Support systems for renewable energies

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***Renewable energy sources* (RES)…**

- ***reduce CO_2 emissions***
- **decrease import dependency** by **diversifying sources of production**
- **create competitive industries with lead market potential**.

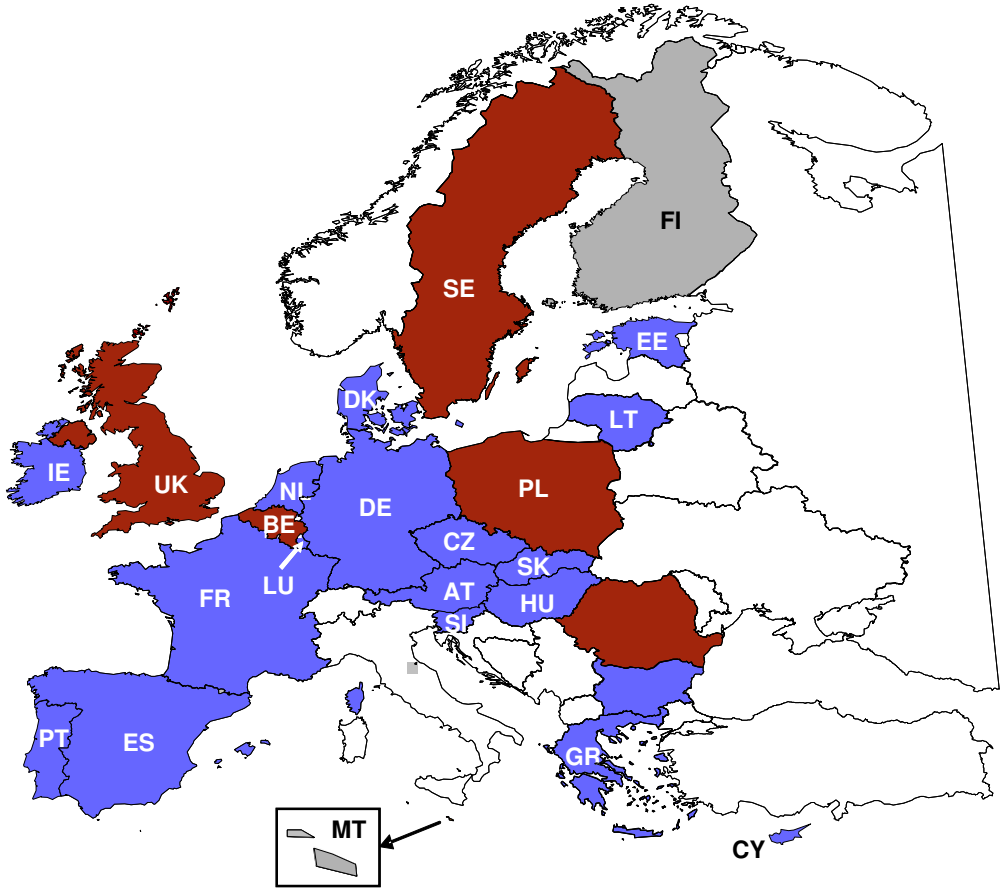
Recent policy developments in Europe …

7 December 2005 & 23 January 2008	The Commission publishes evaluation of support schemes **"The support of electricity from renewable energy sources"**
10 January 2007 …	The Commission publishes the **Renewable Energy Road Map** (COM (2006) 848 final)
9 March 2007 …	The Council of the European Union agrees … → to increase **RES-share in EU energy mix** up to **20% by 2020** → on **binding overall RES target for each Member State** → ***National targets*** covering the ***whole energy sector***. → Minimum ***10% biofuels*** in each Member State.
23 January 2008 …	The Commission publishes the **Proposal of the new RES directive** …

*… the overall 20% target for RES was broken down into **national RES targets** for 2020 …*

Main policy instruments used in EU Member States and their past success

Dominating support schemes for RES-E in the EU



- Feed-in tariff
- Quota / TGC
- Feed-in tariff and Quota / TGC
- Tax incentives / Investment grants
- Other system

A clear majority of EU countries uses feed-in tariffs as main instrument
6 countries have implemented a quota obligation with TGCs

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SEC(2008) 57

COMMISSION STAFF WORKING DOCUMENT

The support of electricity from renewable energy sources

"This report presents an updated review of the performance of support schemes using the same indicators presented in the 2005 report. It finds that, as in 2005, well-adapted feed in tariff regimes are generally the most efficient and effective support schemes for promoting renewable electricity."

