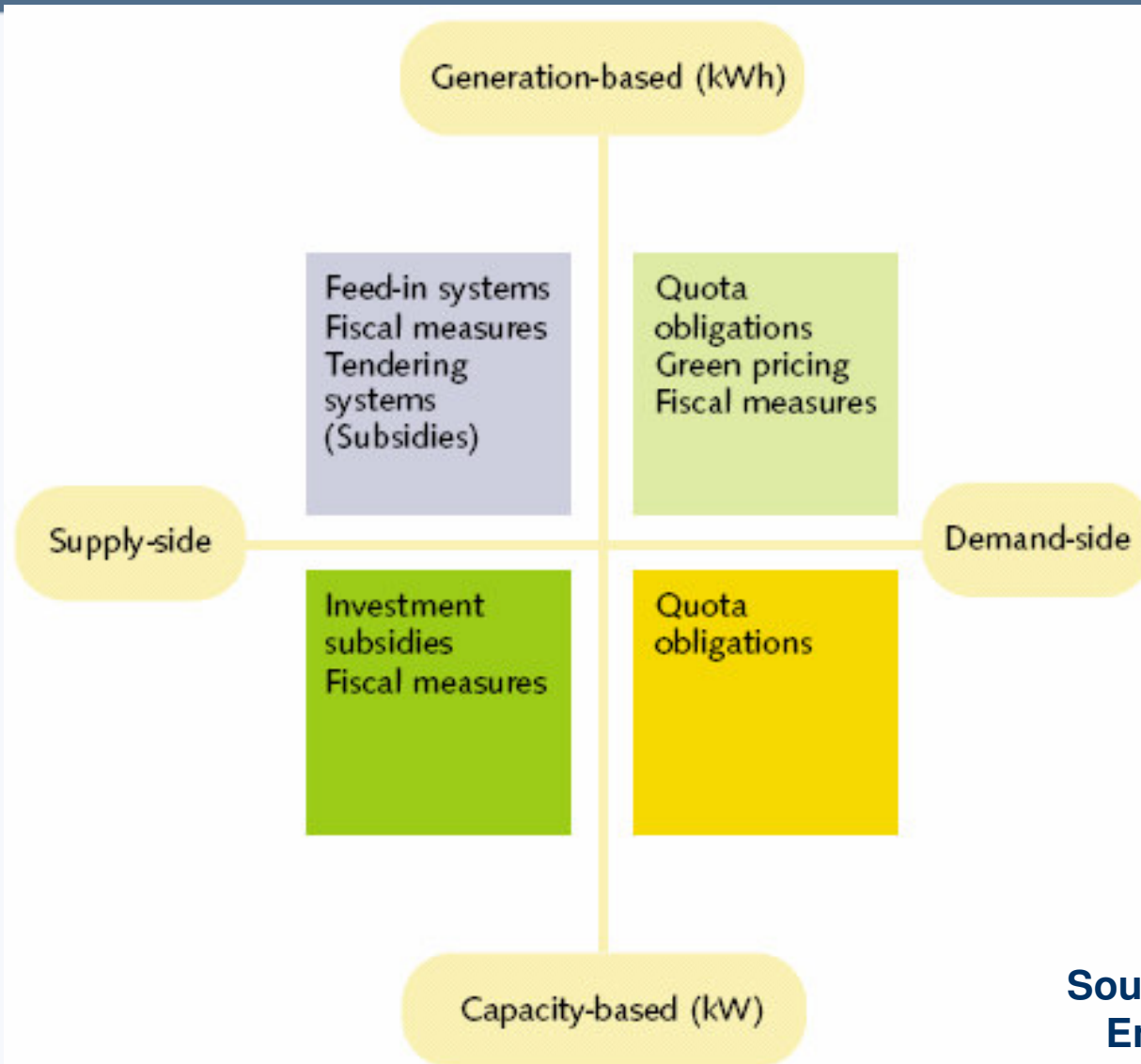
- High efficiency CHP = min. 10% energy savings compared to separate production
- No targets
 - Member States analyze their own potential
- Transfer into national legislation by Feb 2006

- Reduce GHG emissions by 8% from 1990 levels by 2008 - 2012
- Scheme for GHG emission allowance trading
- Imposing limitations on emissions
 - Per Member state with penalty mechanism
 - National Allocation Plans
- Clean Development Mechanism
- Joint Implementation

- JI/CDM credits can be used to fulfill EU ETS obligations
- Transposed into national law by 13 Nov 2005

