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Key Design Elements of an Effective and Efficient RES Policy in the EU

Regional workshop of the RE-Shaping project

Milano, 7th October2011

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RE-Shaping
Shaping an effective and efficient European renewable energy market

ECOFYS

Fraunhofer ISI

Current achievements are substantial

The last decade was characterized by the successful deployment of renewable energy sources (RES) across EU member states – total RES deployment increased by more than 40%. In more detail:

- RES electricity generation grew by approximately 40%, RES heat supply by 30% and biofuels by a factor of 27 during the last decade,
- new renewables in the electricity sector (all technologies except hydropower) increased fivefold during the same period,
- total investments increased to about € 40 billion annually in 2009, and
- employment due to RES amounts to about 1.5 Mio. people in 2010
- cost reductions for key technologies like wind and PV in line with learning curve expectations

The challenge

- But more is needed to reach the 2020 targets: Compared to the last decade,
  - growth in RES-E needs to almost double from 3.4% per year to 6.7% per year,
  - growth in RES-H sector needs to increase from the 2.7% per year achieved over the last decade to 3.9% per year until 2020,
  - compared to the last three years relative growth rates need to roughly continue during the next decade,
  - credit crisis reduces growth in a number of MS
  - costs of RES policies have reached 0.3% of EU GDP
- Evaluation of NREAPs shows that largest deficits exist regarding the mitigation of non-economic and grid-related barriers and regarding support schemes for RES-H followed by RES-E and RES-T policies

The challenge

Areas, where action is needed:

- Increase the effectiveness and efficiency of support by improved instrument design in case of RES-E and by introducing new off-budget instruments for RES-H
- Accelerate deployment by stronger and EU-wide coordinated mitigation of non-economic barriers
- Increase the compatibility between RES-E and power markets by increasing flexibility of power markets and of RES-E support schemes
- Coordinate support scheme design, market design administrative procedures and intensify use of cooperation mechanisms

Main support policies for RES electricity

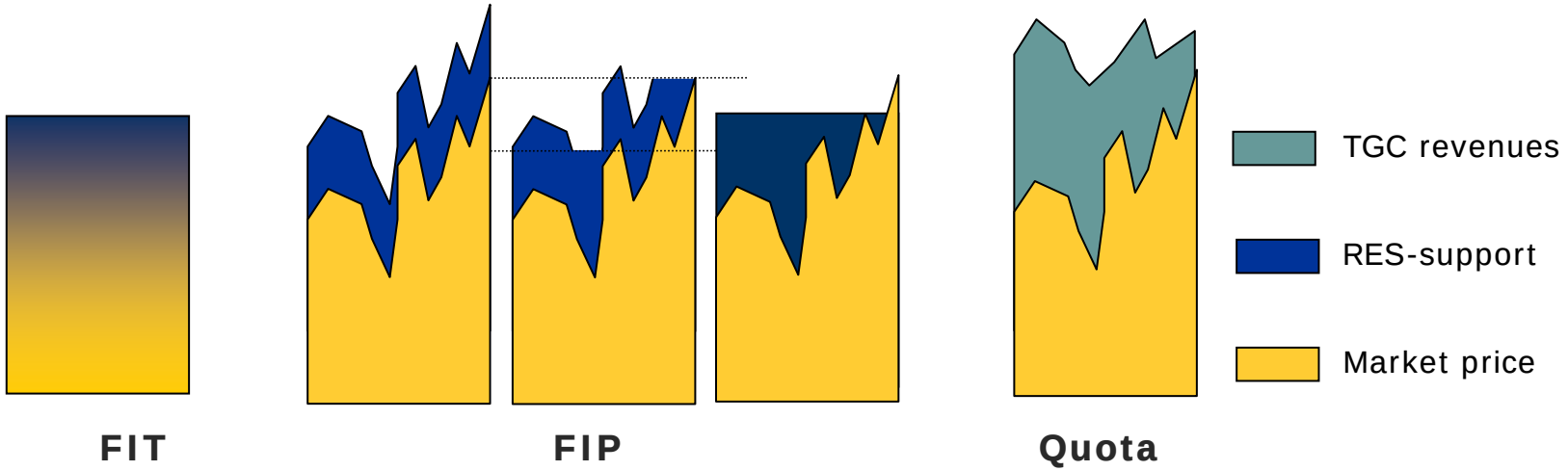
- Feed-in tariffs
- Feed-in premiums
- Quota obligations with tradable green certificates
- Loan guarantees
- Soft loans
- Investment grants
- Tax incentives
- Tendering schemes