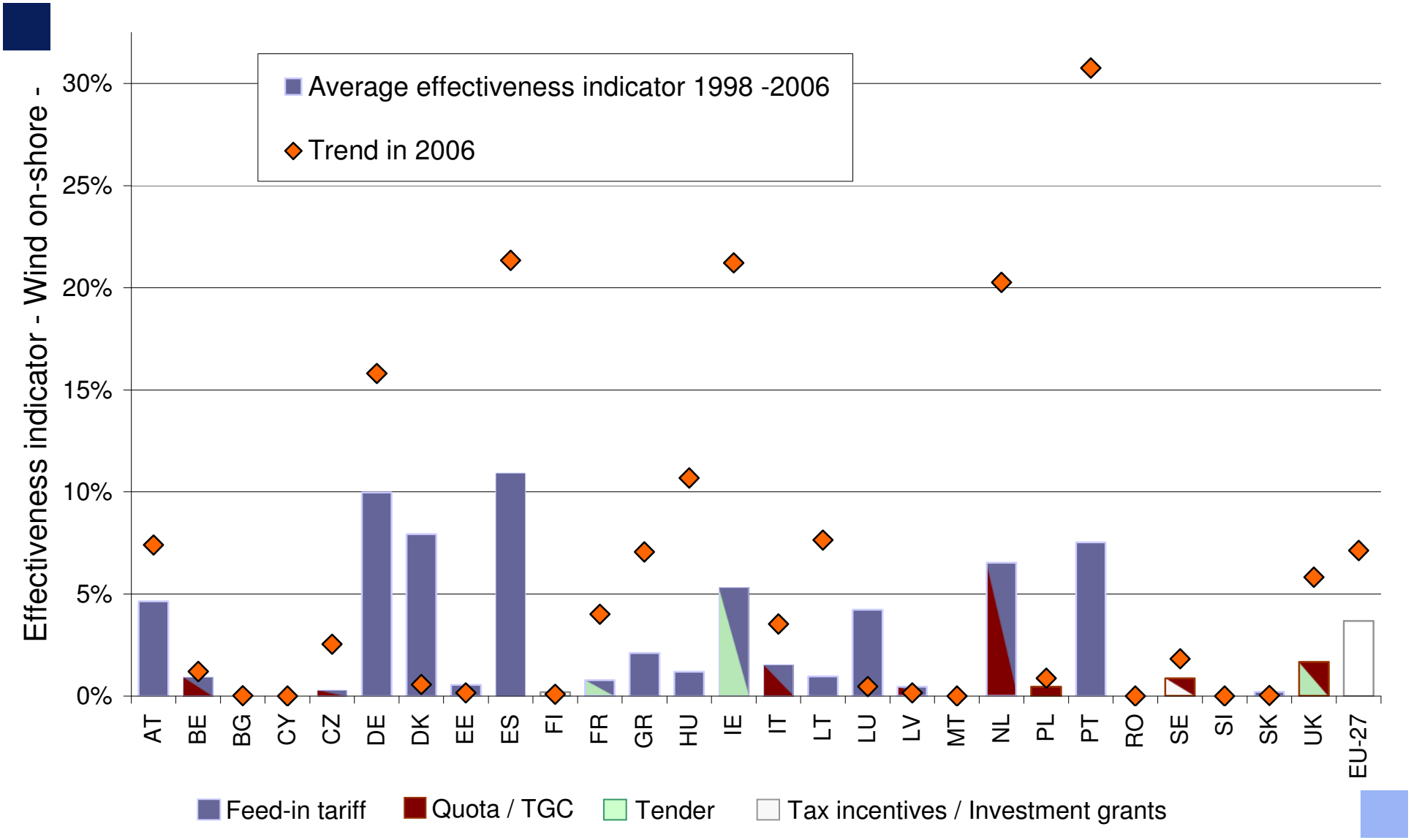
Measuring the effectiveness of RES-E support

Indicator used: **absolute growth of normalised generation as ratio of the additional potential**

$$E_n^i = \frac{G_n^i - G_{n-1}^i}{ADD - POT_n^i}$$

E_n^i	Effectiveness indicator for RES technology i for the year n
G_n^i	Existing electricity generation potential by RES technology i in year n
$ADD-POT_n^i$	Additional generation potential of RES technology i in year n until 2020