- No European-wide support scheme enforced
 - Directive 2001/77/EC by 27 October 2005:
 - Report on experience with different mechanisms
 - **cost-effectiveness**
 - Proposal for a Community framework?
 - Min. 7 years transitional period
- ⇒ **no harmonization before 2012**

Available policy instruments to support RES

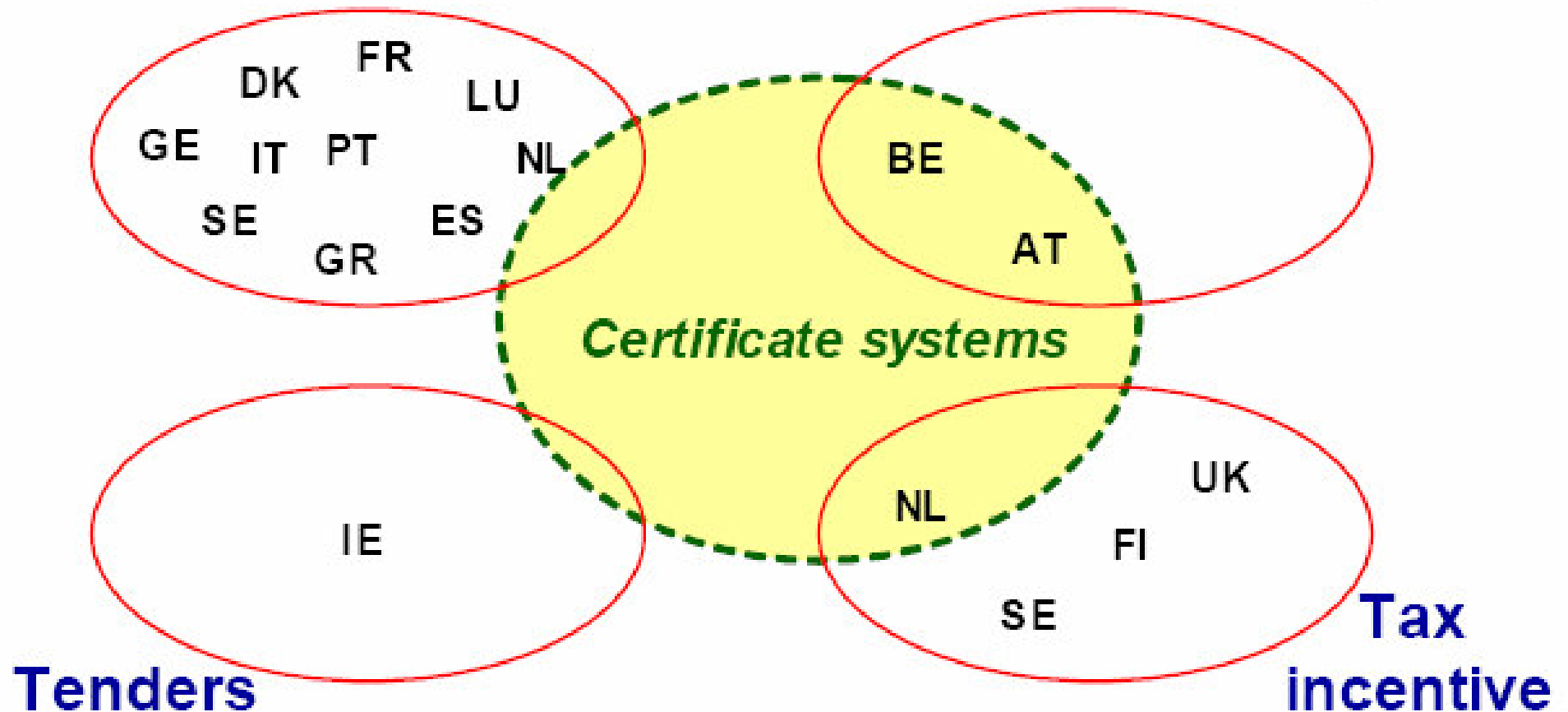


Source: Renewable Energy Journal

Patchwork support schemes (2001)

Feed-in tariffs

RES-E obligation



Source: EC, DGTREN

- Feed-in tariffs
 - Guaranteed price for green producer
 - **Typically long term to encourage investments**
 - Obligation on grid operator to purchase output
- Tendering
 - State places tenders for supply of green electricity
 - Surplus costs are passed on to end consumer