Also very relevant:

- Permitting procedures
- Grid access & operation
- Power market design & structure
- R&D, industrial policy

Support schemes for RES-E
Effectiveness and efficiency

Key features FIT, FIP & Quota



fixed premium - cap & floor - sliding/Cfd

Fixed feed-in tariff (FIT)

Gov fixes price, market decides quantity

- Fixed tariff (€/MWh)
- Guaranteed during lifetime or x years
- Purchase obligation
- (Grid (access & use) priority)

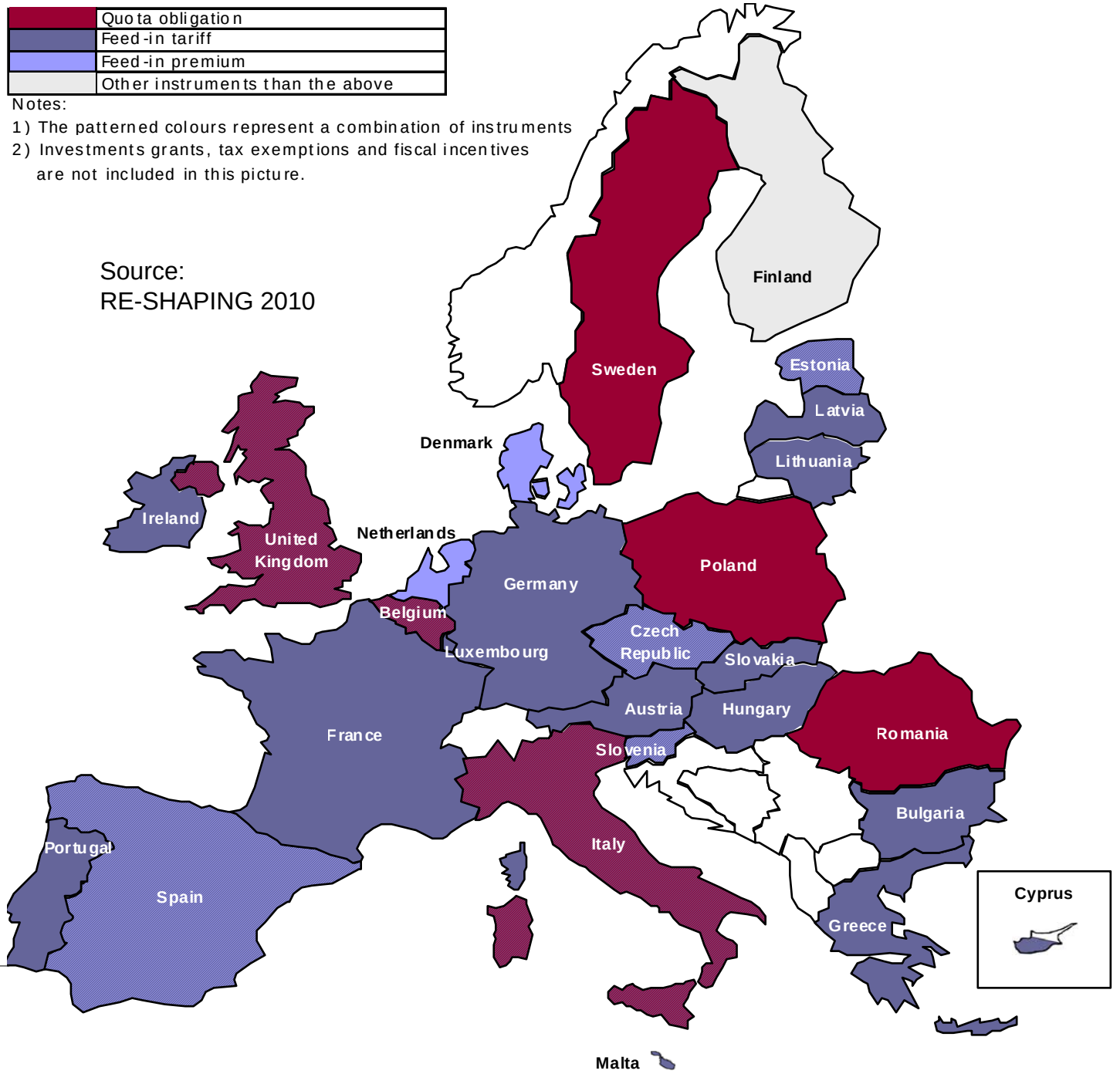
Feed-in premium (FIP)

