



# Implementing the 2020 RES-Directive - challenges for the future design of national renewable energy policies

Mario Ragwitz

Fraunhofer Institute Systems and Innovation Research

## Erneuerbare Energien in der EU und am Oberrhein

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# Climate change: a main driver for technology innovation

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- "Climate Change is the greatest environmental challenge of the 21st century" – Tony Blair
- Besides **climate change - security of supply and economic competitiveness** constitute the main challenges in the energy sector
- "**Carbon pricing** alone will not be sufficient to reduce emissions on the scale and pace required ... **deployment incentives** for low emission technologies should increase two to five times ... **public energy R&D funding** should double" – Stern Review
- An **active innovation policy** in the energy sector can become one of the most important pillars for fulfilling the Lisbon objective for Europe

# Main policy development on EU level

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## EU Renewable Energy Directive 2009/28/EC

- **New Directive was passed in December 2008**
- **Targets for 2020:**
  - **20% renewable energy in final energy consumption**
  - **Binding targets for Member States**
- **National support schemes will remain the cornerstones for the deployment of renewables in Europe**
- **Flexibility mechanisms between Member States**
  - **Statistical transfer**
  - **Joint projects**
  - **Joint support schemes**
  - **Physical imports from third countries**
- **Measures to reduce non-economic barriers (particularly reduce administrative, regulative, grid related barriers)**

## Main policy developments on MS level


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- **Countries start to adapt ambition level of their policies to target level, e.g. banding of quota system in RO, IT and UK, new tariff levels for RES-E in DE, NL and SI, UK feed-in system for RES-E and RES-H**
- **MSs start to analyse the impact of specific flexibility measures on their renewable energy sector, first talks between different MSs and between MSs and third countries**
- **Little progress on the reduction of non-economic barriers**
- **Financing constraints have been significant during last years**
- **National Renewable Energy Action Plans currently under evaluation**

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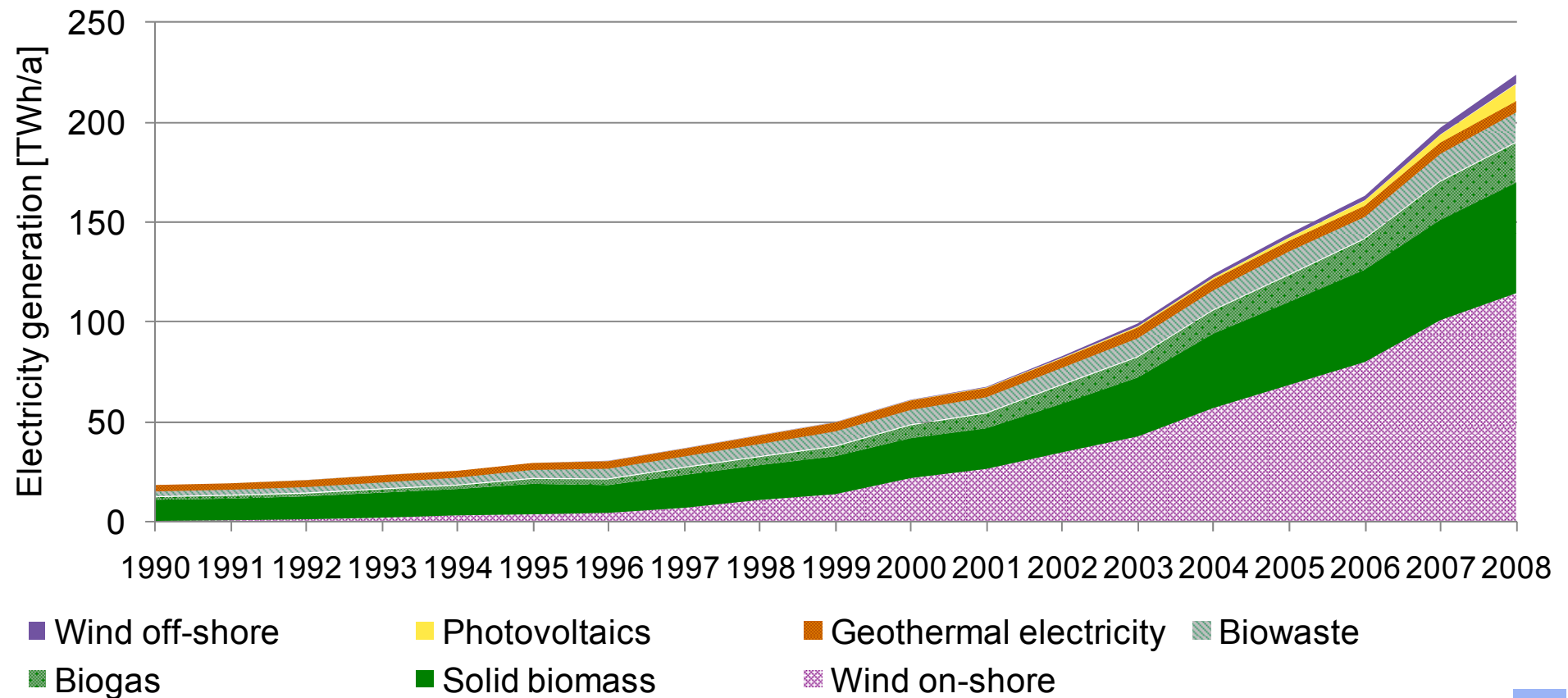


Historic Experiences:  
Effectiveness and efficiency of currently  
implemented policies in the EU

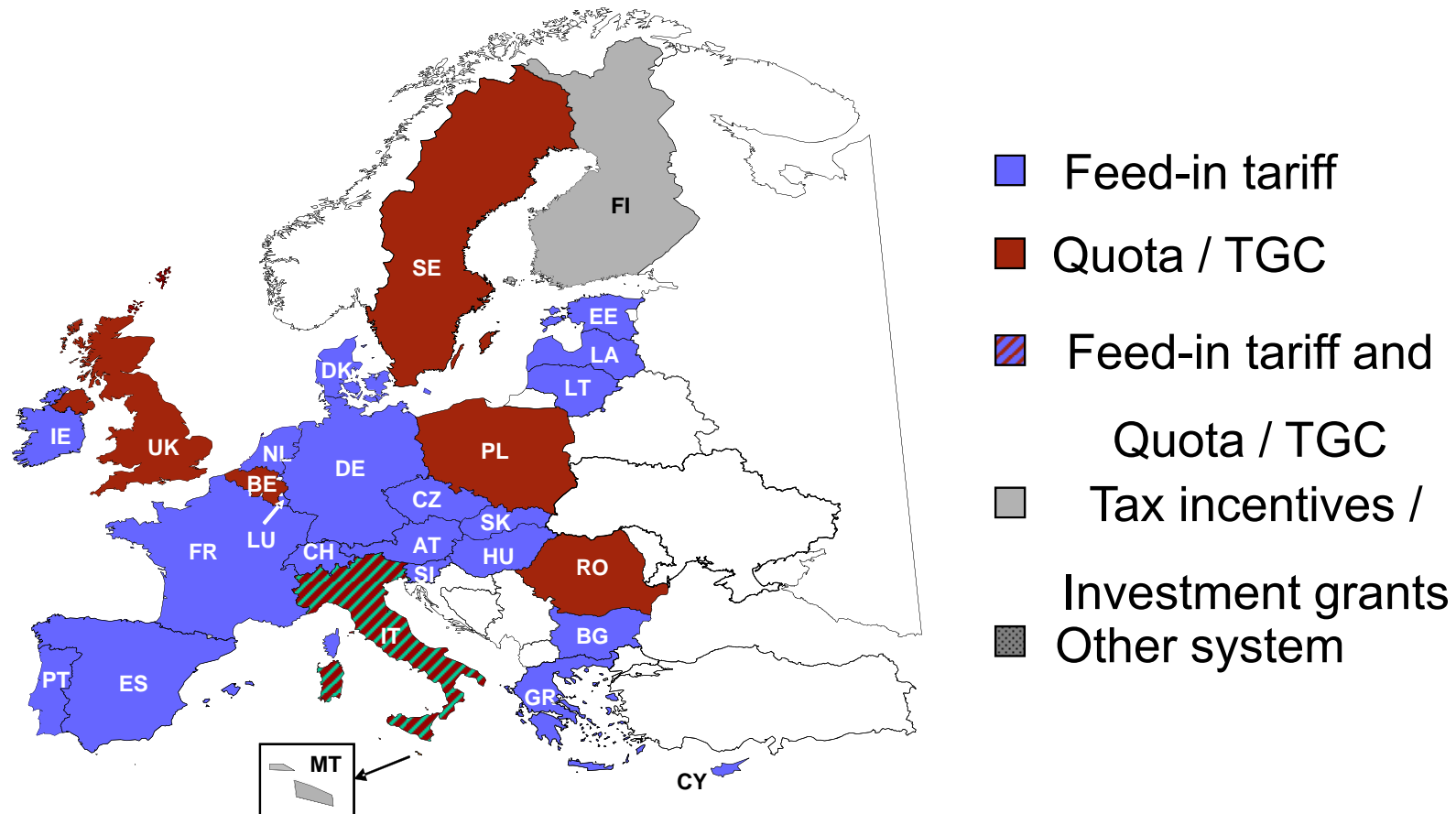
# Historical development of new RES-E in the EU-27