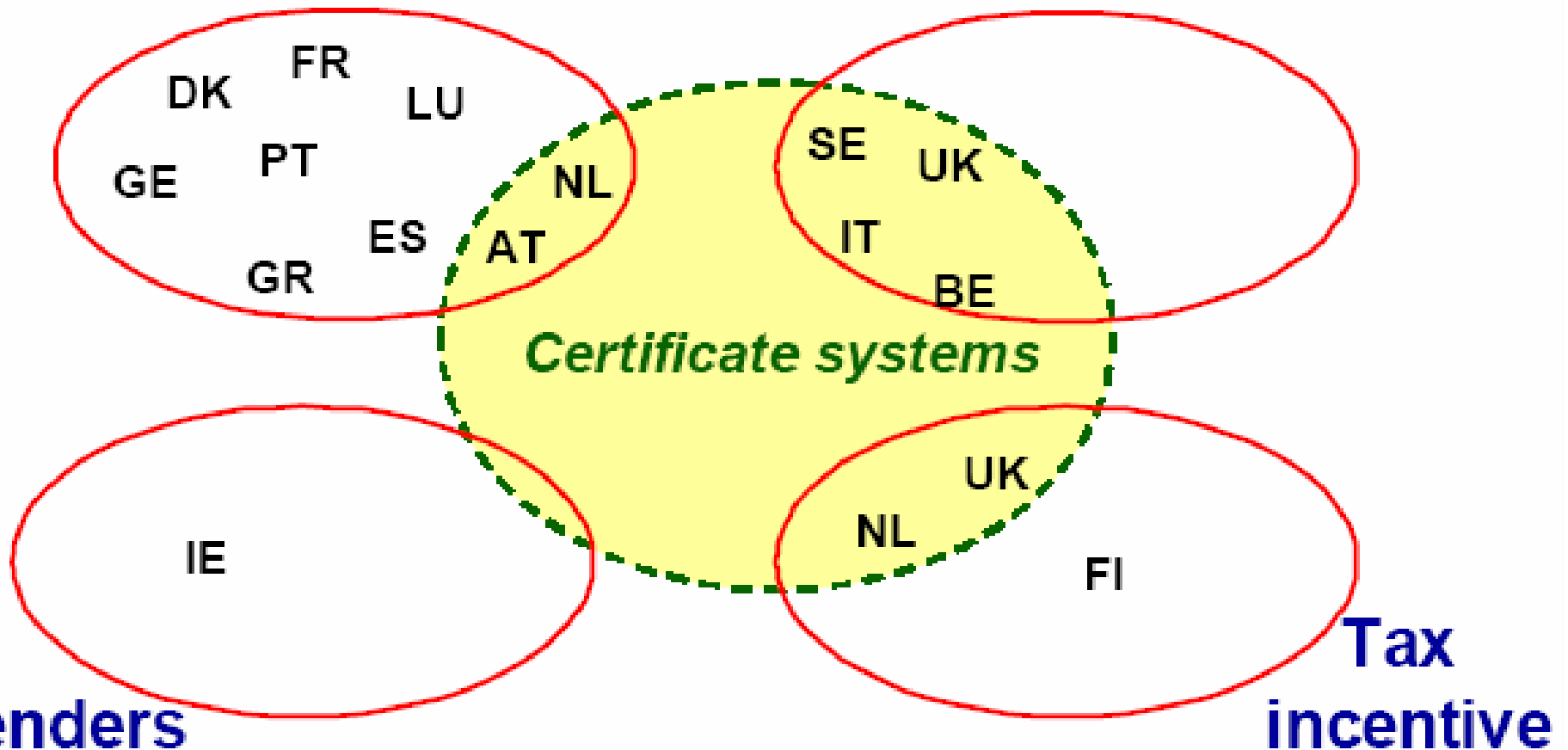
Demand-side Certificates

- Certificates issued for production green electricity
 - Extra income for green producers
 - Hidden taxes
- Supplier buy certificates
 - To avoid fines for not reaching a quota
 - Product differentiation: guaranteeing the supply of green energy to end users