- Fixed premium (€/MWh)
- Guaranteed during lifetime or x years
- Power sold on conventional markets

Quota

Gov fixes quantity, market decides price

- Obligation for suppliers:
  - Minimum RES-E share
  - Increasing over time
  - Penalty
- Tradable certificates for RES-E production ('market' price)
- Obligation is met by submission of certificates to competent authority
- Power sold on conventional markets


Quota obligation
Feed-in tariff
Feed-in premium
Other instruments than the above
Notes:
1) The patterned colours represent a combination of instruments
2) Investments grants, tax exemptions and fiscal incentives are not included in this picture.
Source:
RE-SHAPING 2010
Finland
Sweden
Estonia
Latvia
Lithuania
Denmark
Ireland
United Kingdom
Netherlands
Germany
Poland
Belgium
Luxembourg
Czech Republic
Slovakia
Austria
Hungary
Romania
France
Slovenia
Bulgaria
Italy
Portugal
Spain
Greece
Cyprus
Malta

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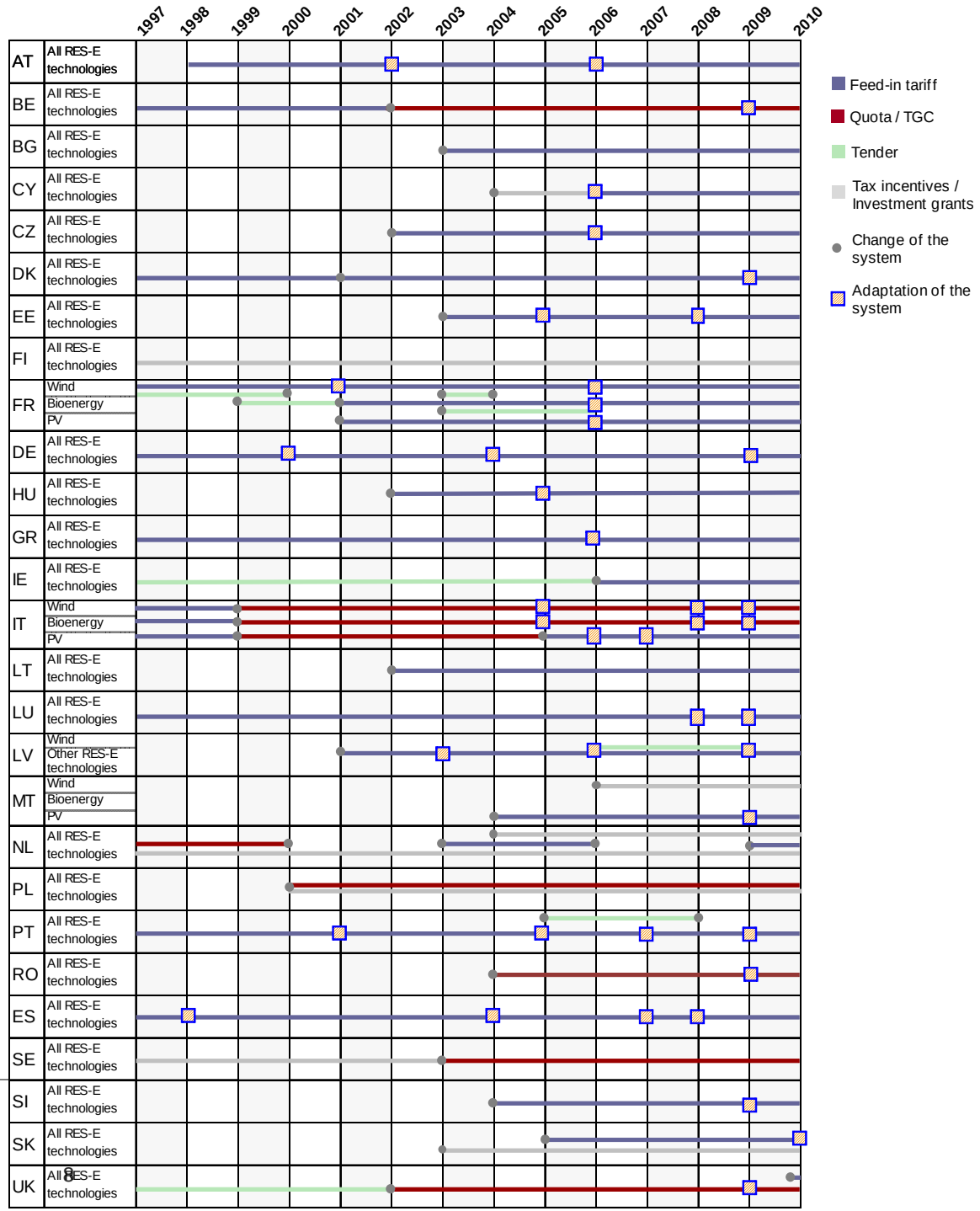