## ▶ "New Renewables" in the EU-27

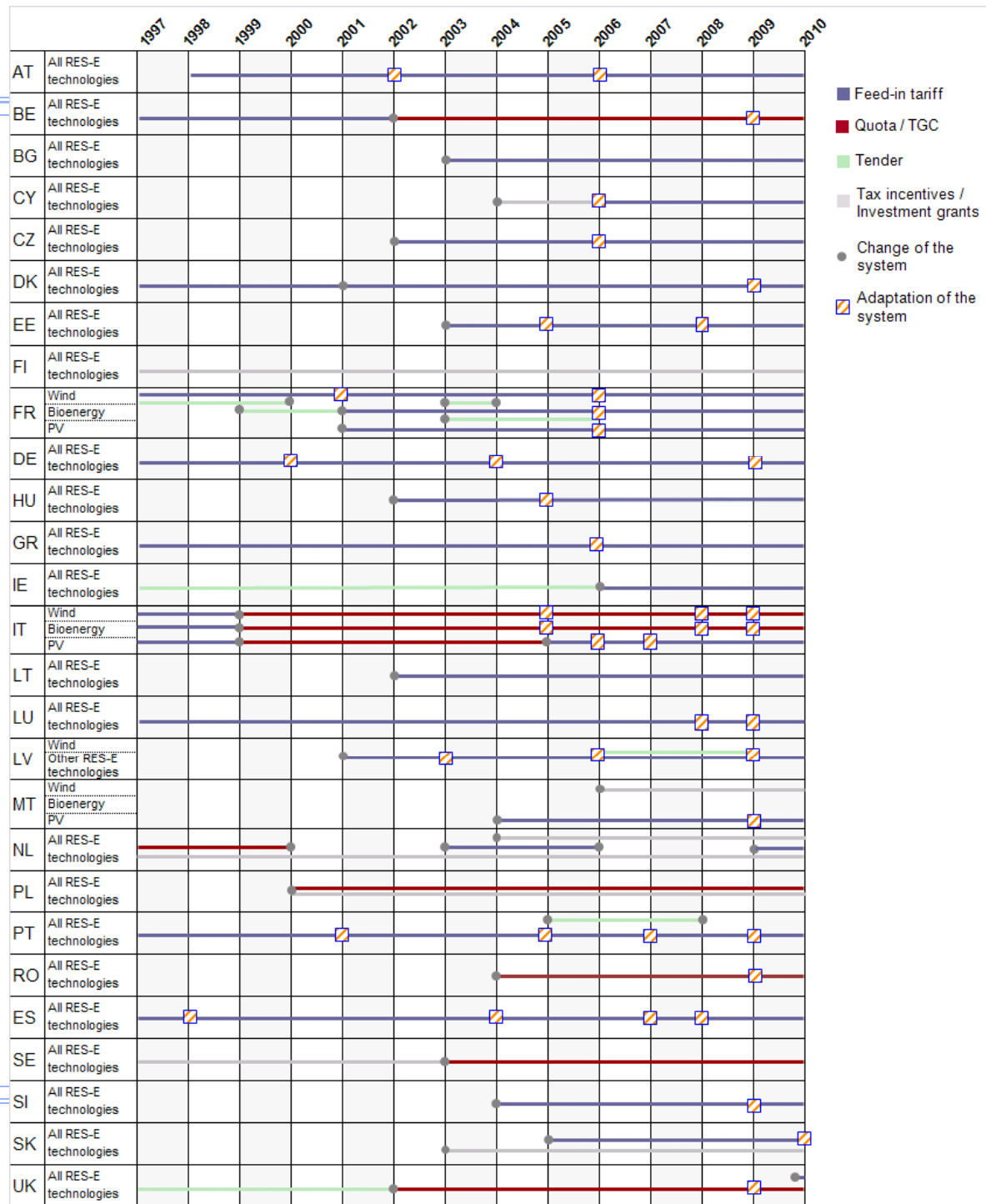
- ▶ Dominating: Wind energy (in the EU-15) & Biomass (in the new member states)



# Dominating support schemes for RES-E in the EU



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



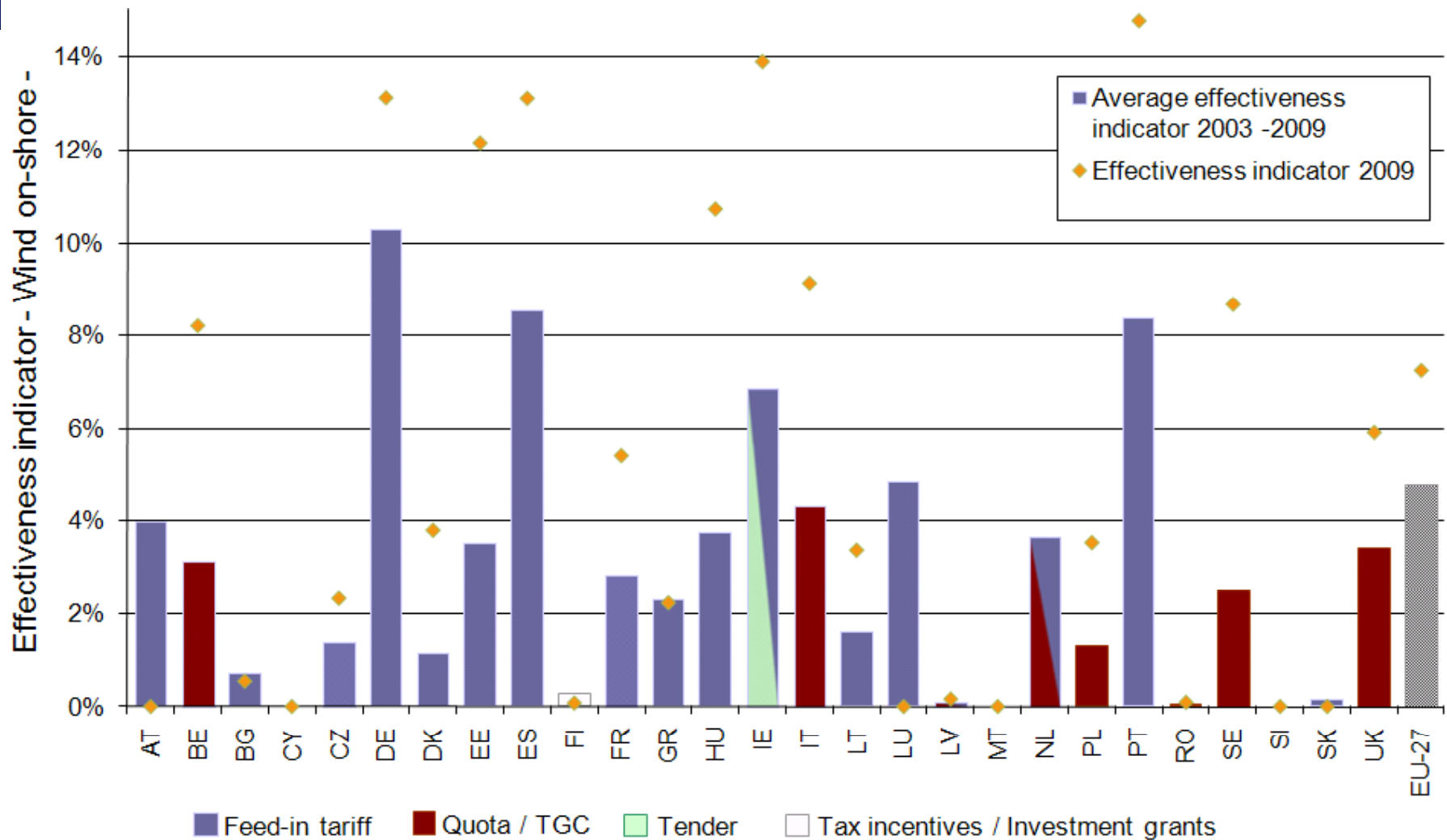
## Measuring the effectiveness of RES-E support

1. **Relative or absolute growth rates** are typically used to demonstrate the achievements of countries, however both measures are biased
2. Better measure to judge the performance is the **absolute growth as ratio of the additional potential**