2003: Tendency towards certificates and feed-in tariffs

Feed-in tariffs

RES-E obligation

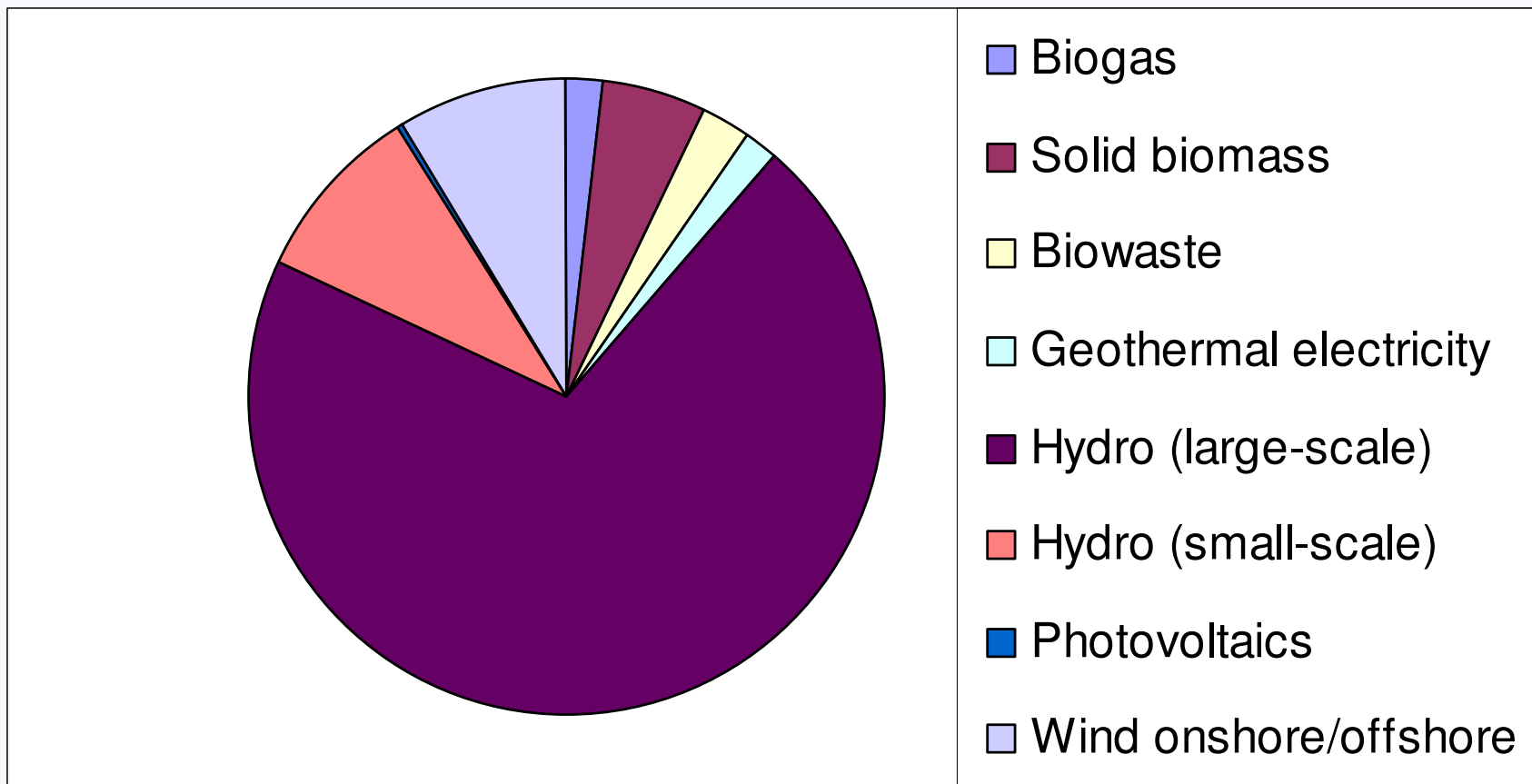


Source: EC, DGTREN

Reality show

How far are we: **2001 EU15**

RES share in total consumption: **15,20%**