Main support instrument RES-E & policy changes 1997-2010

Measuring the effectiveness of RES-E support

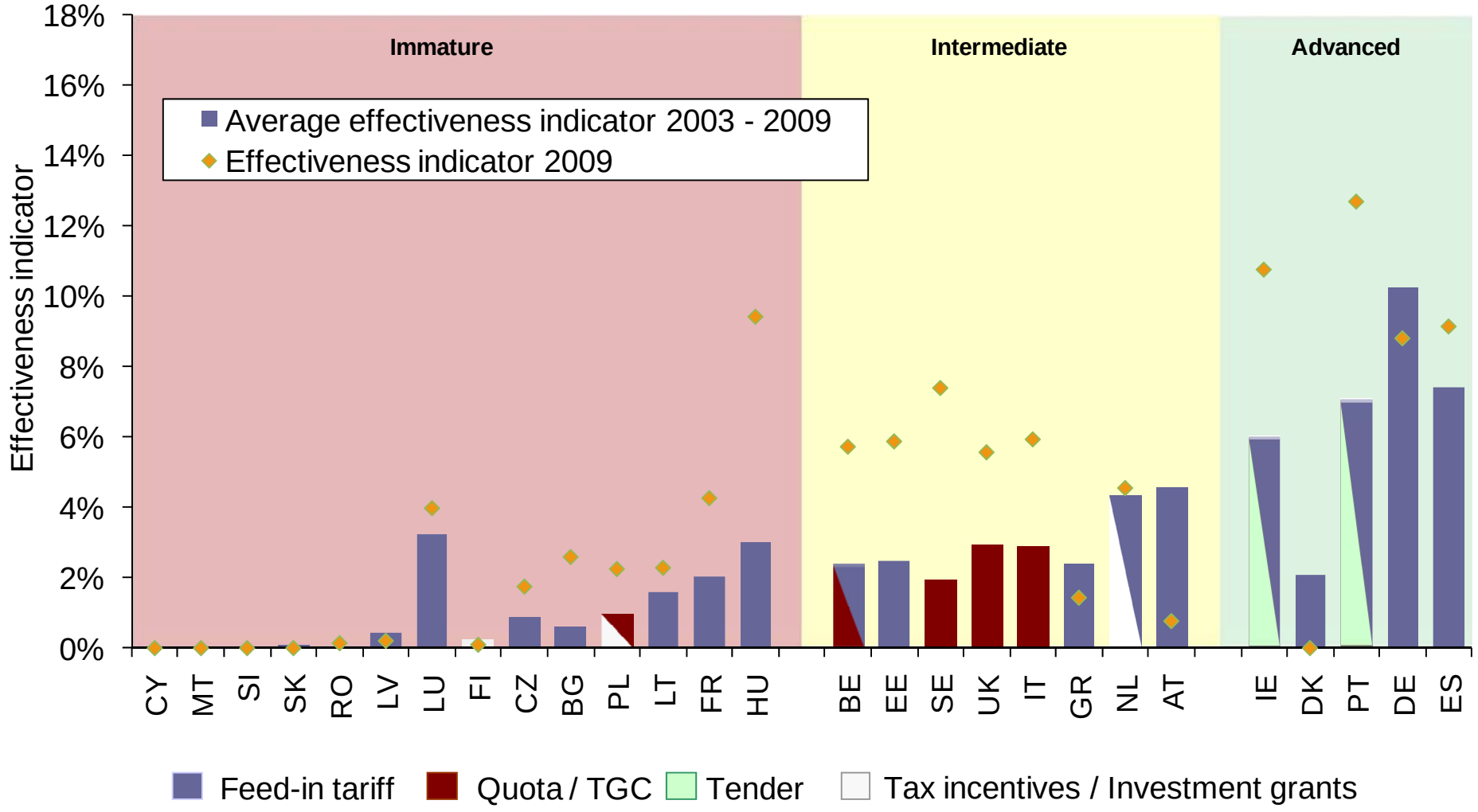
1. **Relative or absolute growth rates** are typically used to demonstrate the achievements of countries, however both measures are biased

