

The German Renewable Energy Sources Act

Objectives, Design & Achievements

Dr. Volker Oschmann



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

Energy Policy in Germany

- Ministry of Economics: fossil energies
- Ministry for the Environment: renewable and nuclear energies

Outline

- Overview of the Renewable Energy Sources Act (RE Act)
- Objectives
- Mechanism
- Achievements
- Feed-in tariffs in the EU Member States

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Renewable Energy Sources Act – What's that?

- “Feed-in law”:
 - = fixes prices for electricity from renewable energies (RE)
 - -> gives planning and investment security
 - -> encourages private action and investments
- Main instrument for promotion of RE electricity in Germany
- Most successful German instrument to reduce CO₂
(52 million t in 2004)

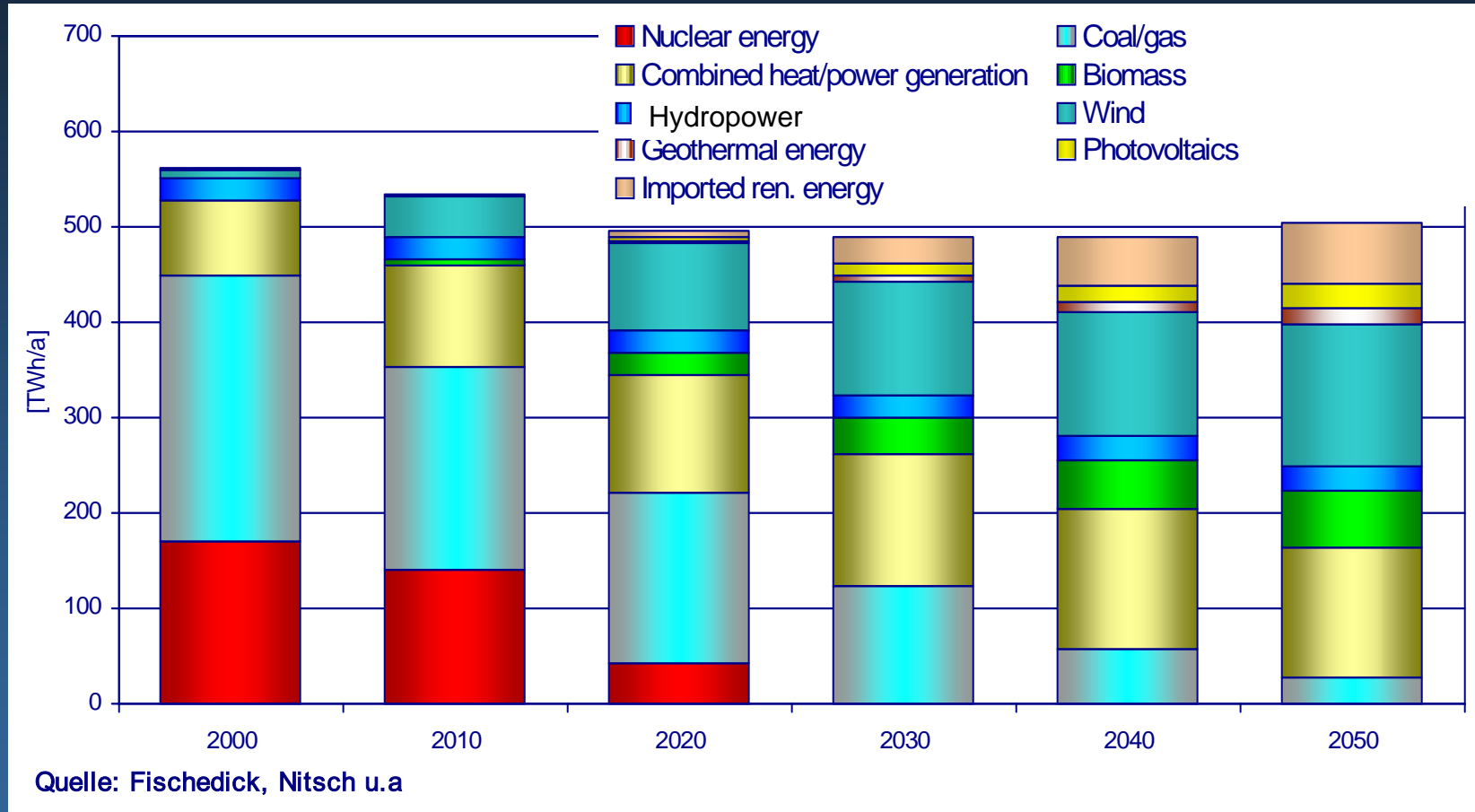
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Objectives of the RE Act

- Long term: sustainable electricity system based on RE
- Short term:
 - develop RE
 - create an innovative RE industry
 - facilitate economies of scale
 - cost reduction
- Specific targets for the share of RE electricity:
 - 2010: > 12.5 %
 - 2020: > 20 %
 - 2050: ~ 70%

Electricity Scenario up to 2050



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Main Features of the RE Act

The RE Act

- Gives RE priority access to the electricity grid
- Obliges grid operators to purchase the RE electricity
- Fixes the price (tariff) for RE electricity

How does the RE Act work?