Effectiveness for wind on-shore in the period 1998-2006 in EU-27



Support level and country specific costs

1. **Long run marginal costs** of different technologies based on

$$C = C_{VARIABLE} + \frac{C_{FIX}}{q_{el}} = \left(C_{FUEL} + \frac{C_{O\&M}}{H} * 1000 \right) + \frac{1000 * I * CRF}{H}$$

$$CRF = \frac{z * (1+z)^{PT}}{\left[(1+z)^{PT} - 1\right]}$$

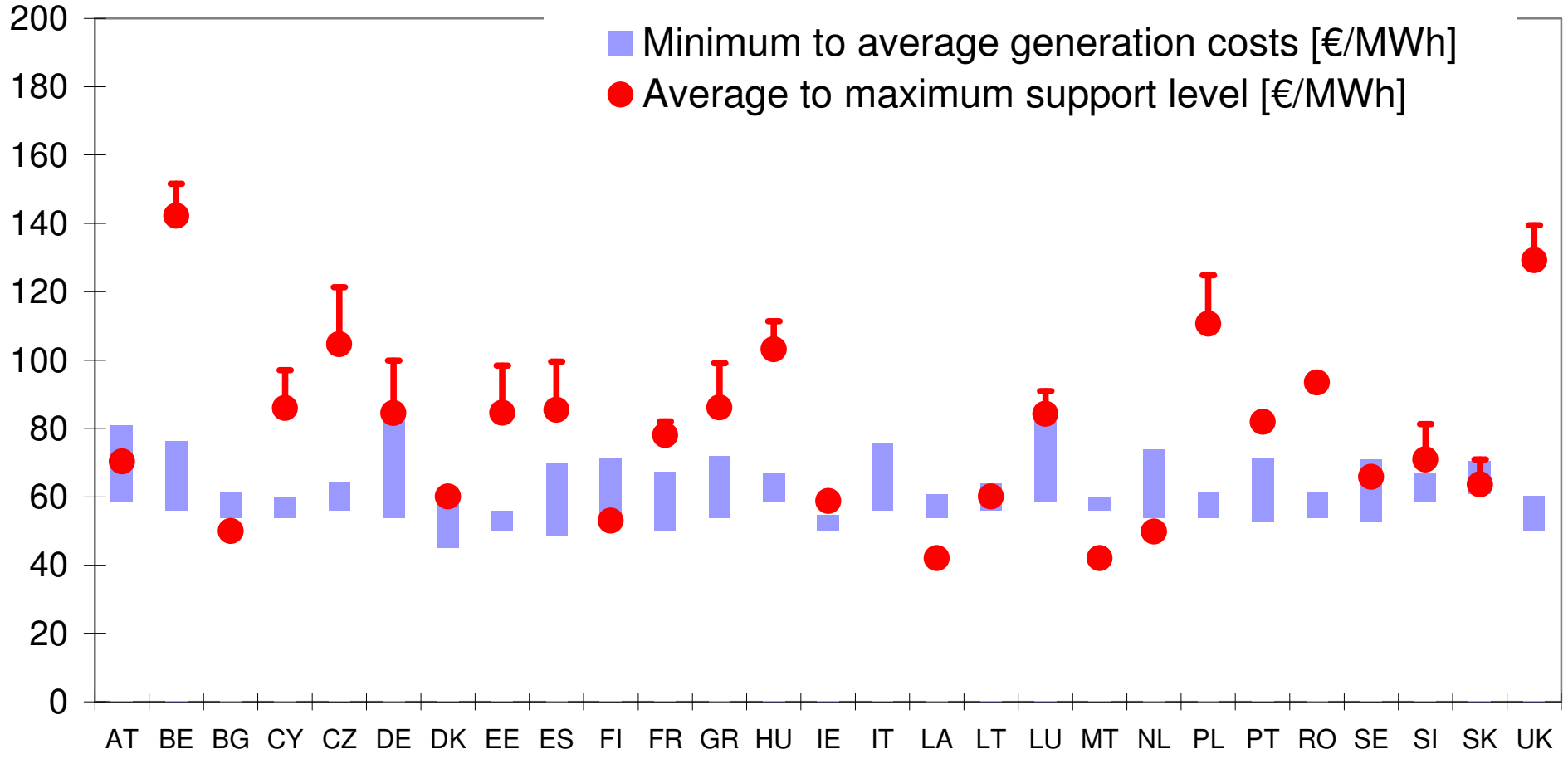
PT: payback time - 15 years

Z: interest rate - 6.5%

H: Full load hours

2. **Support level** in different countries – levelised to a uniform duration of the instrument given by the lifetime