2. Better measure to judge the performance is the **absolute growth as ratio of the additional potential**

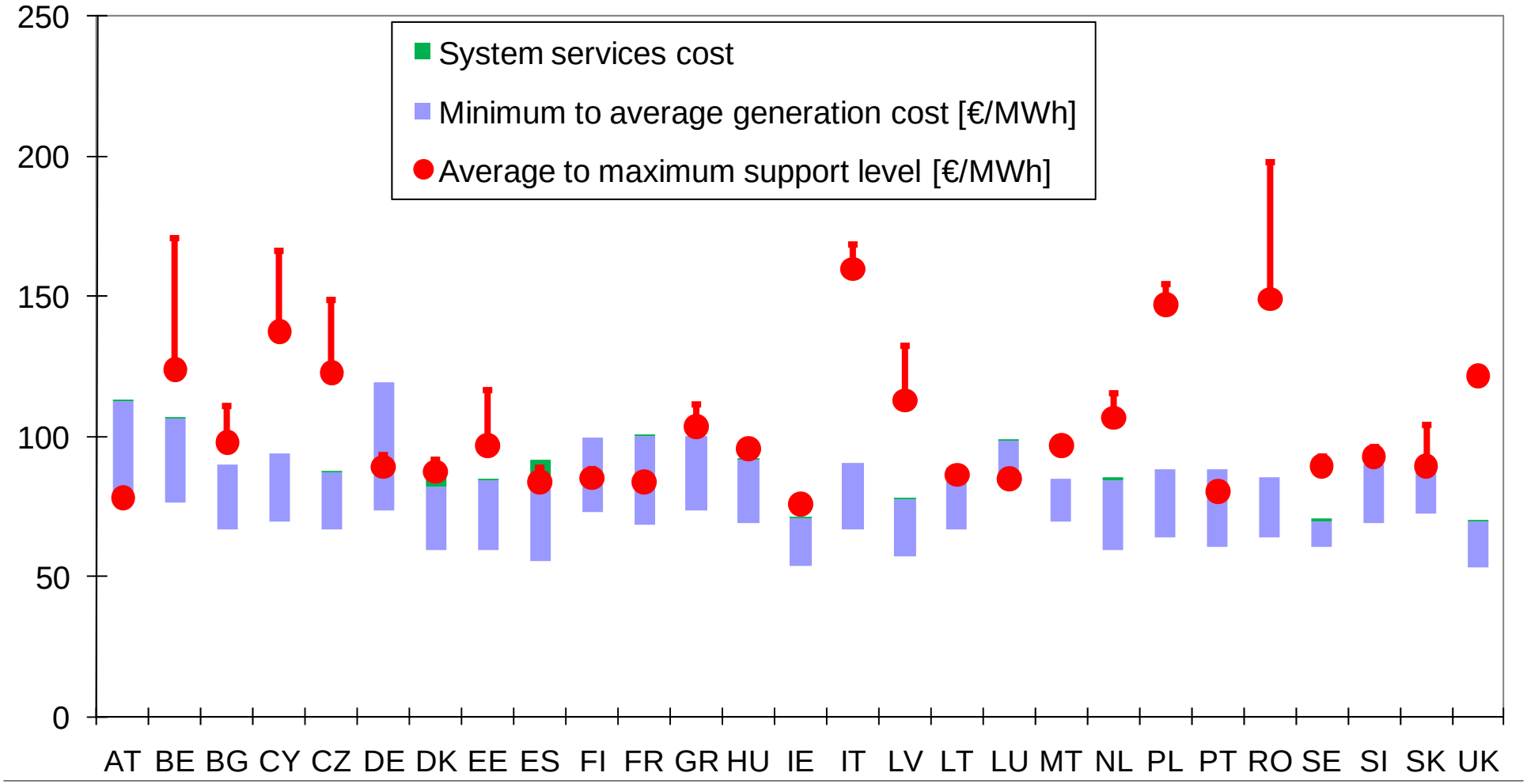
$$E_n^i = \frac{G_n^i - G_{n-1}^i}{ADD - POT_n^i}$$