1. RE Act sets tariffs and pay period



2. RE producer feeds electricity into the grid

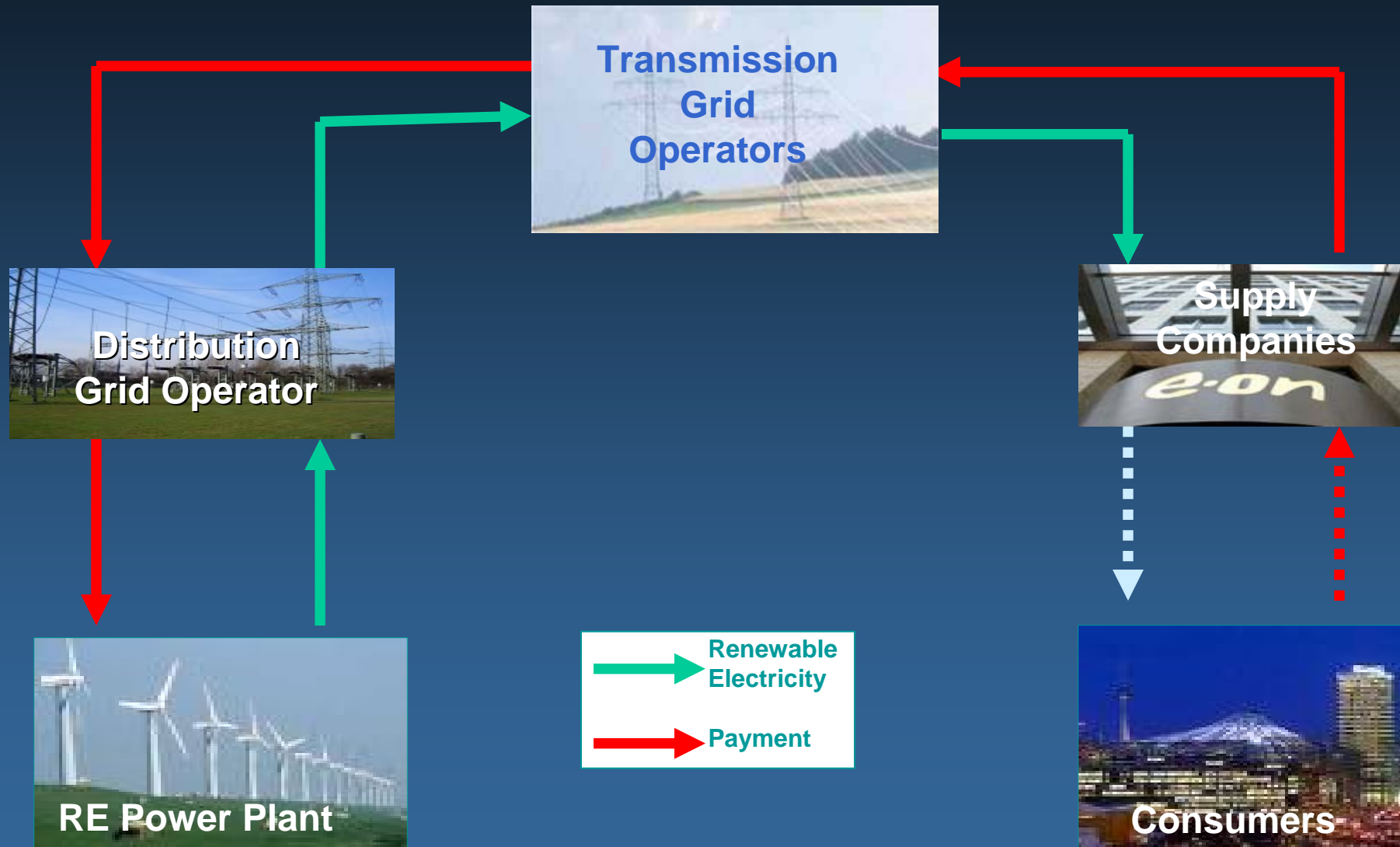


3. Grid operator pays remuneration (no state aid involved!)



4. Transfer of RE electricity and costs to the consumers

RE Act: Transfer Mechanism



Feed-in tariffs in Germany

	2005 (Cent/kWh)	Degression (%/a)
Hydropower	6.65-9.67	0
Biomass (<20MW)	8.27-17.33	1.5
Geothermal energy (<20MW)	7.16-15.00	1.0
Wind energy (onshore)	5.39-8.53	2.0
Wind energy (offshore)	6.19-9.10	2.0
Solar energy	43.42-59.53	5.0

Degression: The tariff remains constant for commissioned installations, but depends on the year of the initial operation. The later an RE installation is commissioned, the lower the tariff

Why different tariffs?

- All types of RE are needed to reach the RE targets
- Costs for RE electricity depend on different factors, e.g. kind of RE or size of plant
- Consequences:
 - tariffs need to be differentiated by source and size of plant
 - tariffs for new plants need to decrease every year to further technological development and to bring costs down

How do we calculate the tariff ?

- Scientific studies investigate specific cost per kWh.
- Payback period: 16 to 20 years
- Internal rate of return: e.g. wind power: ~10%

E.g.: Wind Power

Calculation basis for tariffs:

- Price of power plant (€ 895/MW)
- Costs for infrastructure etc. (30% of price of power plant)
- Operating costs year 1-10 (4.8% of price of power plant)
- Operating costs year 11-20 (6% of price of power plant)
- Expected rate of inflation for 20 years (2%)
- Imputed interest (7.45%)
 - On borrowed capital (70%) : 5.5%
 - On own capital (30%): 12%