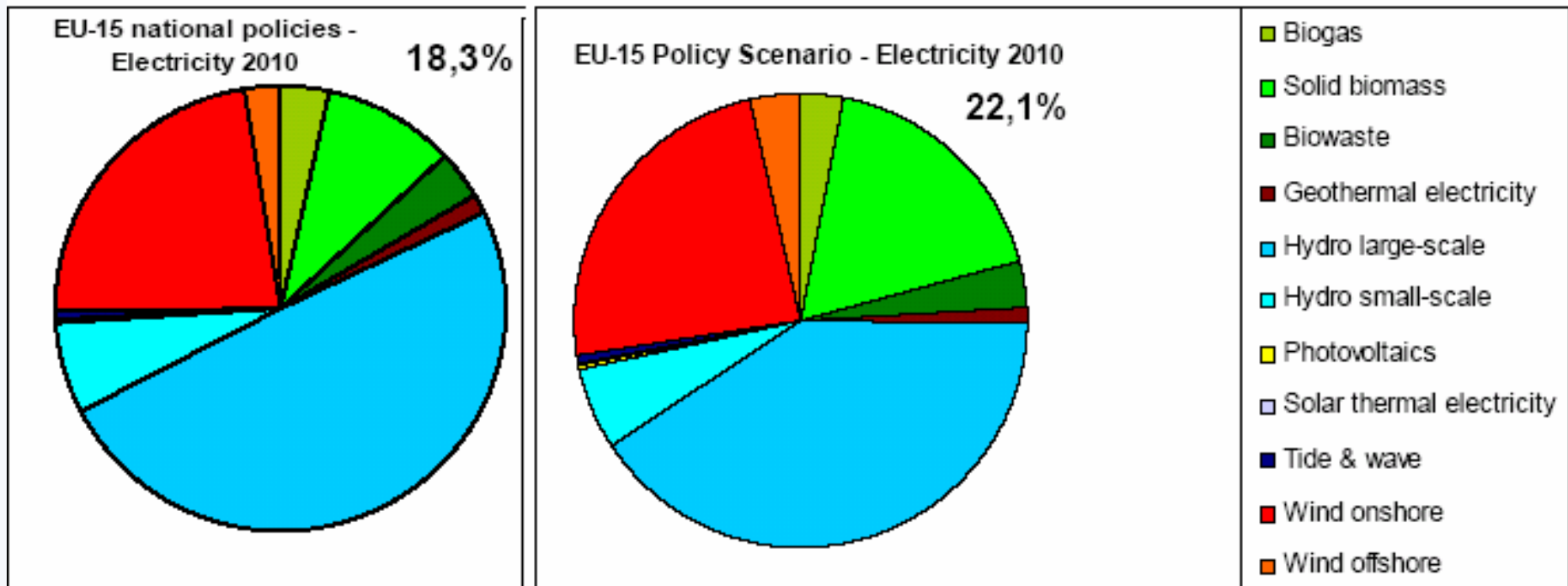


Reality show

DGTREN: Not reaching targets!

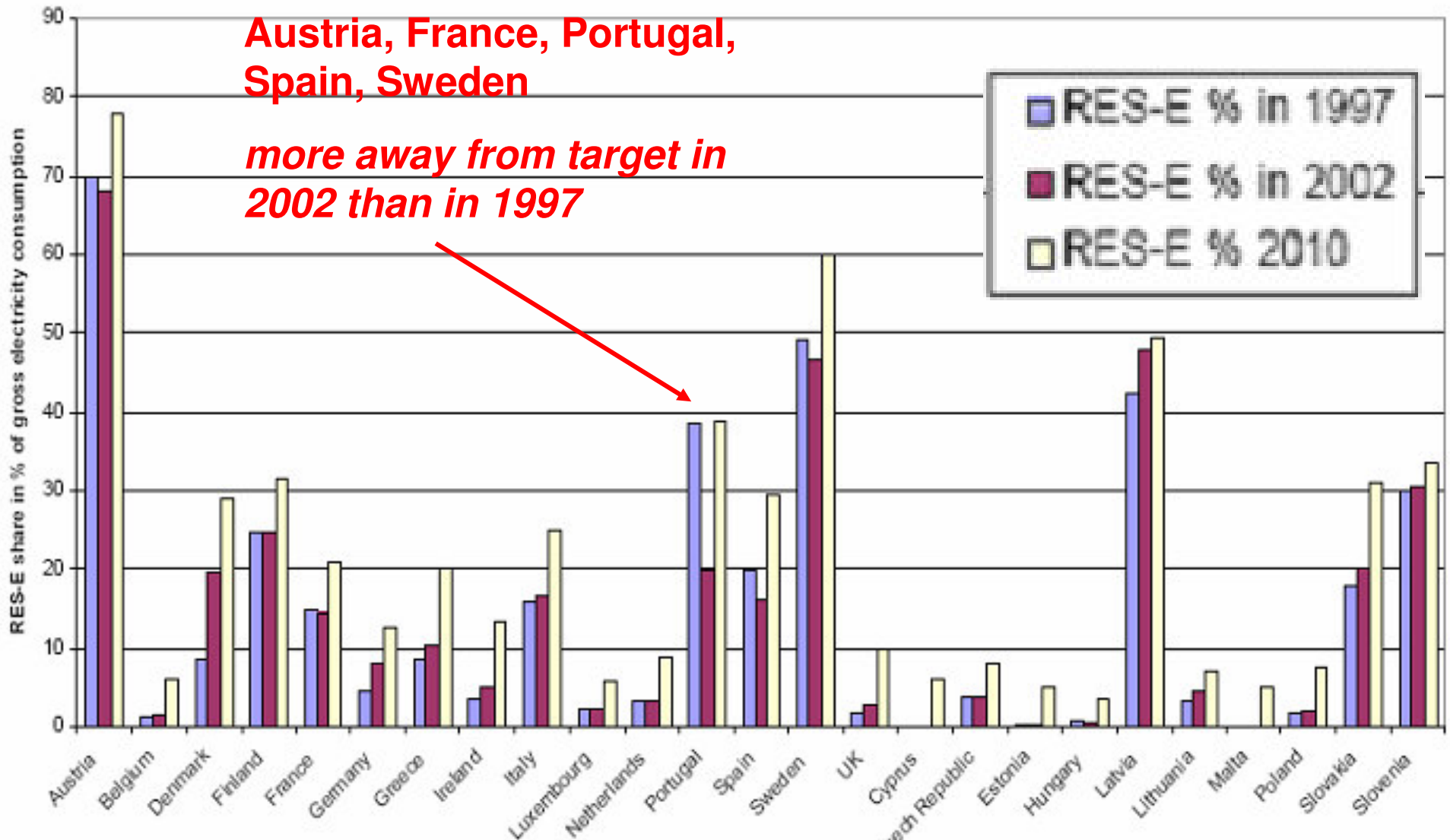
- 18% - 19% RES by 2010 instead of 22%
- **Current policies not enough !**