Support level vs. costs for wind on-shore in the EU



The investor's perspective– Calculating the levelised profit

Analysis of the **direct support for wind onshore** reflecting further on:

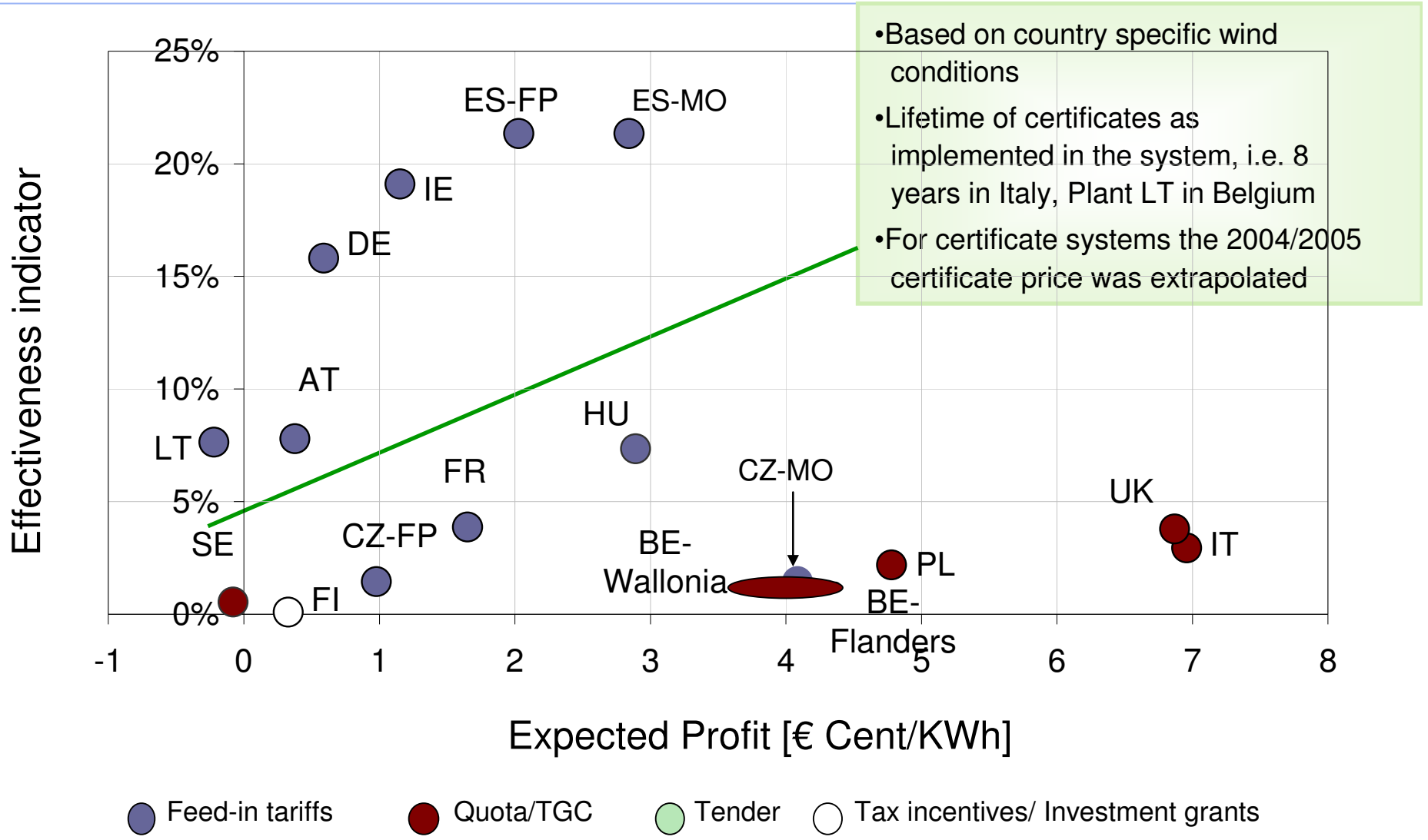
- the duration of support
- country specific cost-resource conditions
- the interest rate in different countries