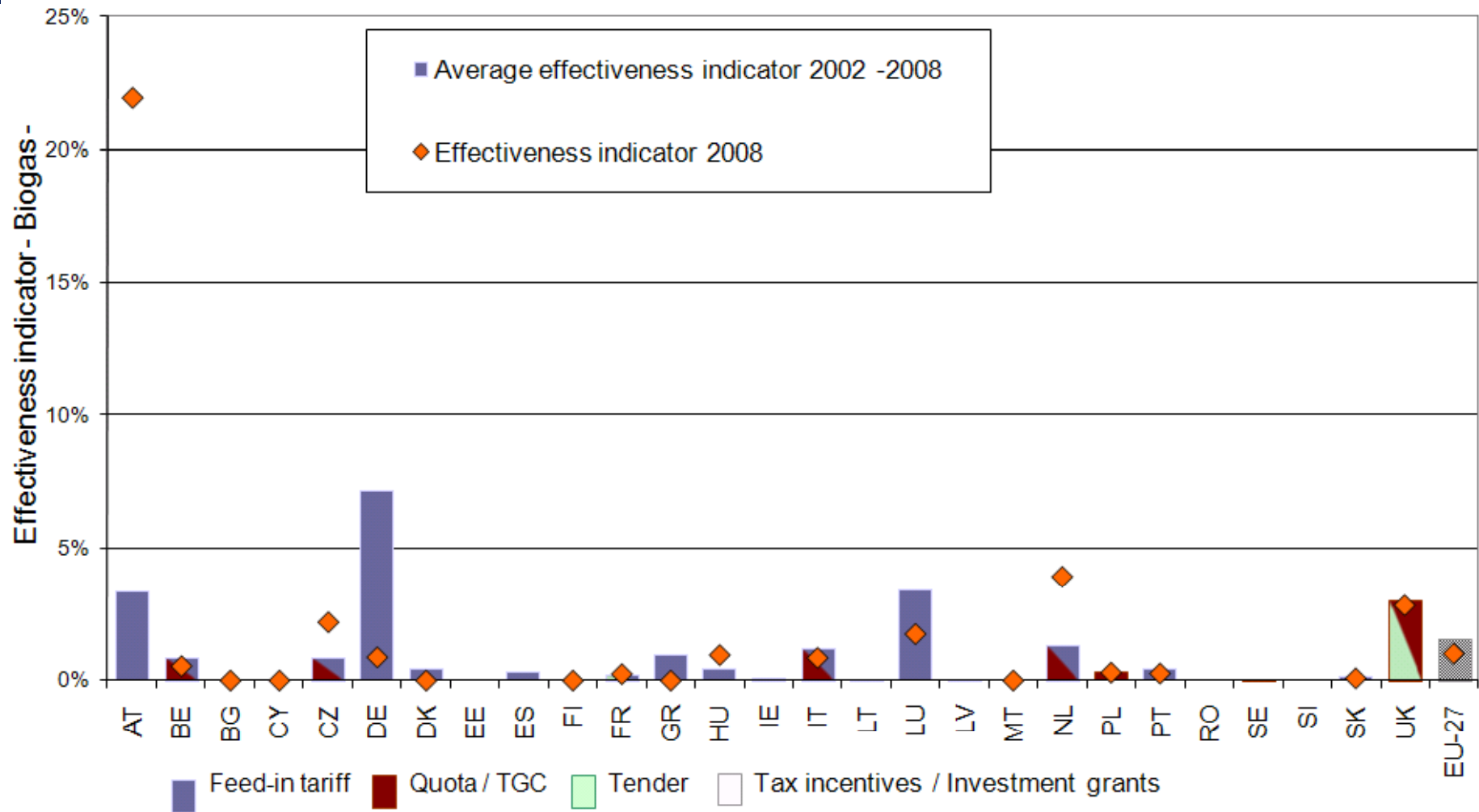
$$E_n^i = \frac{G_n^i - G_{n-1}^i}{\text{ADD} - \text{POT}_n^i}$$

- $E_n^i$  Effectiveness indicator for RES technology  $i$  for the year  $n$
- $G_n^i$  Existing electricity generation potential by RES technology  $i$  in year  $n$
- $\text{ADD} - \text{POT}_n^i$  Additional generation potential of RES technology  $i$  in year  $n$  until 2020