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

Policy effectiveness - wind onshore

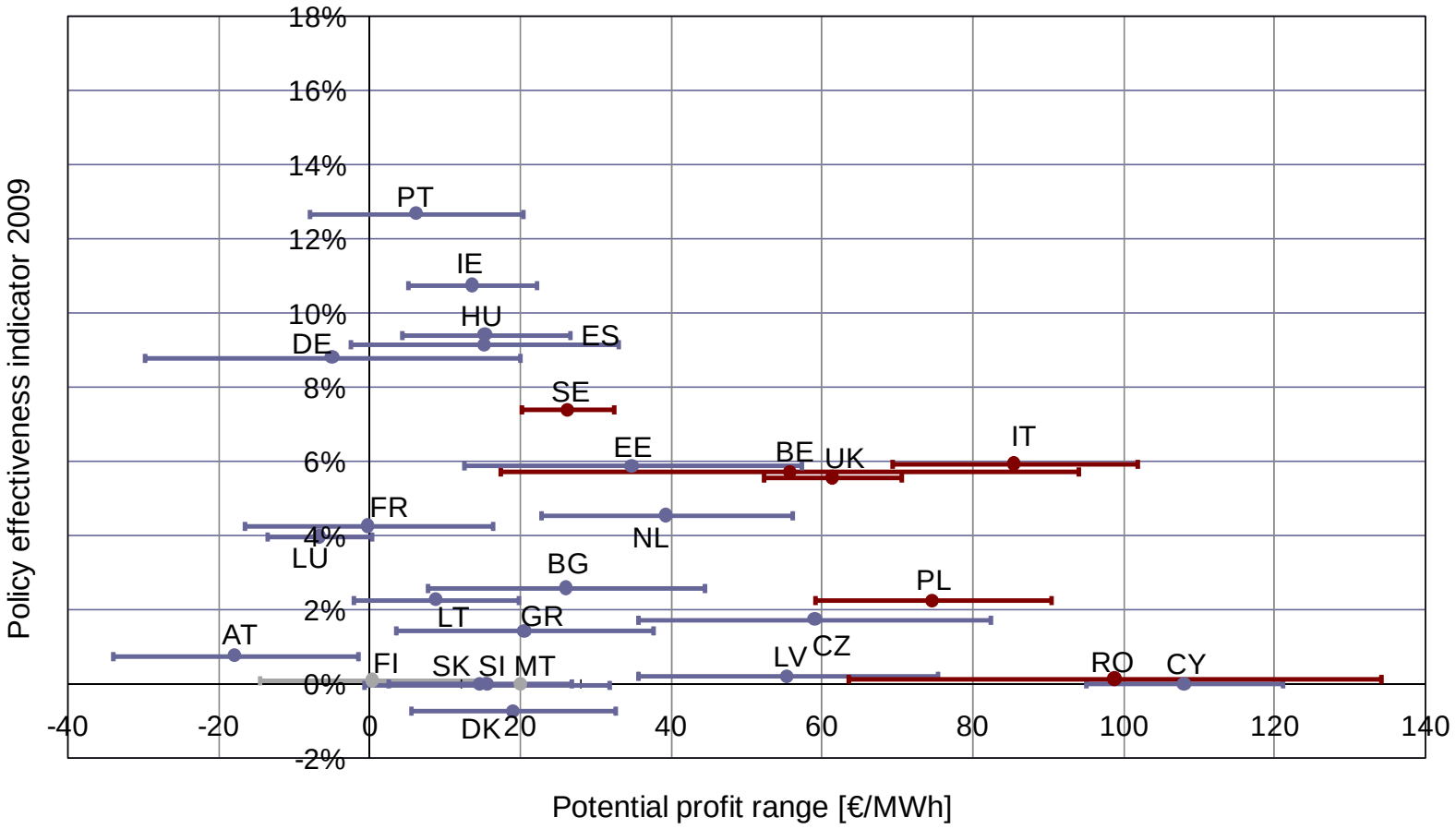


Support level ranges - wind onshore



Potential profit ranges - wind onshore

(=cost-effectiveness of policies)