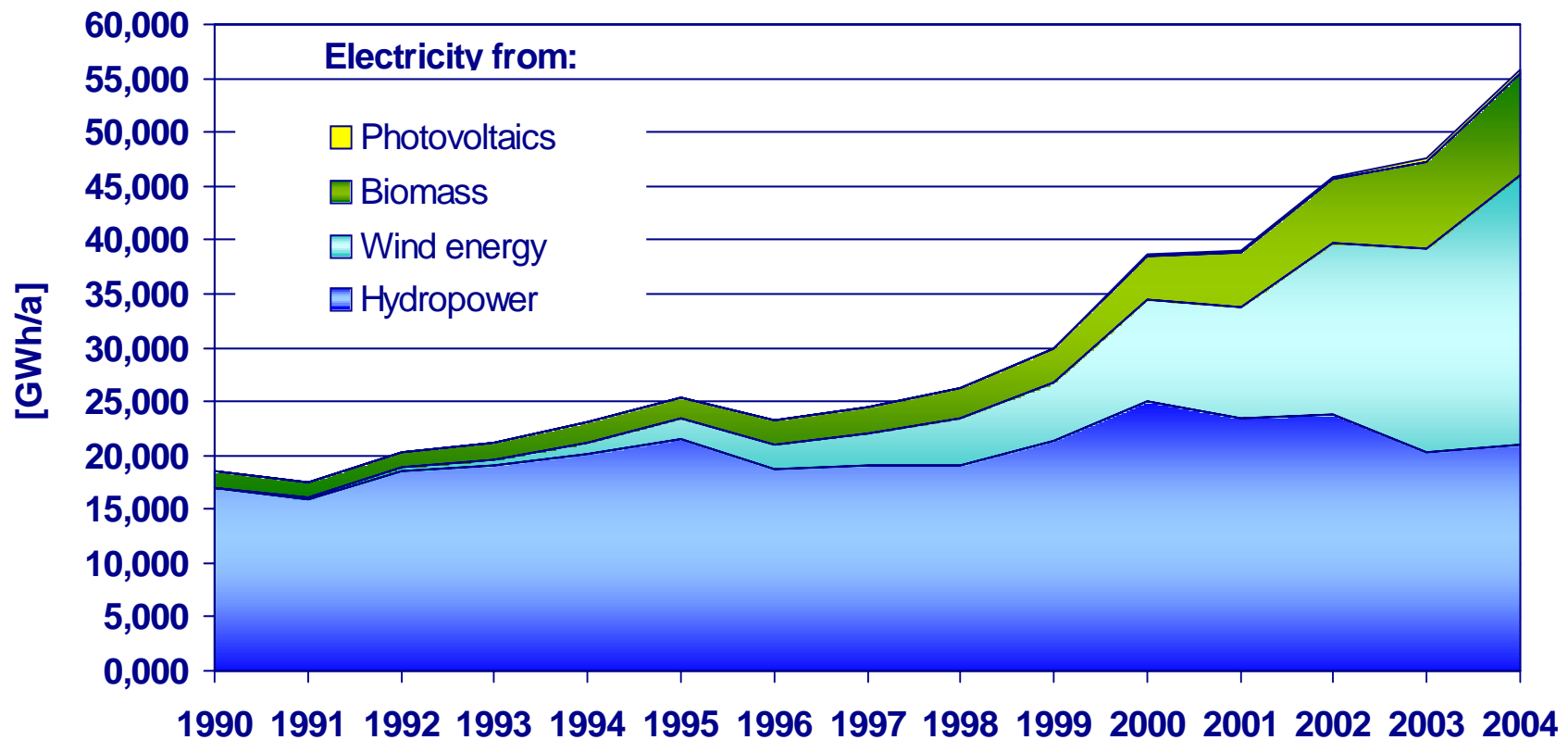
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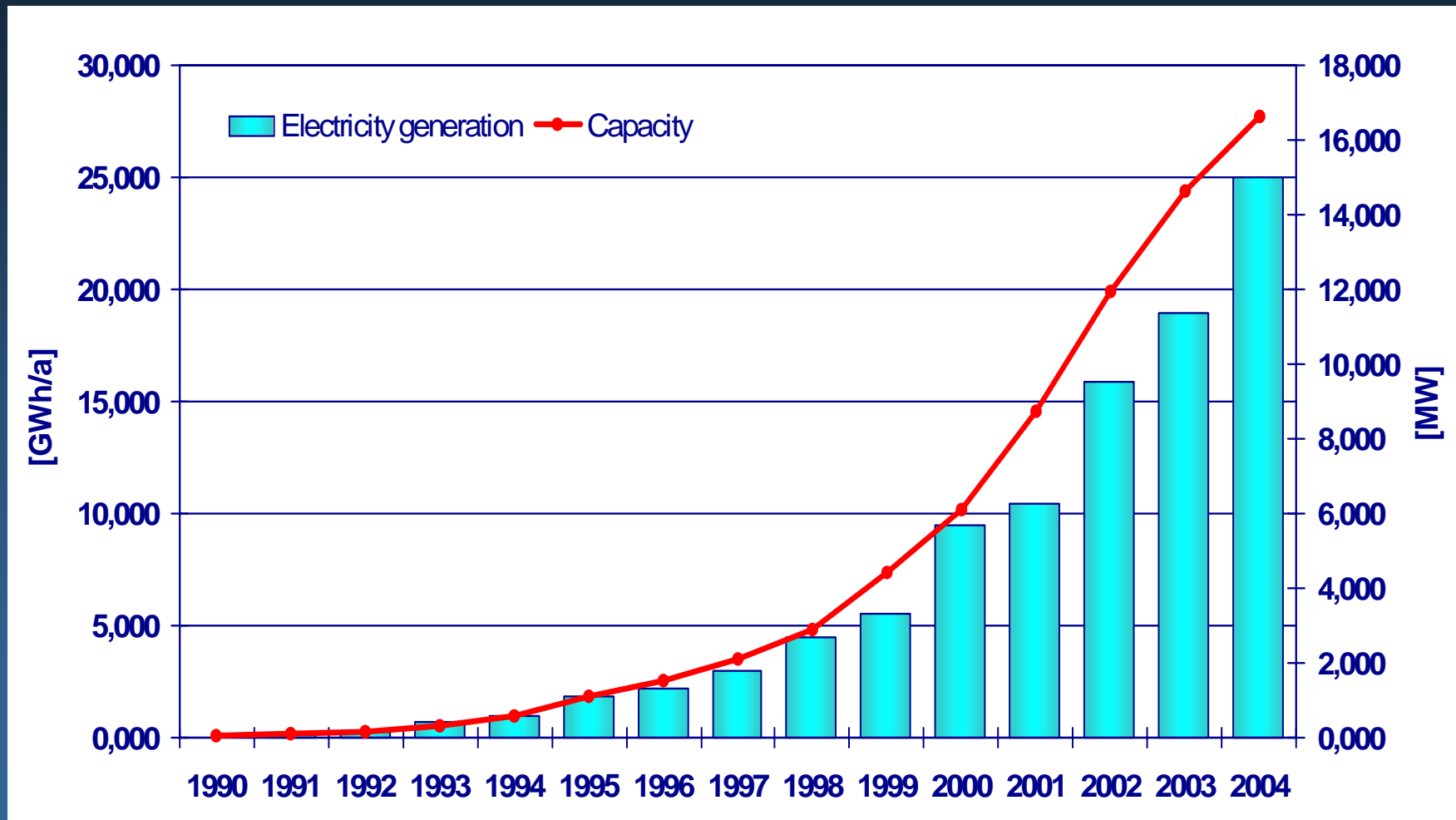
Achievements of the REA (2005)

- Rapid growth of RE (about 10 % per year since 1999)
- Share of RE electricity about 11% by the end of 2005
[1999: 4.6 %]
- 150,000 jobs
- 11.5 billion euro turnover per year
- 6 billion euro investment per year
- 52 million tonnes of CO₂ reduction