# Effectiveness for wind on-shore in the period 1998-2009 in EU-27

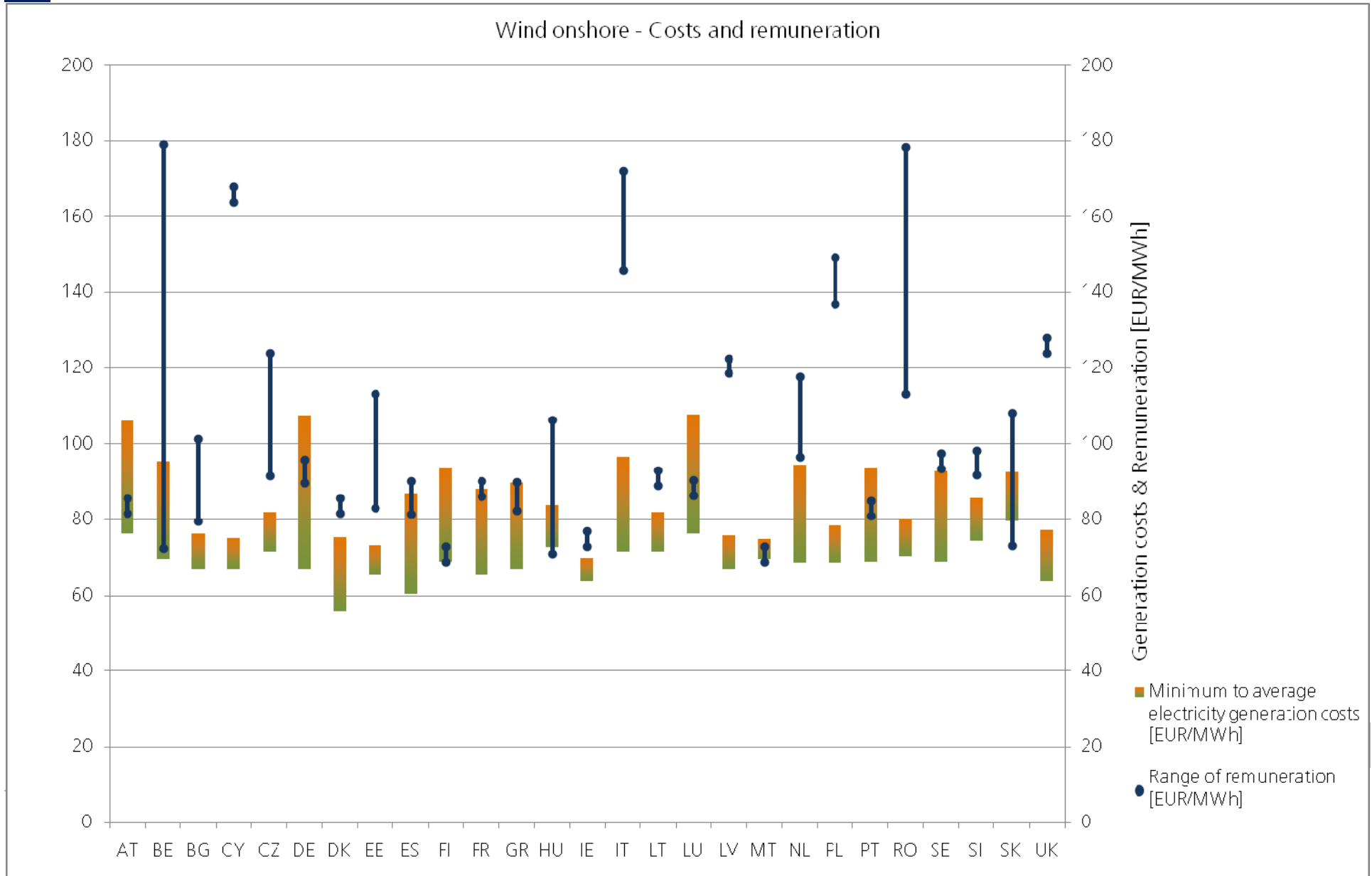


# Effectiveness in the sector biogas in the period 1998-2008 in EU-27



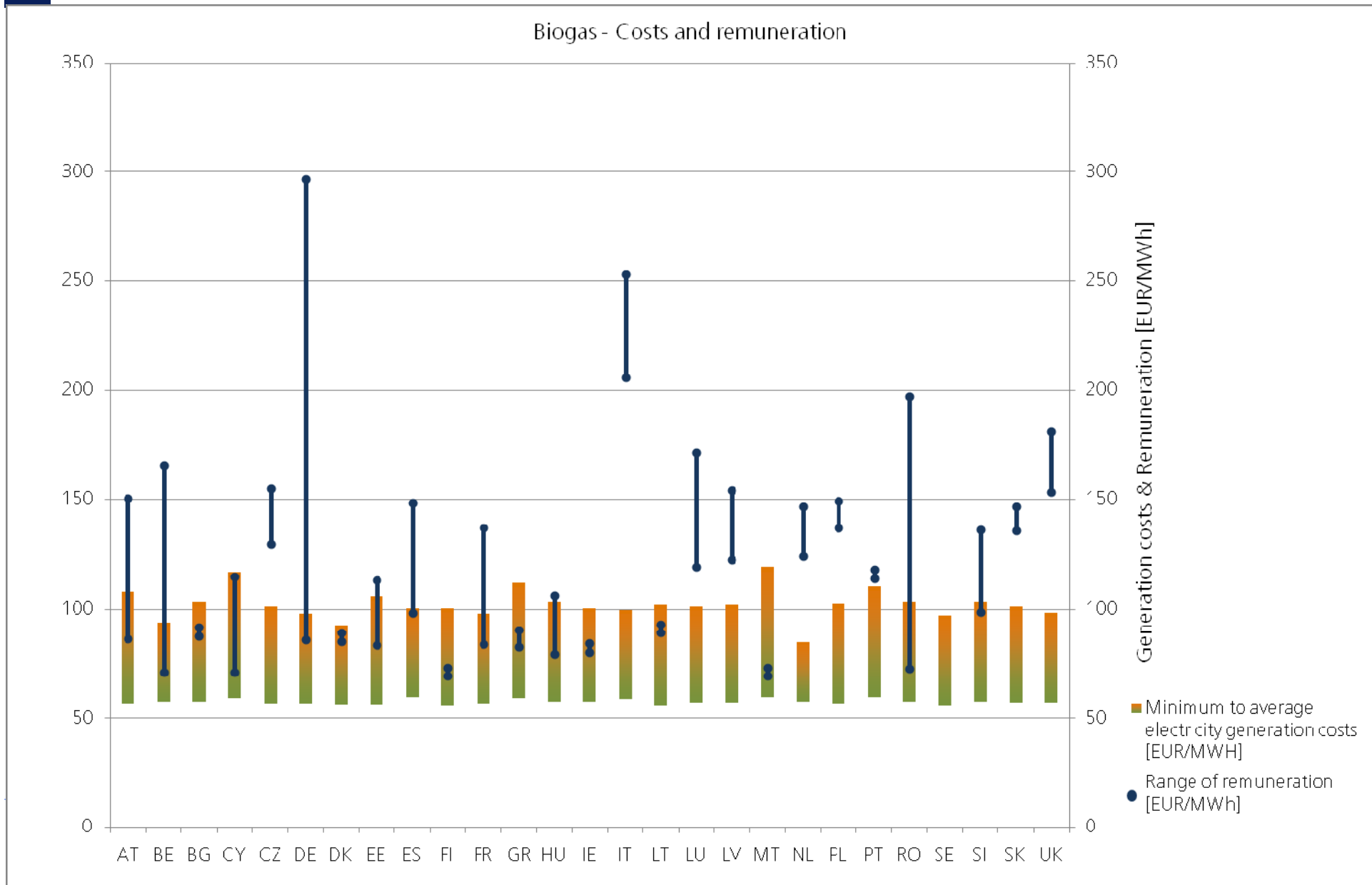
# Current level of support and costs per Member State

Example of wind onshore - Sept. 2009



# Current level of support and costs per Member State

Example of biogas electricity - Sept. 2009



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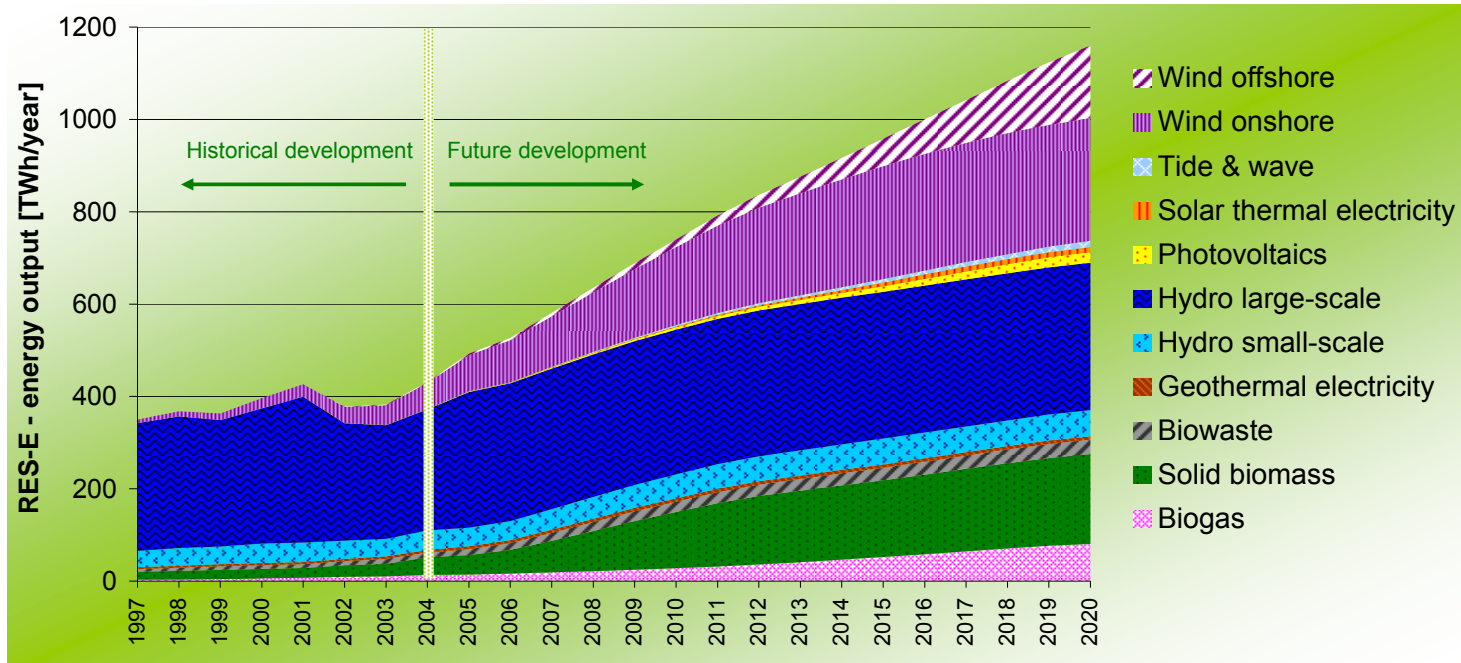
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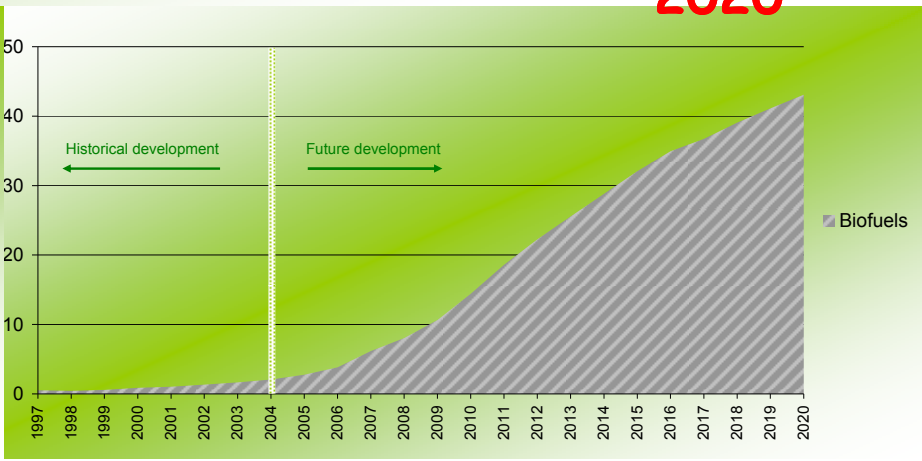
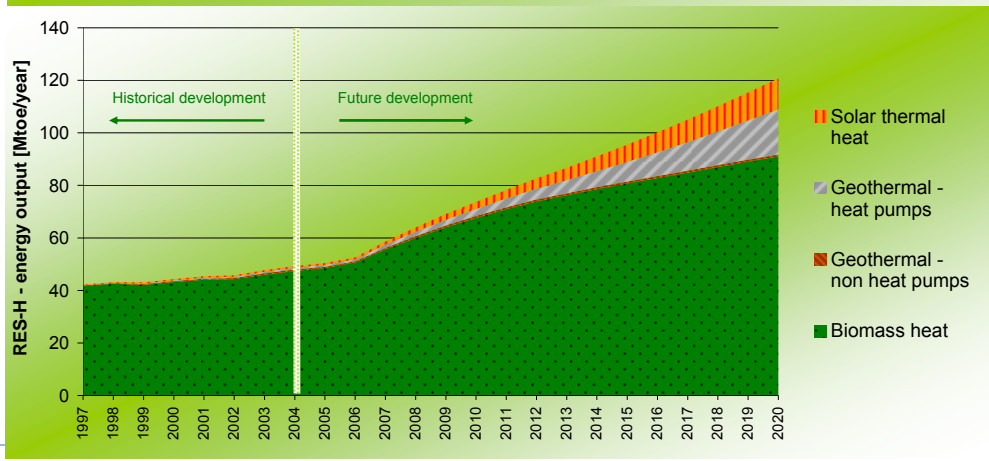
# Future perspectives of RES-E in the EU