RES-E share in 2010 – current national policies vs. practicable scenario



Reality show

Not reaching targets



- Liberalised market
 - Current legislation & regulation
 - Future
- RES, CHP & emission trading
 - Current legislation & regulation
 - Reality show: Belgium
 - Future
- Conclusion & future of WP4

Table 8.2 Environmental Policy Framework: Electricity generation

| | main RES support mechanism | Net addition to generation 2003 (MW) | | | |
|----------|------------------------------------|--------------------------------------|-------------|-----------------|-------|
| | | net new coal/oil | net new gas | net new RES/CHP | other |
| Austria | feed in tariff | 0 | 0 | +340 | 0 |
| Belgium | green certs. and fiscal incentives | 0 | 0 | +80 | 0 |
| Denmark | feed in tariff | 0 | 0 | +350 | 0 |
| Finland | fiscal investment subsidies | 0 | 0 | +20 | +55 |
| France | obligation (tender) | -500 | -10 | +285 | 0 |
| Germany | feed in tariff | 0 | 0 | +2900 | 0 |
| Greece | feed in tariff plus subsidies | +380 | 0 | +110 | 0 |
| Ireland | obligation (tender) | - | - | - | - |
| Italy | green certificates | -350 | +1740 | +450 | +240 |
| Lux | feed in tariff | - | - | - | - |
| Neth | obligation (green certs) | +800 | 0 | - | 0 |
| Portugal | feed in tariff | 0 | +392 | - | 0 |
| Spain | feed in tariff | 0 | +1600 | +1300 | +117 |
| Sweden | obligation (green certs) | 0 | 0 | +250 | + |
| UK | obligation (green certs) | 0 | -250 | +750 | 0 |

Source: EC Fourth Benchmarking Report, 2005

- If objective is RES-E quota (and not Kyoto)
 - Certificate system: not a bad choice
 - Keeps costs under control
 - Incentives to increase installed capacities
 - Market based
 - Guarantees cost-efficiency
 - **When implemented properly!**

Source:
Pepermans

- Federal state, 3 *regions*
 - Flanders, Walloon, Brussels
- Energy: regional and federal competence
 - Regional: promotion RES/CHP
 - Federal: Offshore windmills
 - **Territorial waters are a federal competence**

- Different RES certificates per region
- + Federal certificates for offshore wind
- ⇒ **4 different RES certificate systems**
- **+**
- **separate CHP certificates in Flanders !!!**
 - Walloon, Brussels: same certificate for CHP&RES

- Quota imposed on suppliers
 - Fine for not reaching quota
- Issuing body of certificates: regulators
- Guaranteed minimum prices

Reality show: Belgium

Differences in certificates

- Issuing of certificates
 - Flanders: monthly
 - Walloon: every 4 months
- Submission of certificates
 - Flanders: yearly
 - Walloon: every 4 months