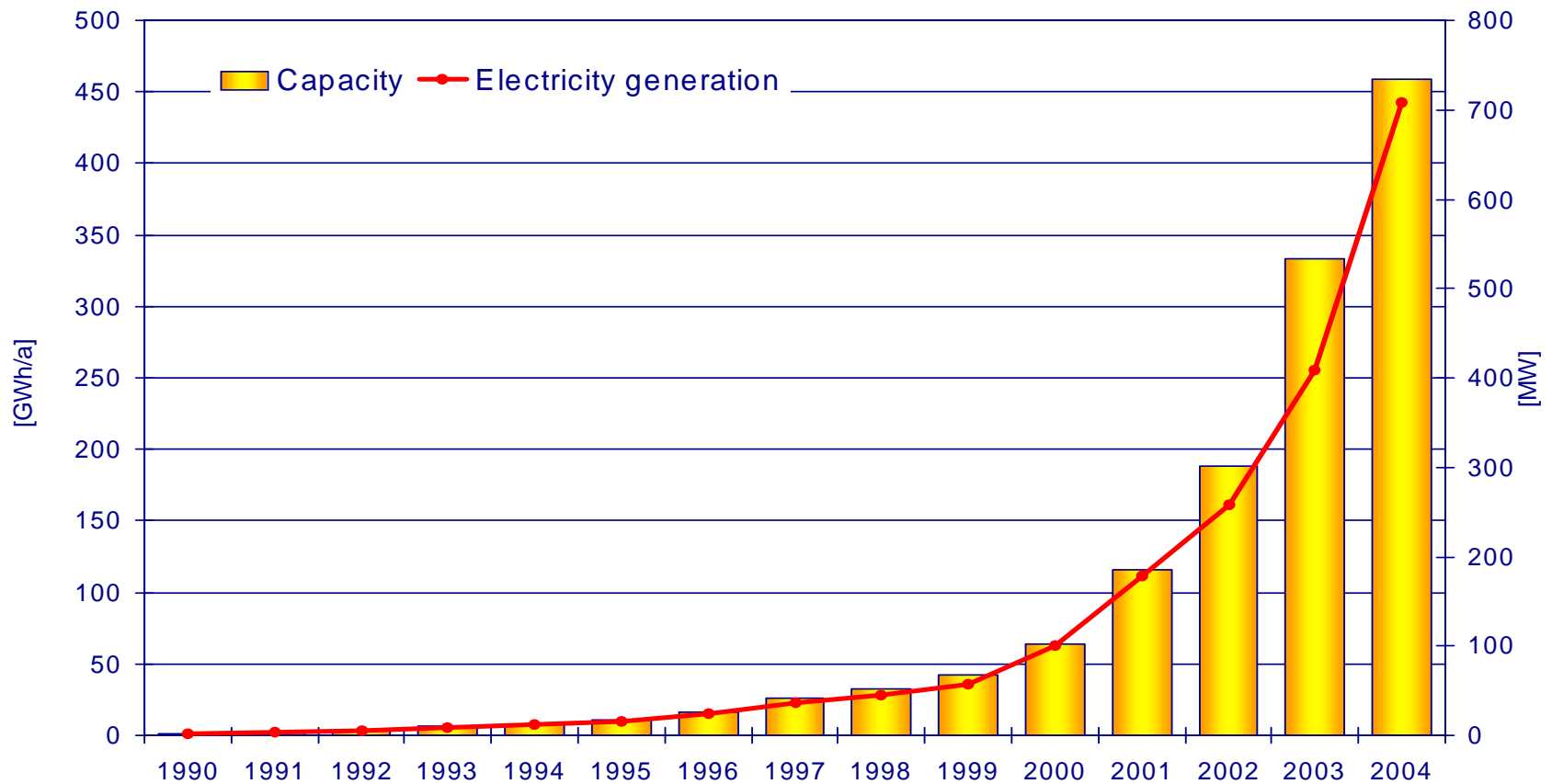
RE Electricity Generation in Germany



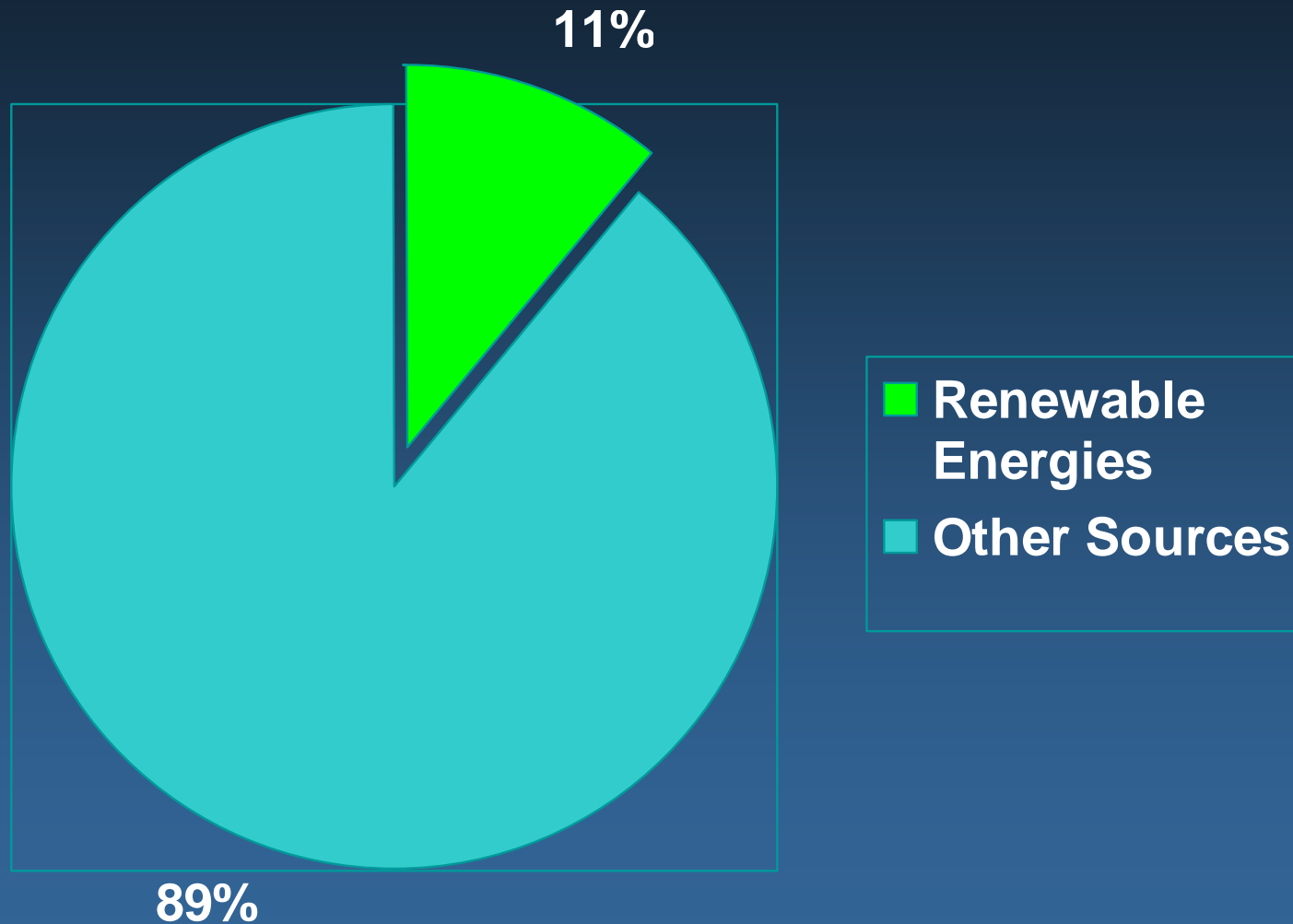
Wind Energy in Germany



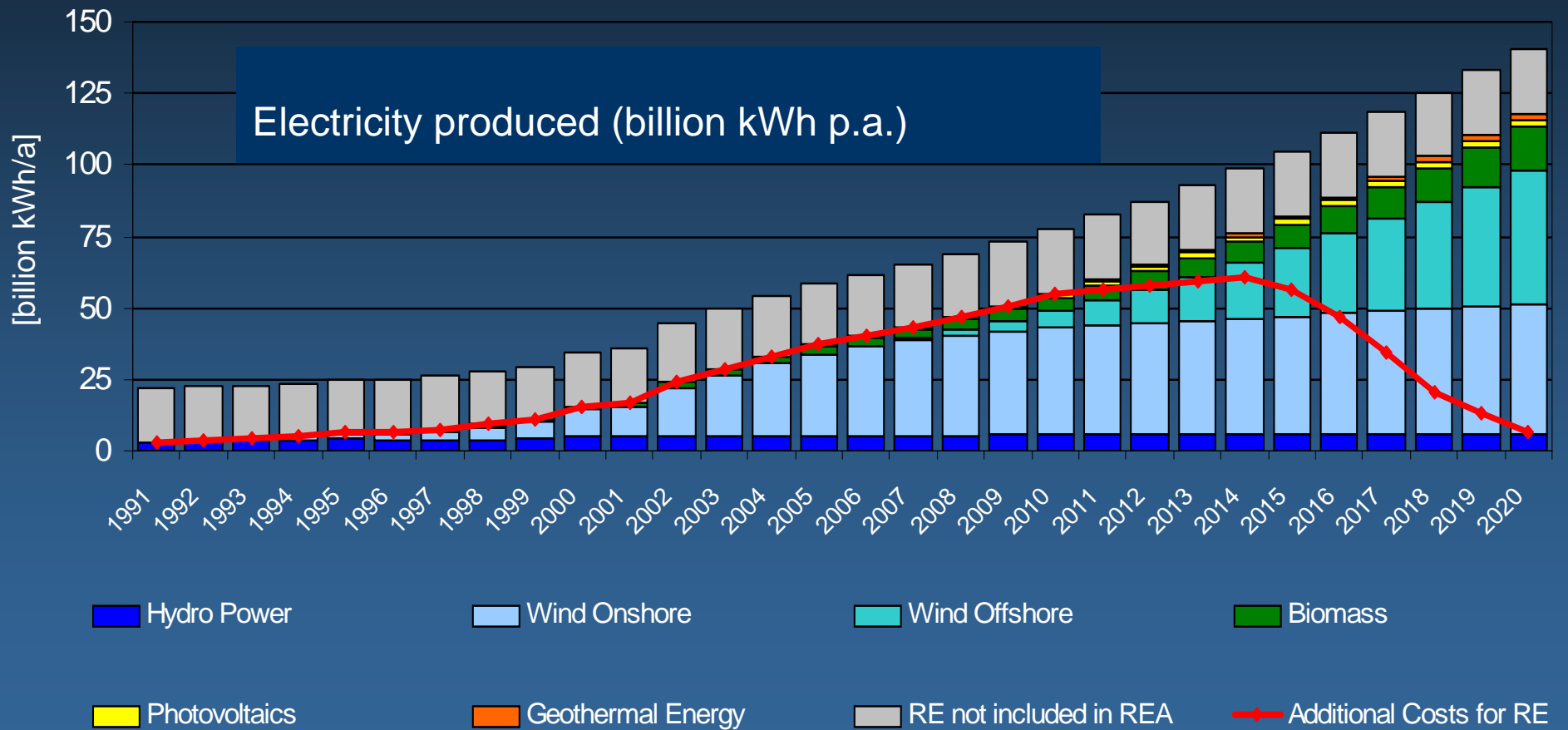
Photovoltaics in Germany