# Future perspectives: a scenario on how to meet the challenge

## Green-X balanced scenario



*Renewable Energy Roadmap (European Commission, January 2007)*  
**European Union**  
**20% Renewable Energies by 2020**



# Future competitiveness with conventional electricity

## Main background assumptions

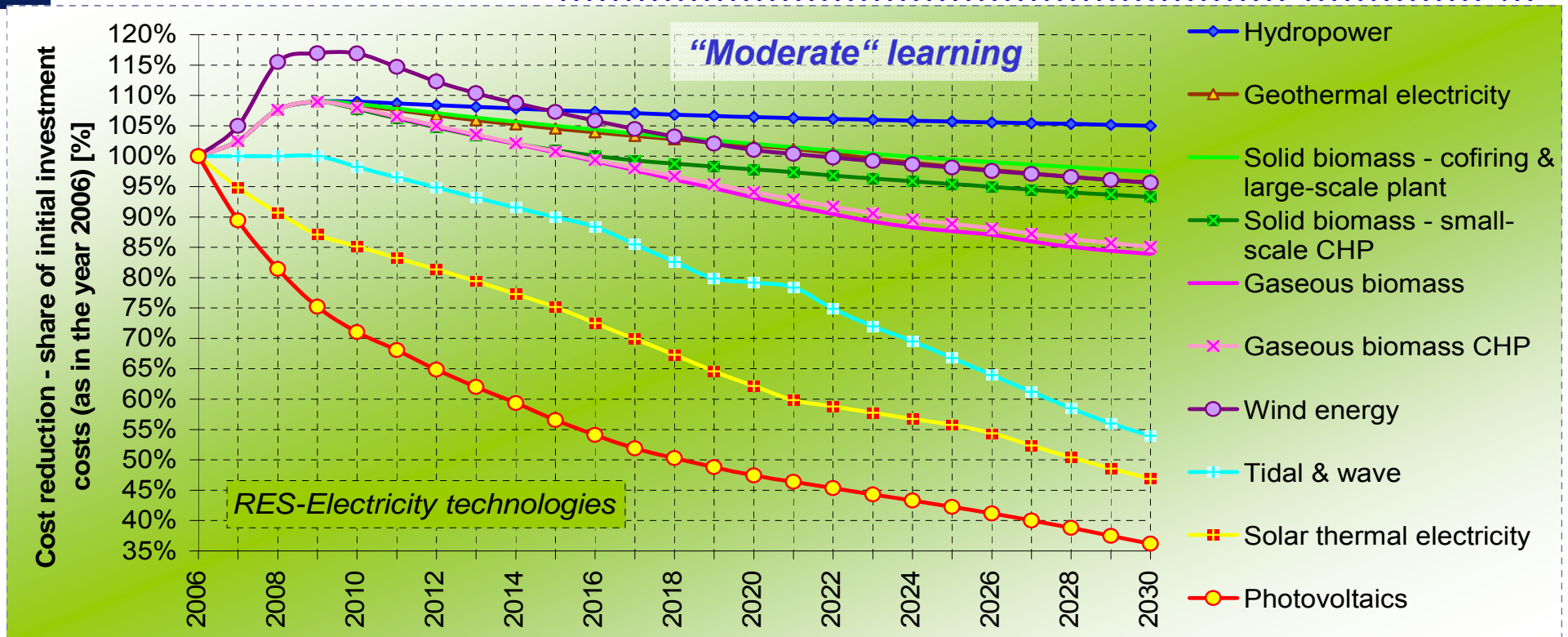
Source: EMPLOY-RES - The impact of renewable energy policy on economic growth and employment in the European Union

PRIMES high energy prices (reference price development) US\$ <sub>2005</sub> /boe	2005	2010	2015	2020	2025	2030
Oil	54.5	76.4	88.1	100.0	101.1	109.1
Gas	34.6	59.1	67.4	77.0	78.3	84.7
Coal	14.8	19.2	21.7	24.0	24.0	25.8

	2005	2010	2015	2020	2025	2030
CO <sub>2</sub> price [€ <sub>2005</sub> /ton]	20.0	20.0	27.1	34.2	39.2	44.2

in €/MWh output	2005	2010	2015	2020	2025	2030
(Wholesale) Electricity price	59.9	66.0	73.9	75.1	71.5	70.7

*Assumptions on expected future technological progress  
(technological learning)*



→ *High energy & raw material prices changed the overall situation ... Prior learning expectations will not be met with a continuation of high energy / raw material prices*

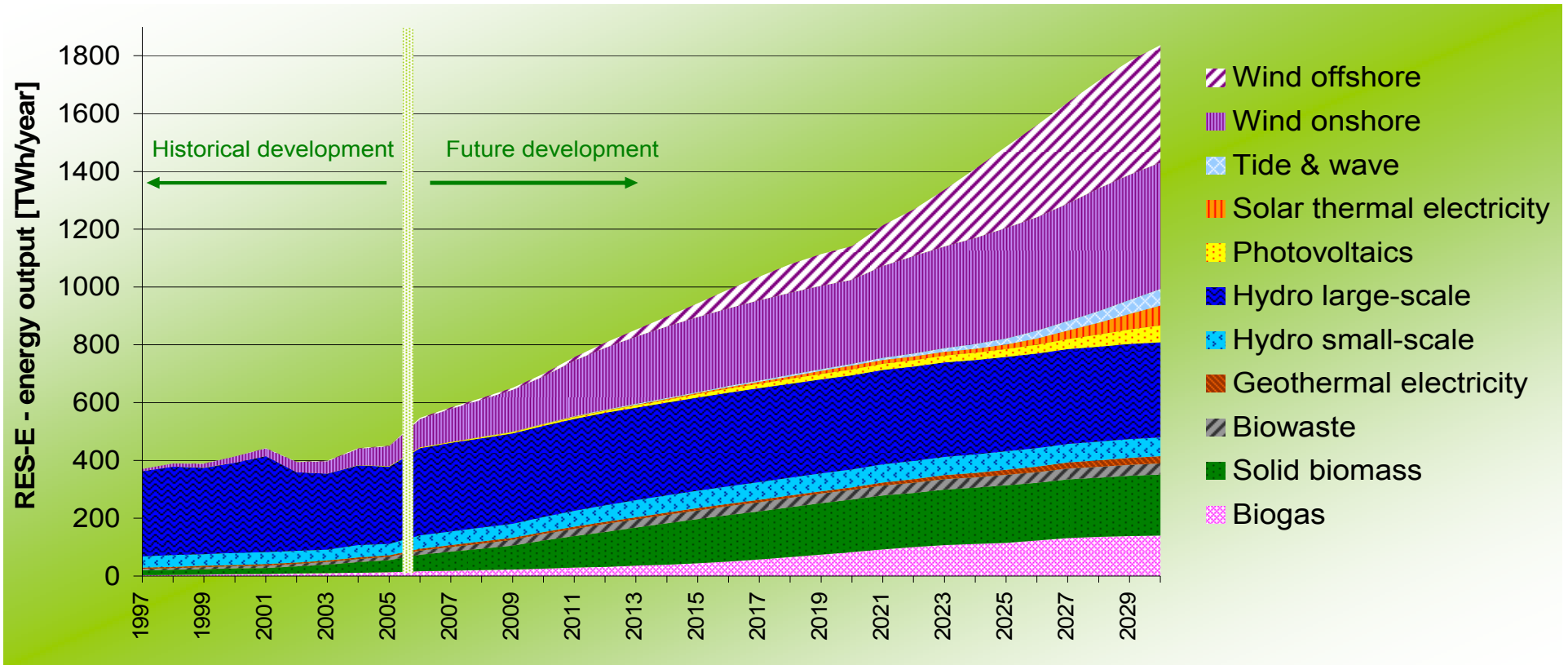
*(i.e. an increase of investment cost could be observed for almost all energy technologies in 2006 to 2008 caused by increasing energy and raw material prices)*