Reality show: Belgium

Differences in certificates

- Who receives certificates
 - Flanders & Brussels: hydraulic systems $P < 10\text{MW}$
 - Brussels: only systems < 10 years
 - Flanders: only CHP installations $> 1.1.2002$
- and how much?
 - E.g. Co-combustion
 - Flanders: 2 separate installations \Rightarrow % certificates
 - Walloon: 1 installation \Rightarrow no certificates

Reality show: Belgium

Differences in certificates

- Quota and penalty/missing certificate (2005)
 - Directive: Belgium 6 % by 2010

| | Quota | Penalty |
|--------------|--------|--------------------|
| Flanders RES | 2,5 % | € 125 |
| Flanders CHP | 1,19 % | € 40 |
| Walloon | 5 % | € 100 |
| Brussels | 2,25 % | € 75 (2007: € 100) |

Reality show: Belgium

Differences in certificates

- Issuing base: 1 certificate =
 - Federal 1 MWh RES-E
 - Flanders RES 1 MWh RES-E
 - Flanders CHP 1 MWh of primary energy saved
 - Walloon 456 kg CO₂-emission avoided
 - Brussels 217 kg CO₂-emission avoided

Reality show: Belgium

Differences in certificates

- Differences in issuing base \Rightarrow differences per MWh RES-E produced in
 - Number of certificates
 - Financial value
 - **Assumption: value certificate = penalty**

| | | Flanders | Walloon | Brussels |
|-------------|-----------------|----------|---------|----------|
| Wind | # cert/MWh | 1 | 1 | 1,8182 |
| | Penalty (€/MWh) | 125 | 100 | 136 |
| Biomass CHP | # cert/MWh | ~ 0,3 | ~ 1,8 | ~ 3 |
| | Penalty (€/MWh) | 13 | 179 | 234 |

Source: VREG, CWAPE

Reality show: Belgium

Differences in certificates

- Guaranteed minimum prices
 - Walloon: € 65 instead of certificate
 - No differentiation by technology
 - Green producer chooses: certificate or €65
 - Flanders: DSO's pay minimum prices
 - Differentiated by technology
 - Federal: TSO Elia pays minimum prices
 - Differentiated by technology
 - For Flemish, Walloon, Brussels & federal certificates
 - Only installations < 10 years

Reality show: Belgium

Differences in certificates

| | Flemish DSO's (per certificate) | TSO Elia (per MWh) |
|--------------------------|------------------------------------|-----------------------|
| Off-shore wind | | € 90 (future: €107) |
| On-shore wind | € 80 | € 50 |
| Hydro energy | € 95 | € 50 |
| Solar energy | € 450 from 2006 | € 150 |
| Other RES, incl. biomass | € 80 | € 20 |

- DSO's & Elia sell certificates back on the market
 - Costs minimum prices partly recovered
 - Difference minimum – market price: included in tariffs

Reality show: Belgium

Differences in certificates

- Guaranteed minimum prices Elia: per MWh
 - Differentiated by technology
 - No distinction in minimum price per region
 - However, \neq certificates represent \neq efforts
 - **Green certificate = RES & CHP?**

| | | Flanders | Walloon | Brussels |
|---------------------|-------------|----------|---------|----------|
| MWh per certificate | Wind | 1 | 1 | 0,55 |
| | Biomass CHP | ~ 3,33 | ~ 0,55 | ~ 0,33 |

Reality show: Belgium

Federal offshore certificates

- Guaranteed minimum price Elia: € 107
 - ↔ onshore: € 50
- For 20 years instead of 10
- Elia finances 1/3 of undersea cable
 - max €25 million
- Balancing tolerance margin: 30 instead of 10%

⇒ **Difference feed-in???**

Reality show: Belgium

Minimum prices solar energy

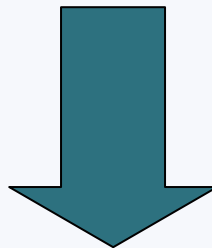
- Market price limited by penalty
 - Flanders € 125
- Minimum prices solar energy > penalty
 - Elia € 150
 - **So far, only Flemish PV certificates offered to Elia**
 - Starting 2006: DSO's € 450

⇒ **Difference feed-in???**

- Liberalised market
 - Current legislation & regulation
 - Future
- RES, CHP & emission trading
 - Current legislation & regulation
 - Reality show: Belgium
 - Future
- Conclusion & future of WP4