These issues are considered by the annuity of an investment:

$$A = \frac{i}{(1-(1+i)^{-n})} * \sum_{t=1}^{n} \frac{\text{Cash Inflows}_t - \text{Cash Outflows}_t}{(1+i)^t}$$

A= annuity; i=interest rate; t=year; n=technical lifetime

Correlating the levelised profit with the effectiveness indicator



Example of wind onshore in 2006

General conclusions

- Not the expected profit but the potential risk determines the effectiveness!
- The effectiveness of various RES-E support schemes largely depends on the maturity and the credibility of the system.
- A stable planning is important to create a sound investment climate and to lower social costs as a result of lower risk premium.
- Administrative barriers can have a significant impact on the effectiveness of an instrument and hamper the effectiveness of generally very powerful policy schemes.
- Effective instruments for RES-E support are frequently economically efficient as well!

Way forward – general design criteria

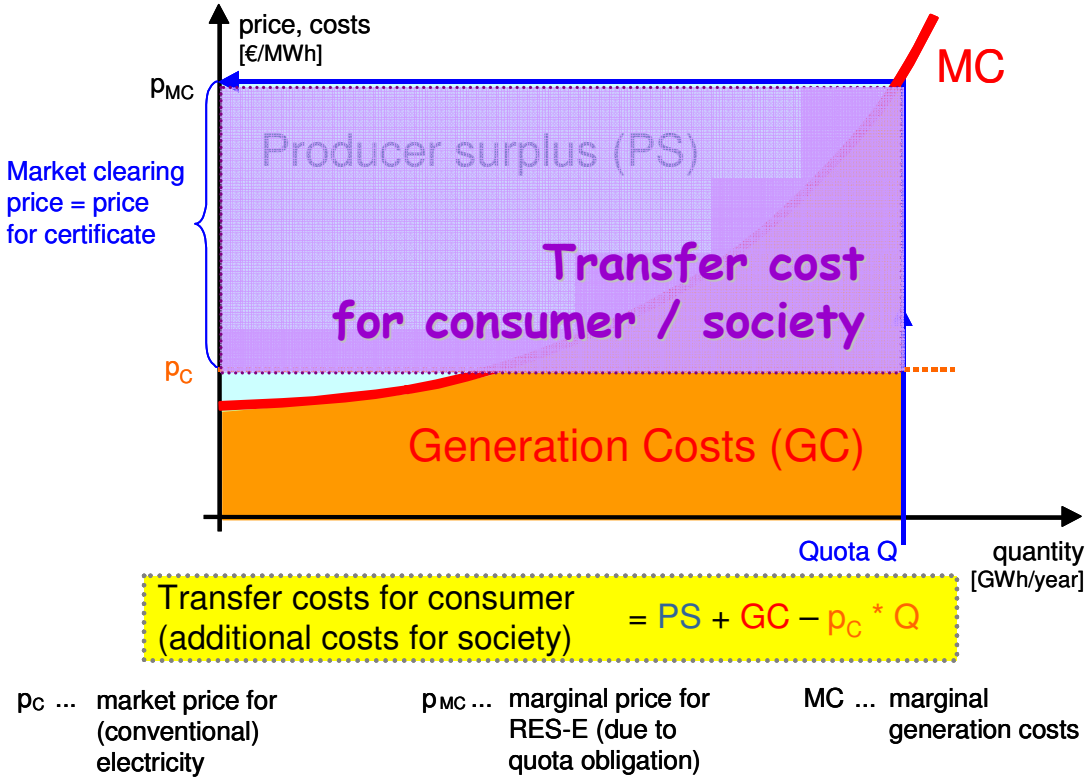
Ensure effectiveness, reduce risks to investors, minimise cost for consumers

- Set long term, sufficiently ambitious but realistic targets
- Policy stability & investor security – mitigate risks on return!
- Remove non economic barriers, administrative, legal, grid,…
- Existing capacities and new capacities should not be mixed
- Duration of support for new capacities should be restricted
- Technology specific support systems should be implemented

Core Objective – Creation of efficient policy schemes

Key criteria for efficient policy instruments

- *Minimise generation costs*
- *Lower producer profits*
- *Reduce risk for investors*



General recommendations regarding RES support schemes in North Africa

► Subsidies for conventional electricity constitute a major obstacle for renewable electricity in most countries

► Monopolistic utilities can be a relevant barrier for a faster diffusion of RES

► There should be significant ambitions and support schemes also for the national promotion of RES in the exporting countries

Thank you for your attention

Contact

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