Resulting (investment) cost reduction due to technological progress (learning)

(according to the policy scenario)

# Future competitiveness with conventional electricity

## Future deployment and additional generation costs



in €MWh output	2006	2010	2015	2020	2025	2030
Additional generation costs	7.6	6.8	9.2	12.2	10.4	12.2

*Capital requirements for the RES-E sector:  
~300 bln € cumulatively until 2020*

*Source: EMPLOY-RES - The impact of renewable energy policy on economic growth and employment in the European Union*

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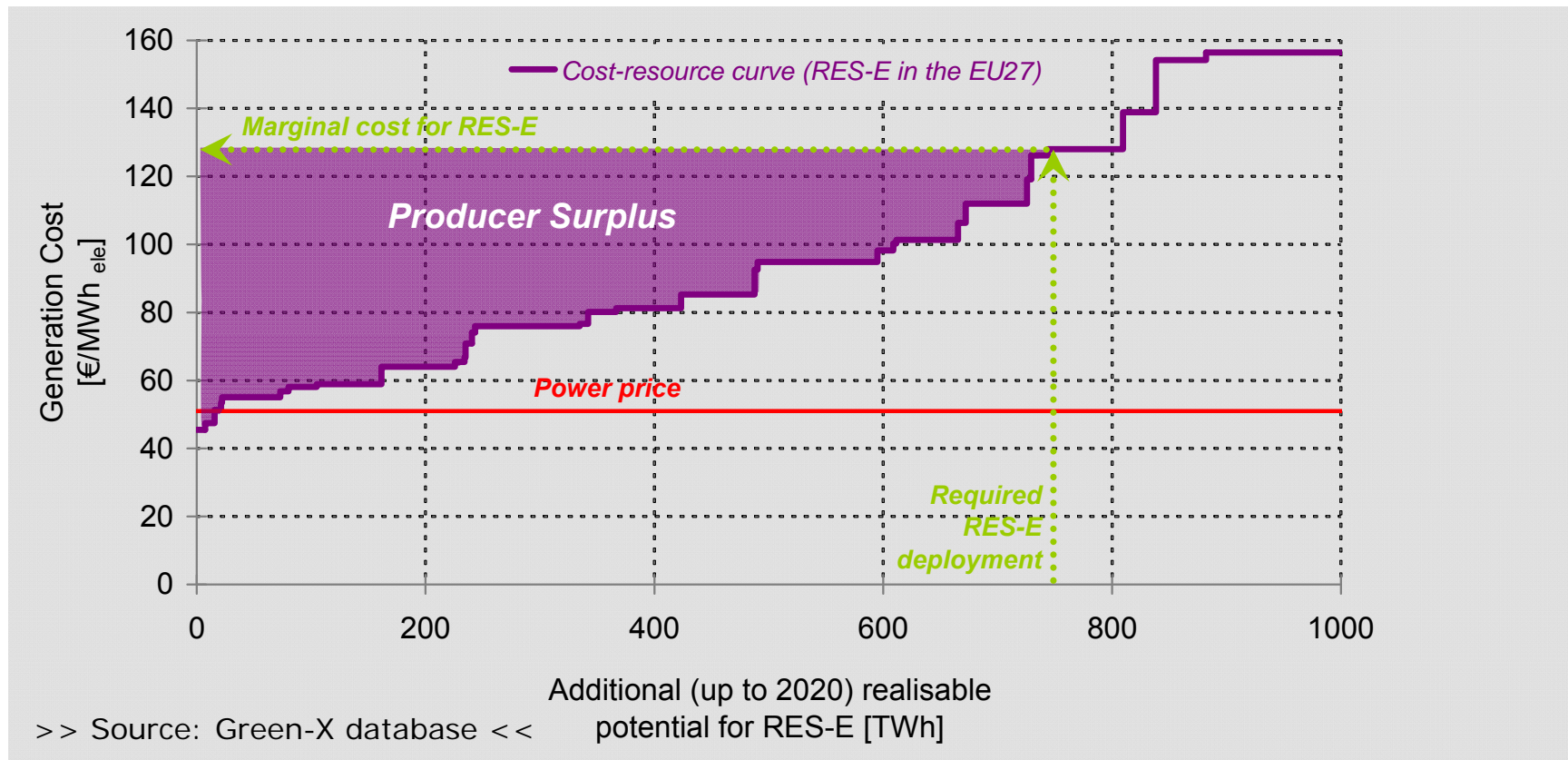
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For achieving an ambitious target a portfolio of RES technologies – being in a different stage of development (cost) - is required.

Therefore technology specific support is preferable to reduce policy costs and to incentivise deployment of less advanced technologies.

# Technology neutrality leads to high producer surplus



A technology-neutral support leads to high policy costs

→ *technology banding has been introduced in UK, Italy and Romania*

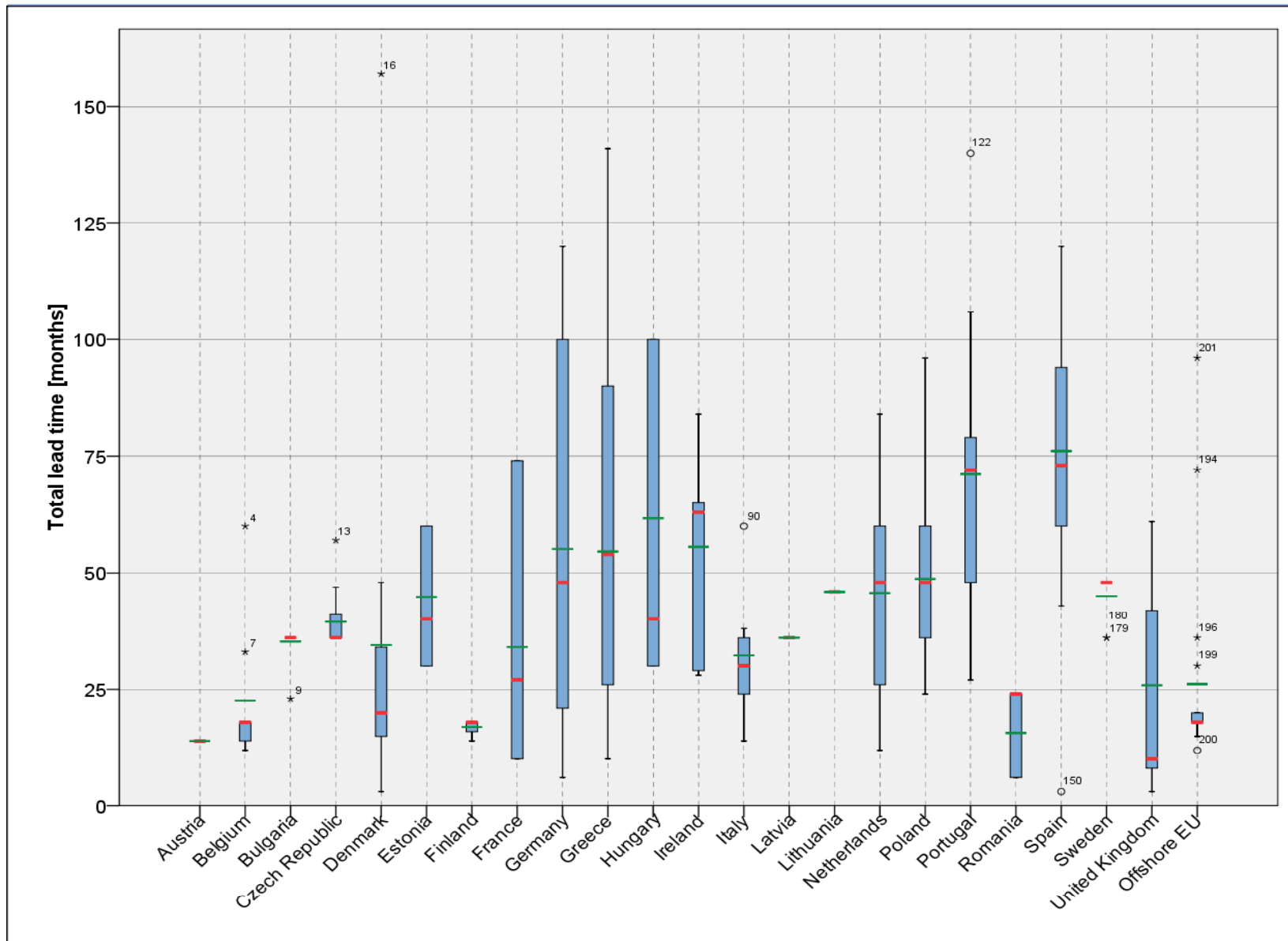
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Non-economic barriers are relevant but  
the quantitative relation with the  
effectiveness not yet fully understood