Share of RE Electricity Generation 2005



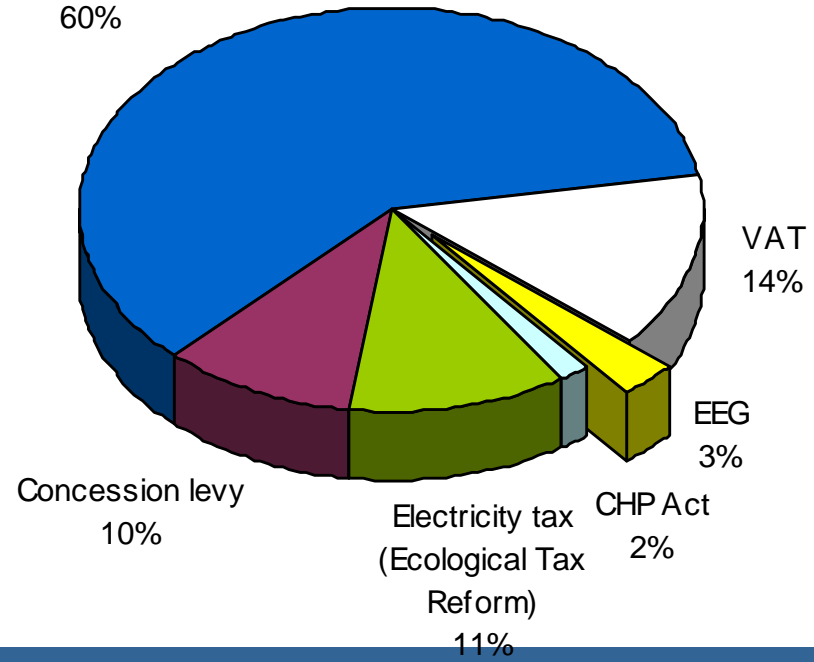
Expected Development



Cost for the Promotion of RE just 3%

Share of costs for one kilowatt hour(18 Ct)