- Fluctuations in certificate price can be large
 - Lack of liquidity in limited market
 - Demand and supply shifts
 - Negative for potential investors
 - Solutions:
 - **Futures market, long-term contracts**
 - **Borrowing & banking**
 - **Floor and ceiling prices**
 - **⇒ International trade of certificates**

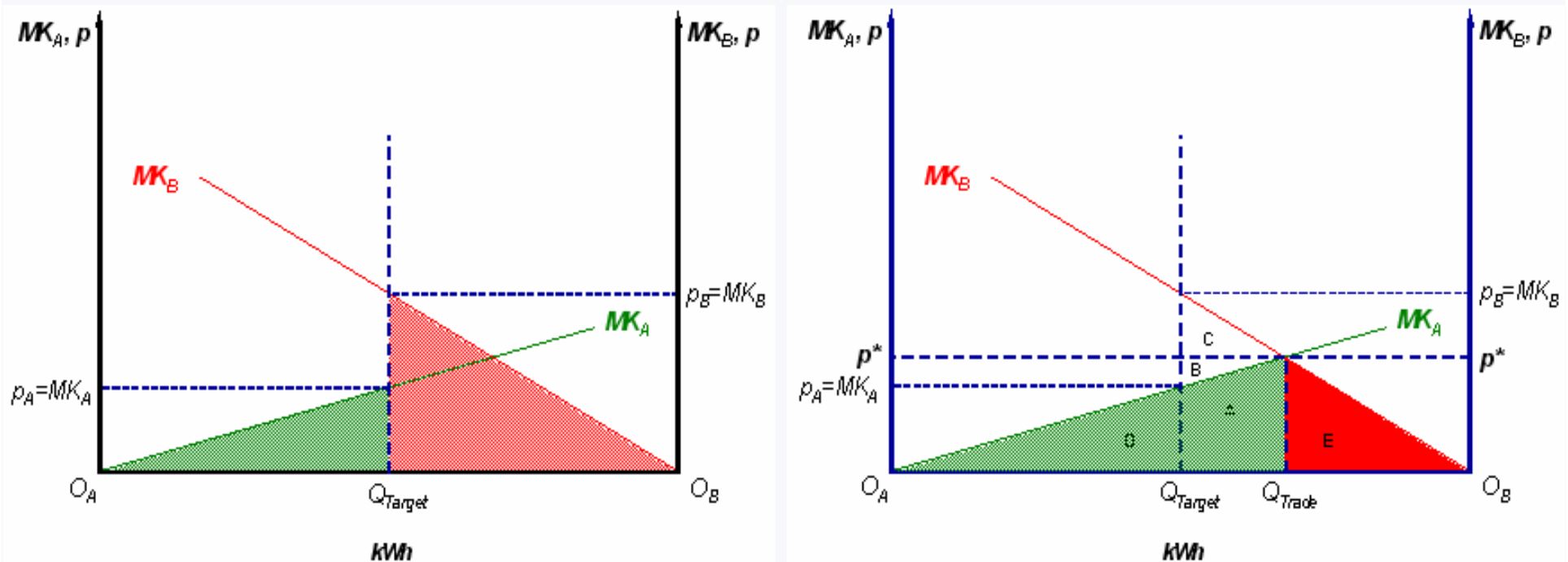
- Harmonization of RES support
- Mandatory targets
- International trade in harmonized market



- **International certificate trading system**
“Produce the product where it is most efficient to do so”

Economic theory – International certificate trade

- If goal is achieving a RES target
 - Cost efficiency improved with international trade



Source:
Pepermans

International certificate trade

Considerations

- Mutual acceptance of certificates for quota
- Technical equality
 - Certificates/electrical energy
 - Calculation electrical energy
- Unilateral interventions $><$ multilateral market
 - Changes in quota or penalties distort the market
- Financial equality
 - Equal penalties

- Include information on environmental performance of RES type in certificates
 - Emissions of CO₂, SO_x, dust, ...
- Eventually fit in with CO₂-emission trading system

- Liberalised market
 - Current legislation & regulation
 - Future
- RES, CHP & emission trading
 - Current legislation & regulation
 - Reality show: Belgium
 - Future
- Conclusion & future of WP4

- EU-wide information on regulation & legislation
 - Liberalization
 - RES & CHP
 - Emission trading?
 - **Linking Directive 13 Nov 2005**
- Reality can be different due to implementation
- ⇒ Reality checks necessary!!!
 - Input of partners is required

- Country reports finalized in coming weeks
 - Send out to perform reality checks
- Other views on future energy market?

- Contact:
karolien.verhaegen@esat.kuleuven.be