# Non-economic barriers show large variety



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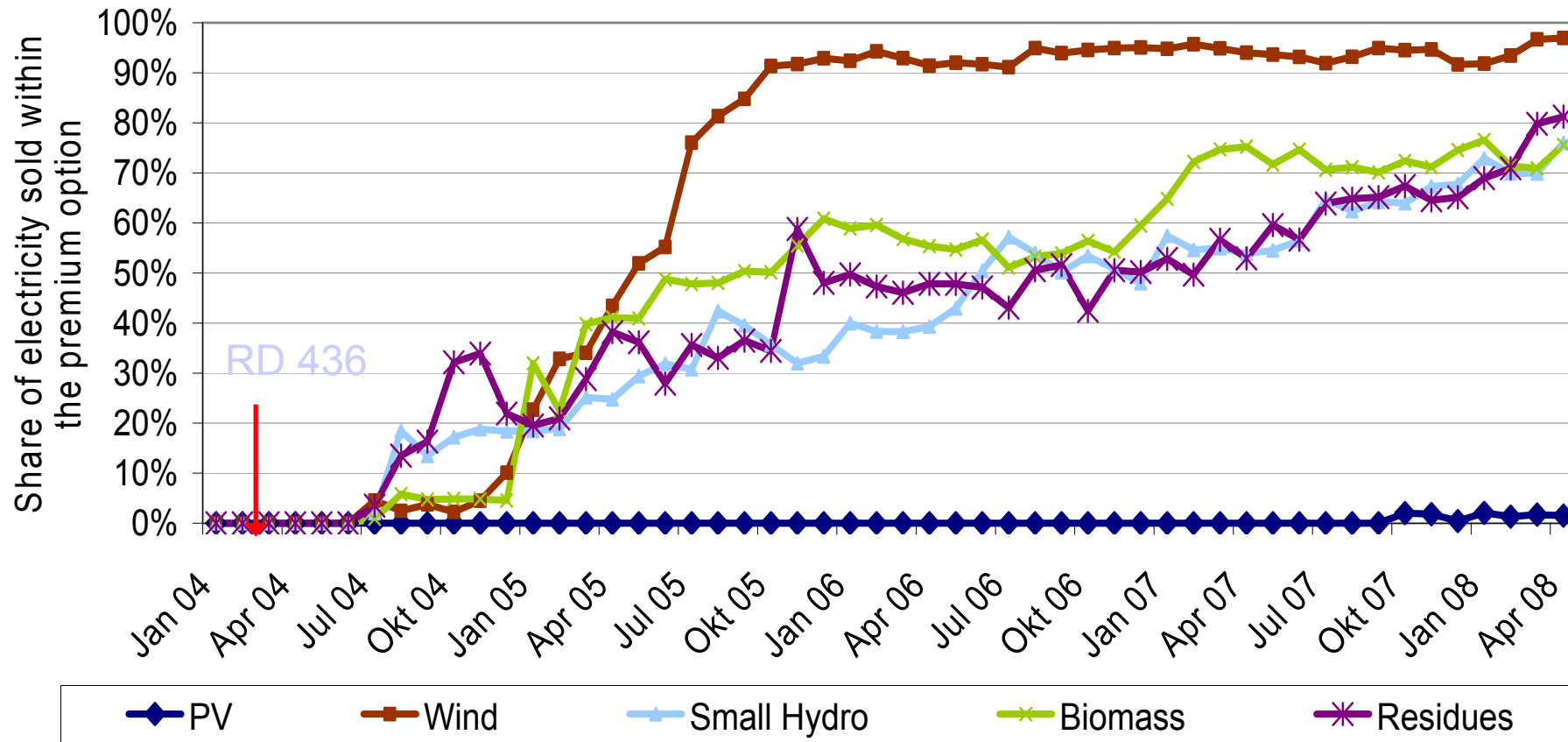
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When renewable energy technologies become **mainstream** the **compatibility** with **electricity markets** becomes crucial

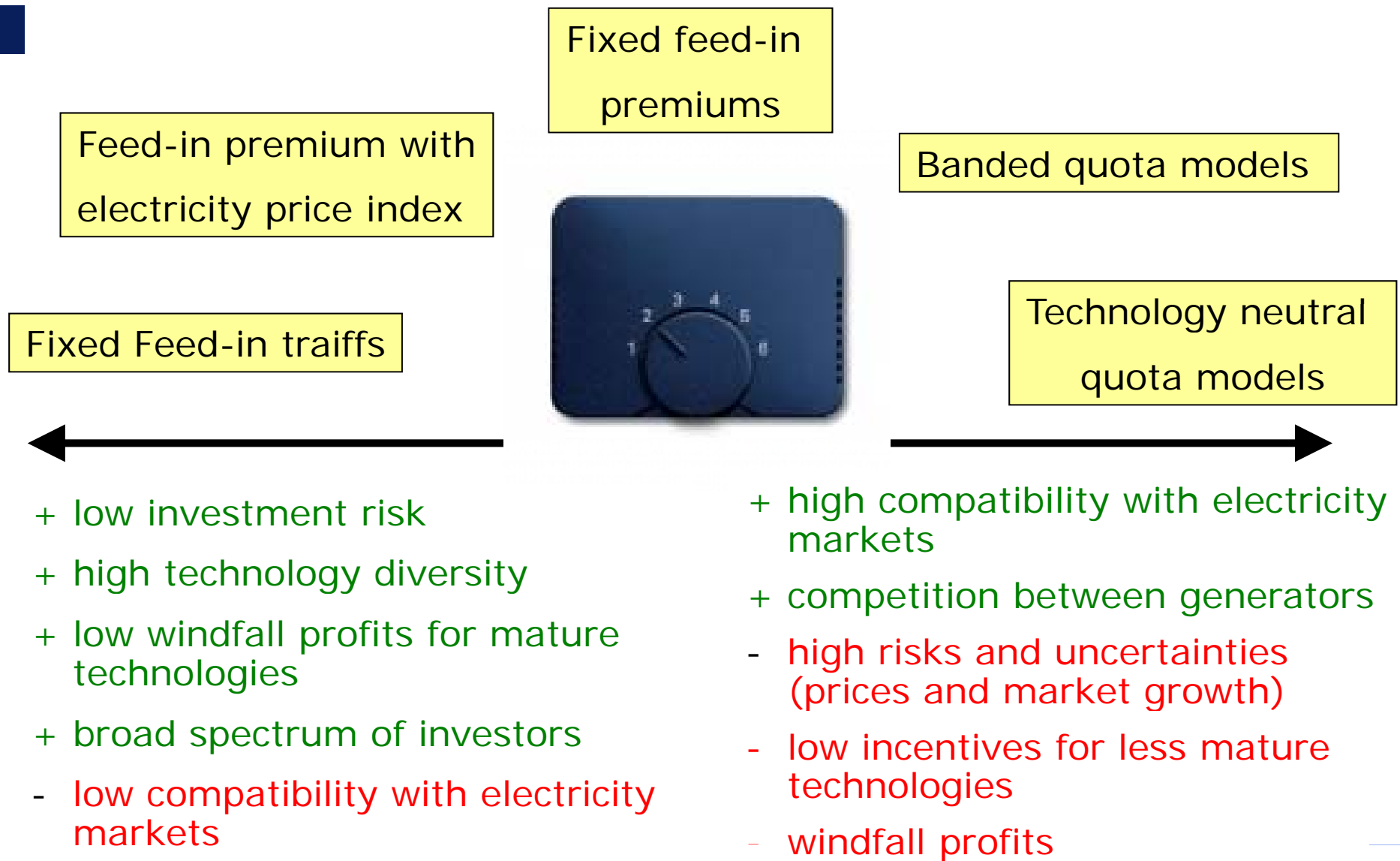
# Premium tariff design – Case study Spain

## Share of RES-E sold with the premium option



In March 2004 a new premium option was introduced by the RD 436

# Continuous transition between different support schemes



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# Implementation of cooperation mechanisms