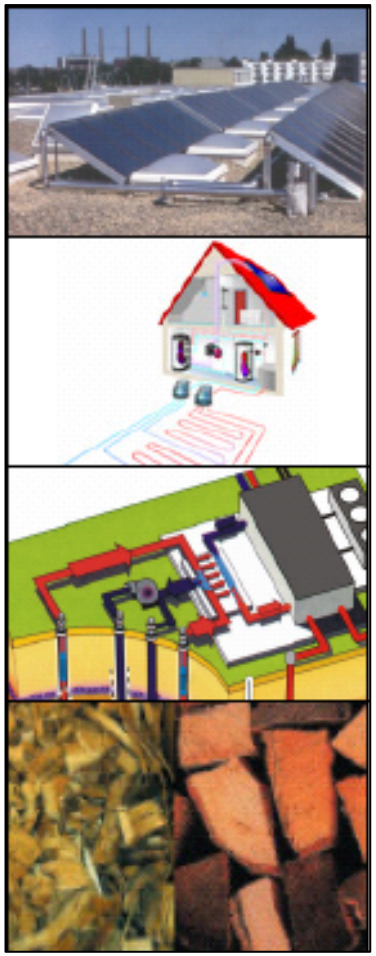
Conclusions – Electricity sector 1 / 2

1. Provide policy stability (for FIT / FIP / Quota):
   - ➔ Retroactive policy changes are most crucial mistake but also other sudden changes should be avoided.
   - ➔ Move away from annual budget planning with stop and go consequences
2. Reduce revenue risk:
   - ➔ Long term contracts are most relevant (quota systems)
   - ➔ Priority dispatch in case of grid congestion & compensation for forced curtailment
3. Offer supplementary measures for small scale projects:
   - ➔ Many quota countries offer separate incentives: BE minimum prices for PV, IT FIP for PV, UK FIT for small-scale applications. Technology-banding within the quota as applied in UK can help to support cost-intensive technologies like wind offshore, but is less suitable for small-scale projects.

Conclusions – Electricity sector 2 / 2

4. Apply automatic degression formulae for FIT and FIP.
   - ➔ Tariffs for new plants should reduce according to learning curve of technology.
   - ➔ FIT/FIP for RET with rapid cost reduction require frequent tariff adjustment cycles and good coordination of tariff levels with other relevant markets. (Frequent) tariff adjustments based on (automatic) adjustment formulae (related to market growth) at dates known to the market sufficiently long beforehand can manage this policy cost risk without negatively affecting the investment climate

Main support policies for RES heat



- Investment grants
- Tax exemptions and other fiscal incentives
- Use obligations

Conclusions – Heat sector

1. RES-H support usually depends on public budget, resulting stop- and go policies create strong uncertainty for investors.
   - ➔ Apply off-budget policies, e.g. via surcharge on heat (fuel) cost
   - ➔ Both new and existing buildings should be covered by new off-budget policies, such as building obligations, feed-in premiums or quota systems.
2. Some MS (e.g. AT, DK, FI, LV, SE) effectively promoted biomass-based centralised heating.
   - ➔ Incentives for creating / extending district heating networks are crucial.
3. Support for decentralised biomass heating plants typically needs a higher level of support than that of centralised plants
4. Ground-source heat pumps effectively promoted by using obligations in SE and investment grants and fiscal incentives HU & FI

Conclusions – Heat sector

5. Long reinvestment cycles limit the diffusion rate for the integration of renewable heating systems that are integrated in buildings

   ➔ Due to long reinvestment cycles it might be useful to already start now supporting especially those technologies that are likely needed in the future energy system. This might refer especially to technologies that are beneficial for system integration of fluctuating RES-E, like heat pumps or biomass CHP with heat storage.