Production,
transport and
marketing of
electricity
60%



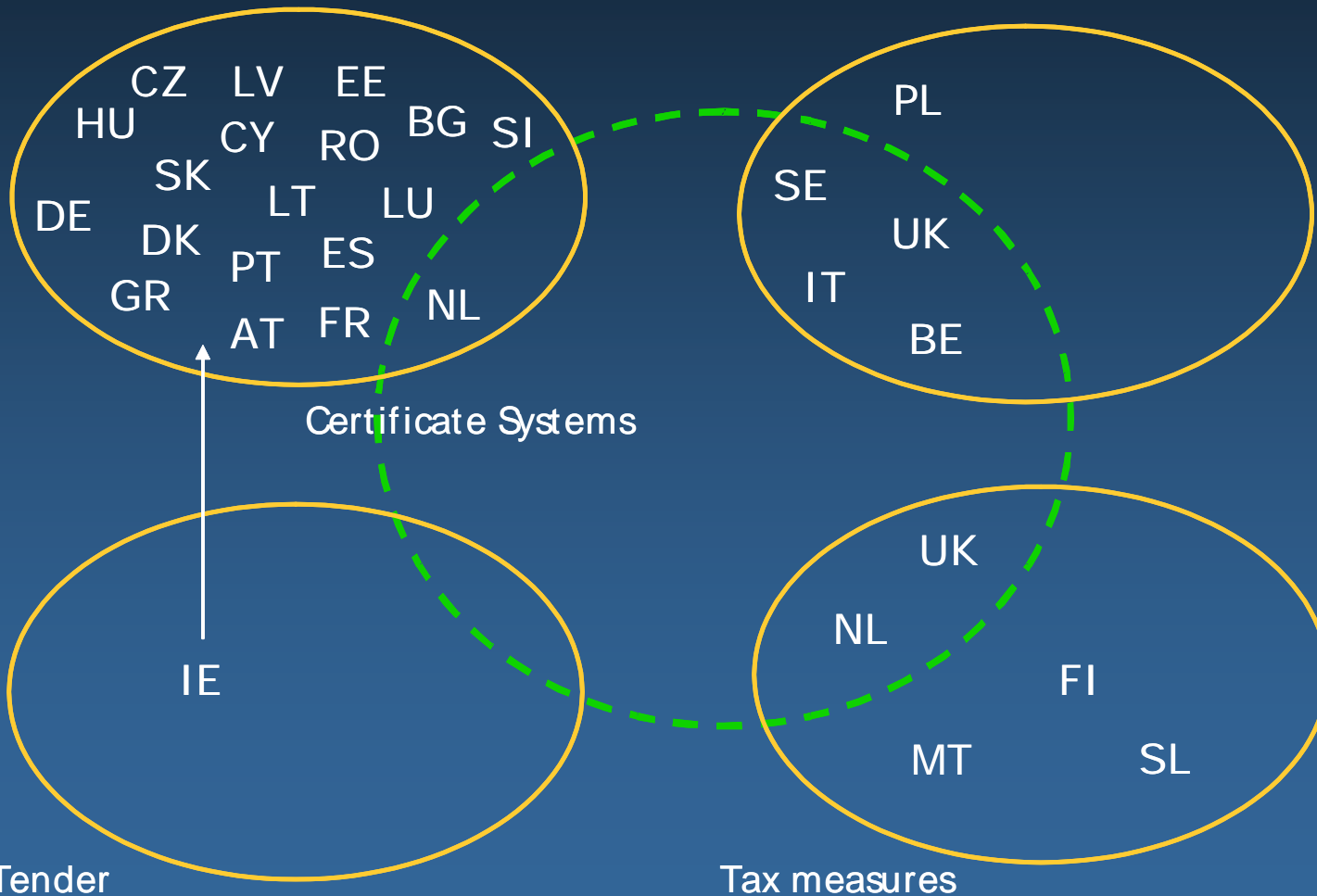
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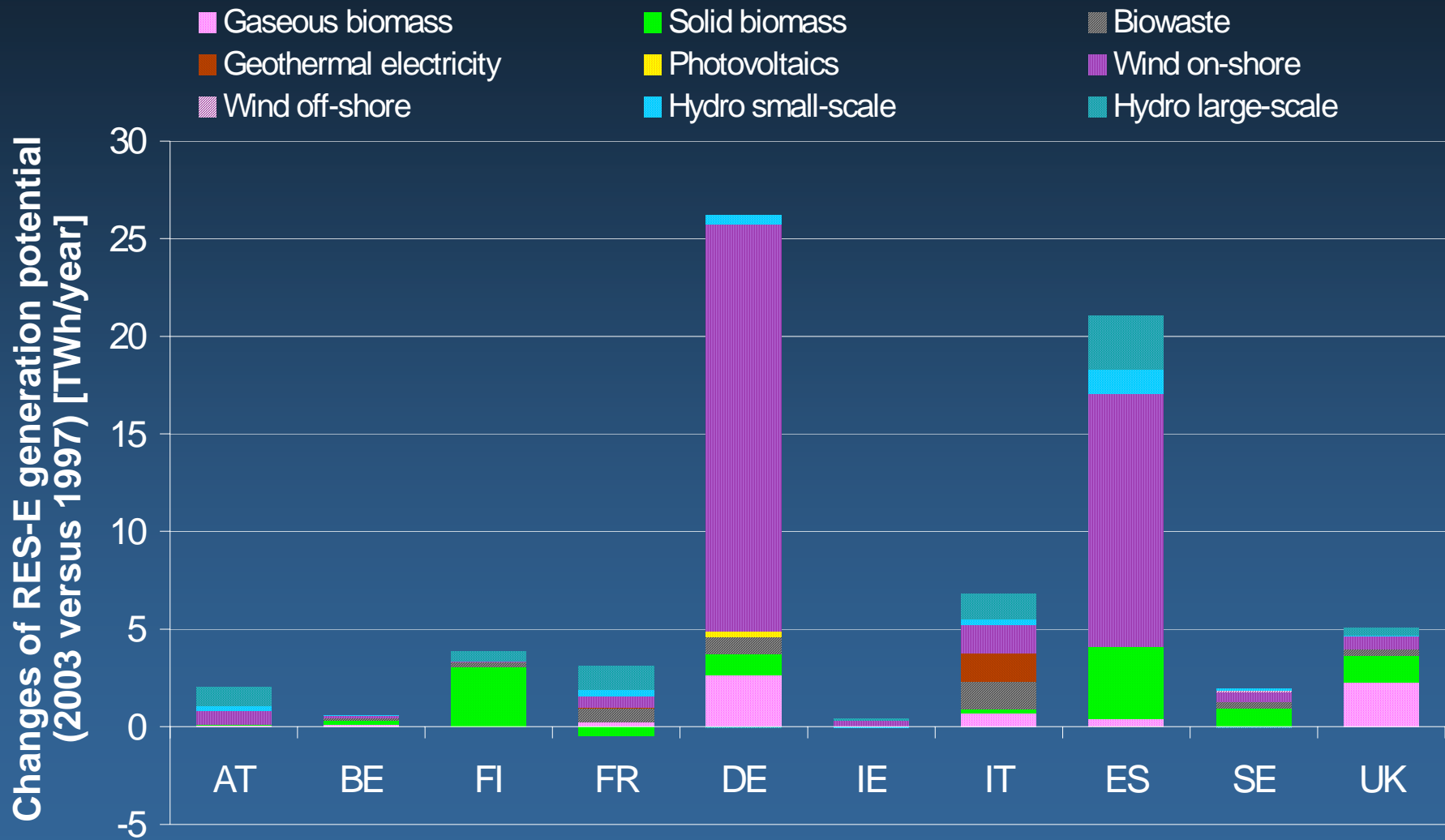
RE Electricity Policy in the EU:

Feed-in Tariff

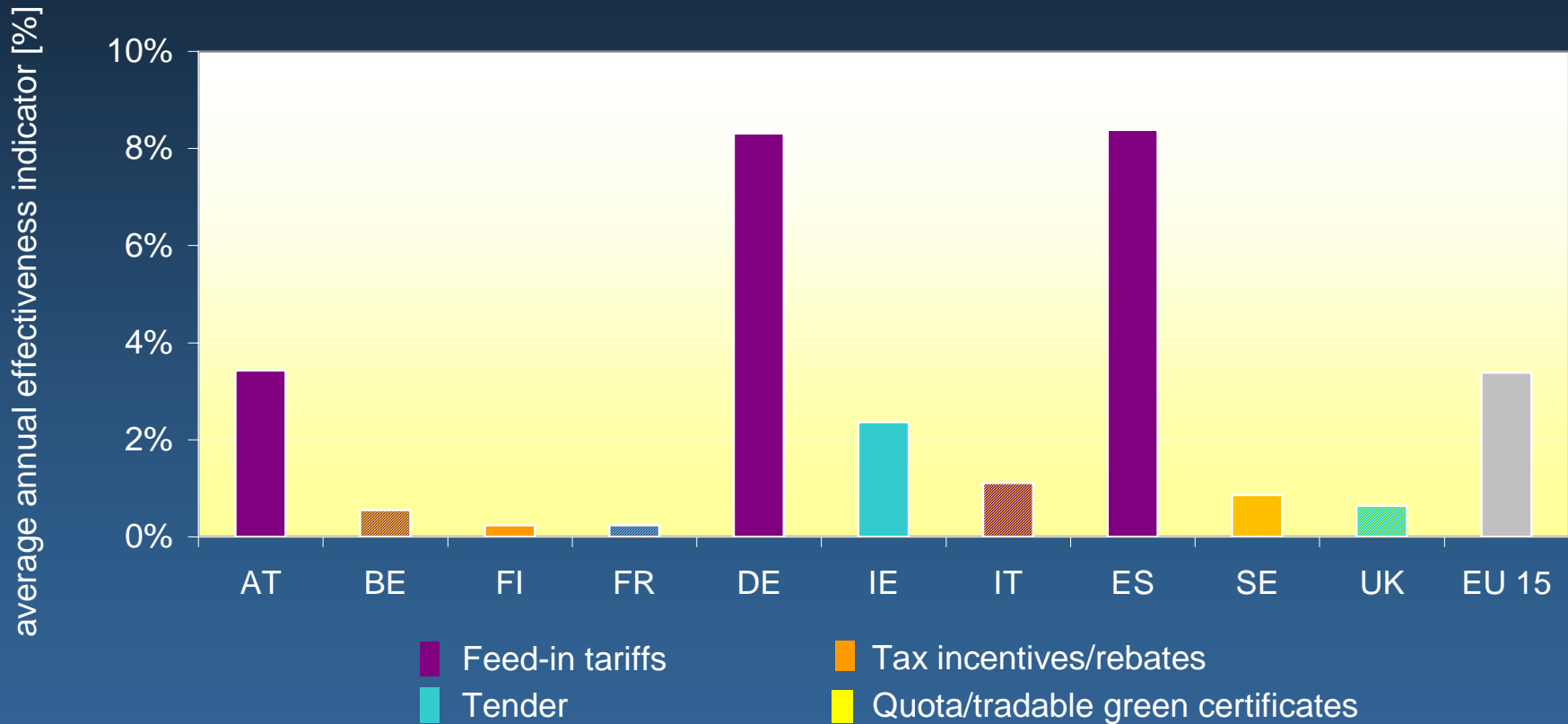
Quota



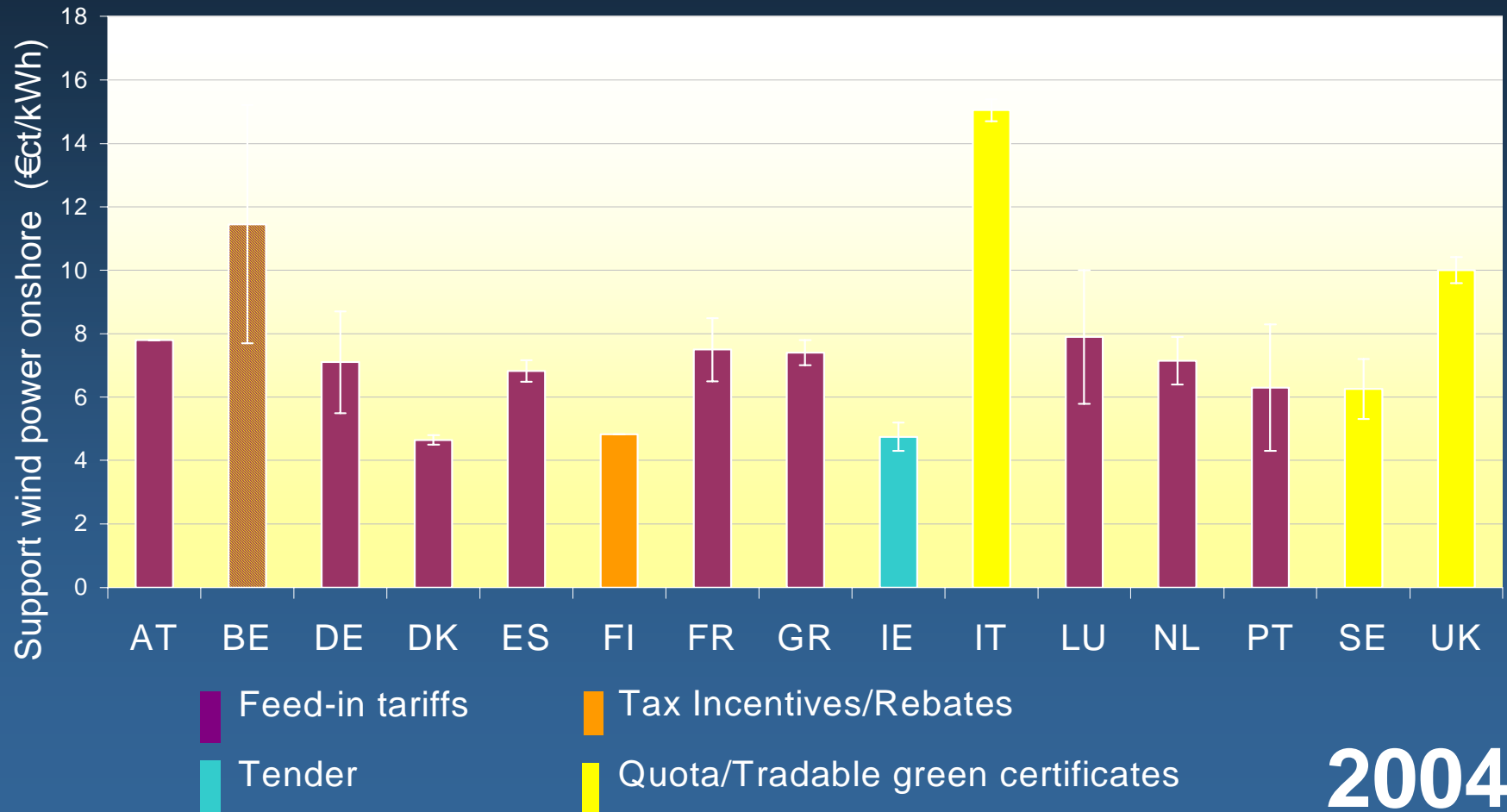
Additional RE Generation 1997-2003



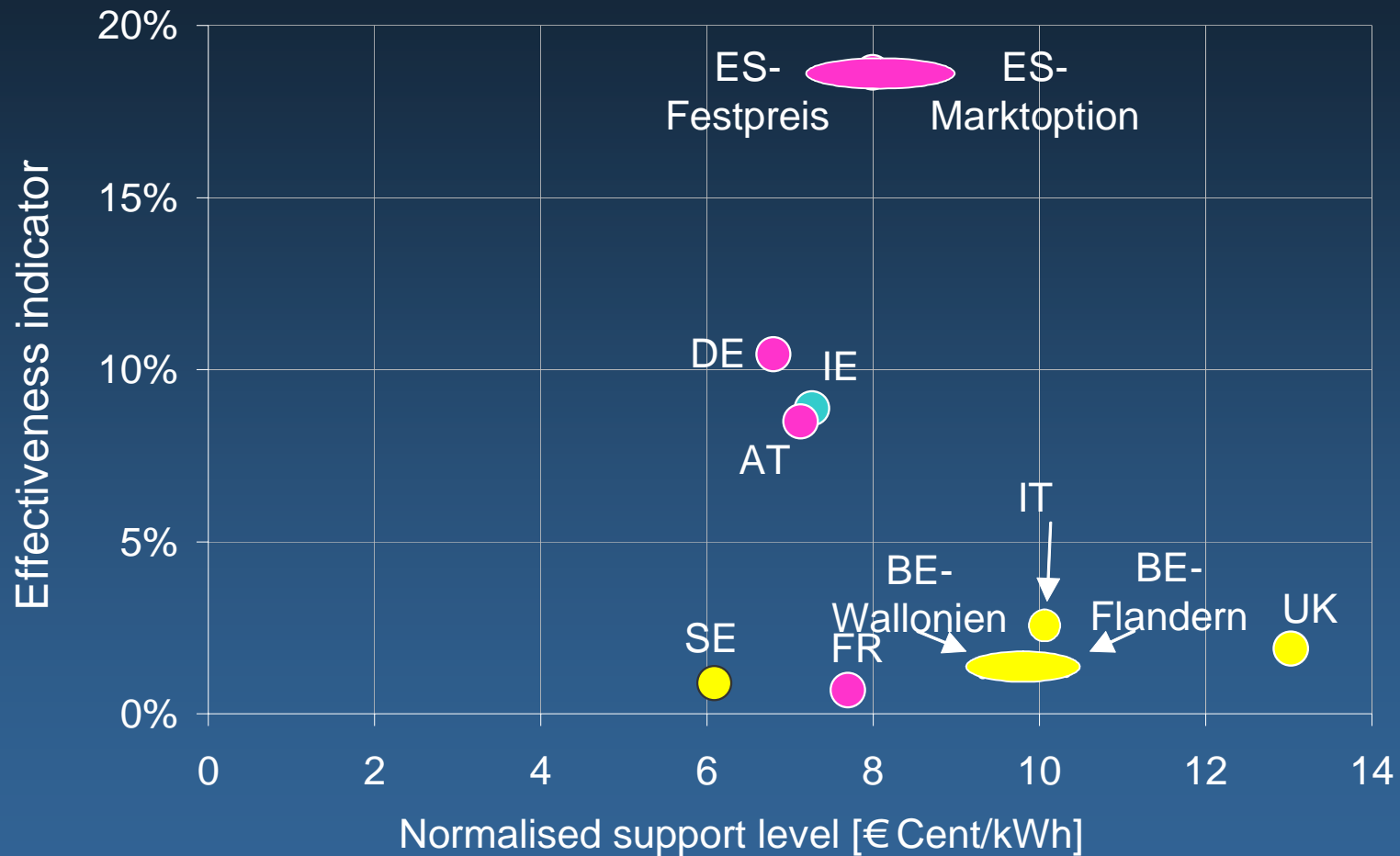
Effectiveness wind onshore 1997-2004



Level of support for wind onshore



Effectiveness vs. annuity (wind onshore)



Feed-in system

Tender system

Quota / TGC

2004

Conclusions:

- European Commission (12/2005):
„feed-in tariffs are currently in general cheaper and more effective than so called quota systems“, because
 - they give high planning and investment security
 - involve lower risks for the investor
 - are easy to handle
 - cause low transaction costs
- But: Success depends highly on details of regulation -> design carefully and properly!

Thank you for your attention!



www.erneuerbare-energien.de

Comparison of main RE instruments

- Feed-in laws: price fixed, quantity determined by market
- Quota obligation/tender: quantity fixed, price determined by market

	Price	Quantity
Feed-in law	Law	Market
Quota/Tender	Market	Law

=> In both cases markets are regulated