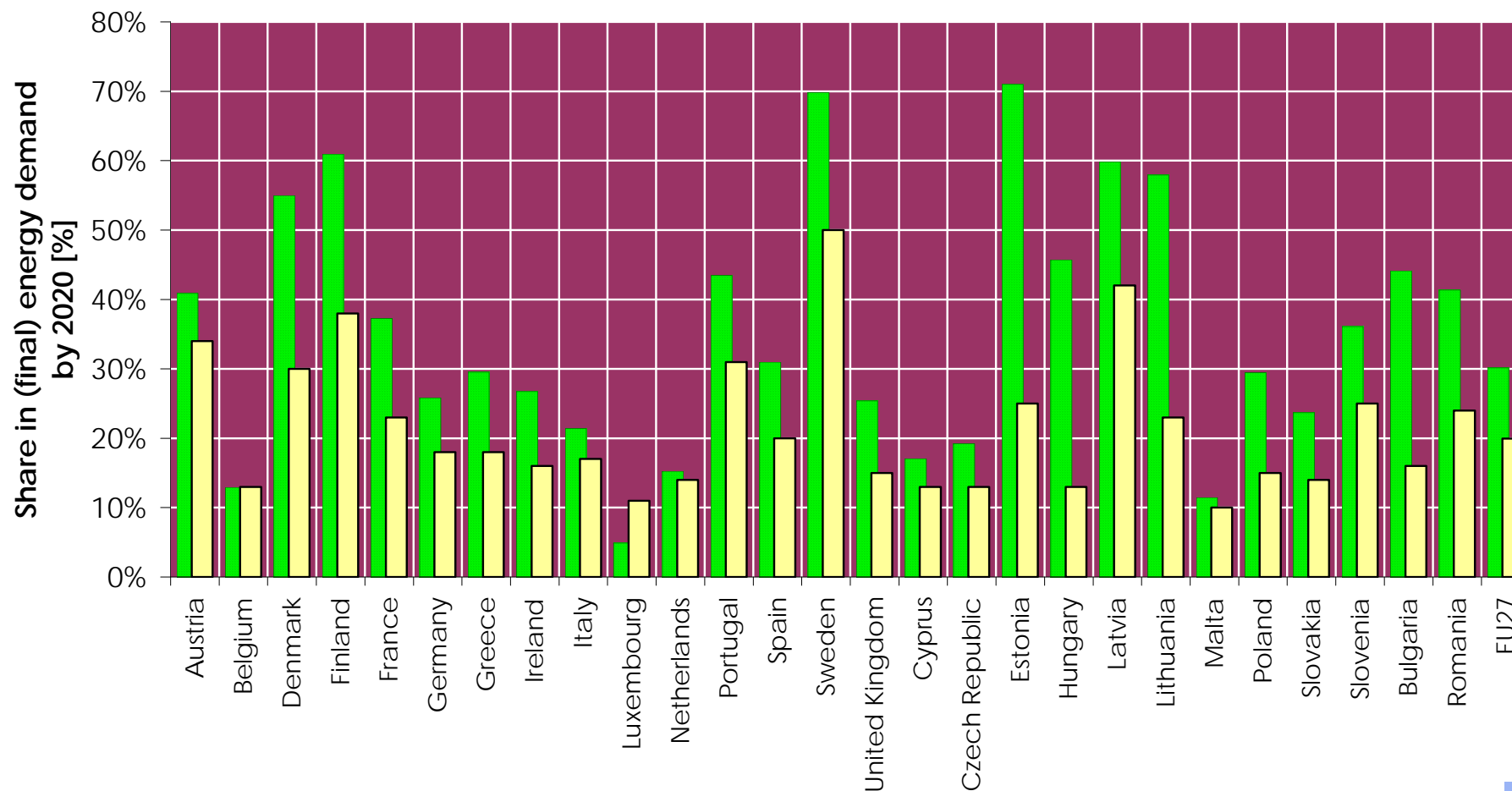
# Potentials by 2020 as compared to the Directive targets

## 20% RES by 2020

- proposed national RES targets

■ Total realisable RES potential up to 2020

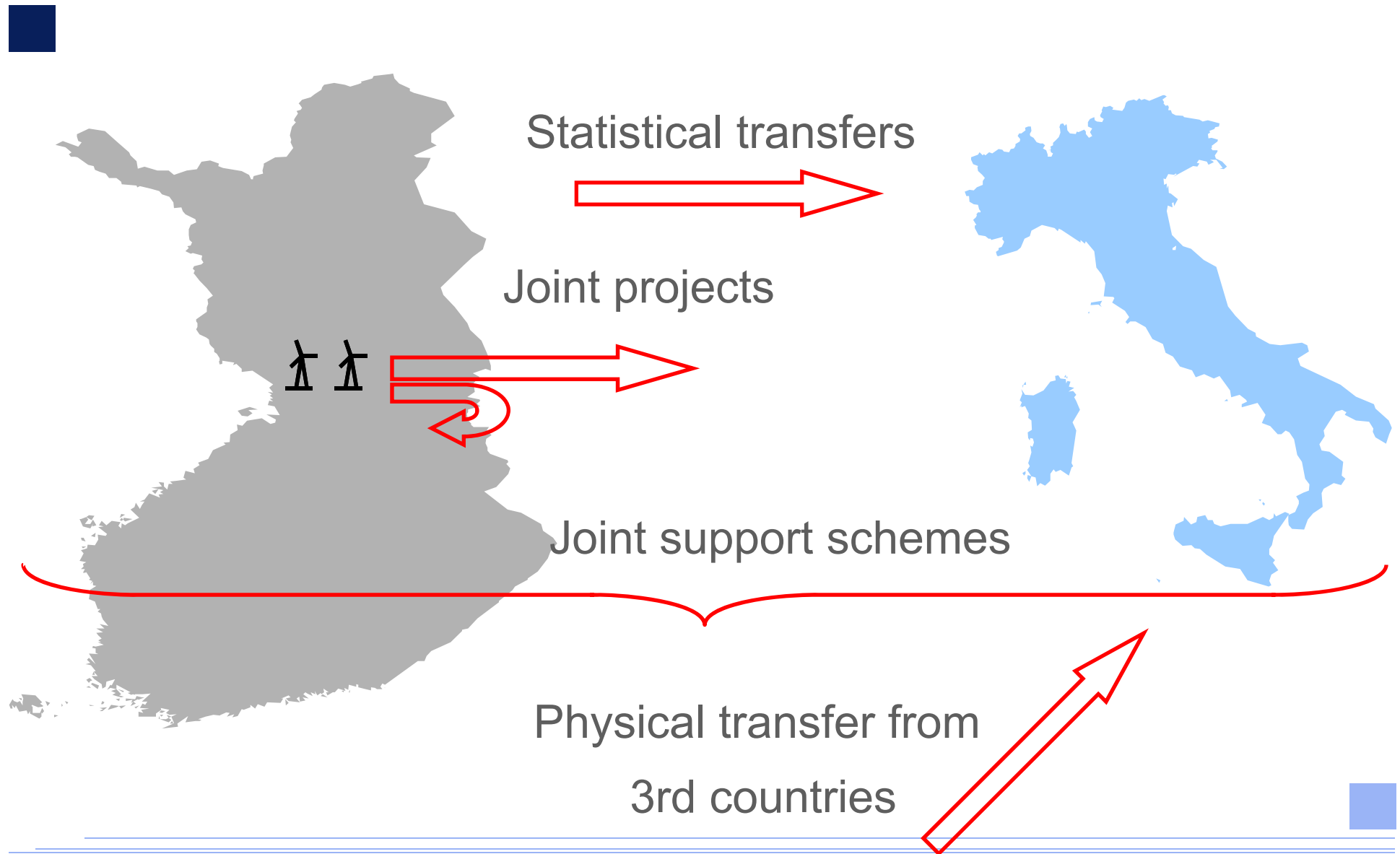
■ Proposed RES targets for 2020



How the European Commission set the targets ... „FLAT RATE” & „GDP-Variation”

... i.e.:  $RES\text{-}target_{2020} = RES_{2005\%} + 50\% * RES_{NEW\%} + 50\% * "RES_{NEW\%} \text{ GDP-weighting}" - \text{"first mover bonus"}$

# Designing and analysing cooperation measures



# Main challenges with respect to **cooperation mechanisms**

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■ Key challenges and economic questions w.r.t. cooperation mechanisms

- (1) **Which costs and benefits** will be considered from the selling and buying country's perspective?  
→ Which is the economic value of imported versus domestic RES from the government perspective?
- (2) **Which price** will emerge?
- (3) **Which are the key economic differences** between the three intra-European cooperation mechanisms?
- (4) Will cooperation mechanisms be implemented **only for the target year 2020 or throughout the period until 2020?**

## *Conclusions on RES policy design*

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- Renewable energy technologies need a long term oriented and risk mitigating deployment policy.
- Instruments should be technology specific to reduce policy costs and to promote less mature technologies.
- Compatibility with general energy markets should be ensured, when higher market shares of RES are reached.
- Non-economic barriers can have a significant impact on the effectiveness of an instrument and hamper the effectiveness of generally very powerful policy schemes.
- The implementation of the cooperation mechanisms of the RES Directive represents a major challenge – in particular the economics of price determination is still an open issue

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Thank you very much

Kontakt:

Mario Ragwitz

[Mario.Ragwitz@isi.fraunhofer.de](mailto:Mario.Ragwitz@isi.fraunhofer.de)