



Session 5: Power Up The Future - Energy and Mobility of Tomorrow -

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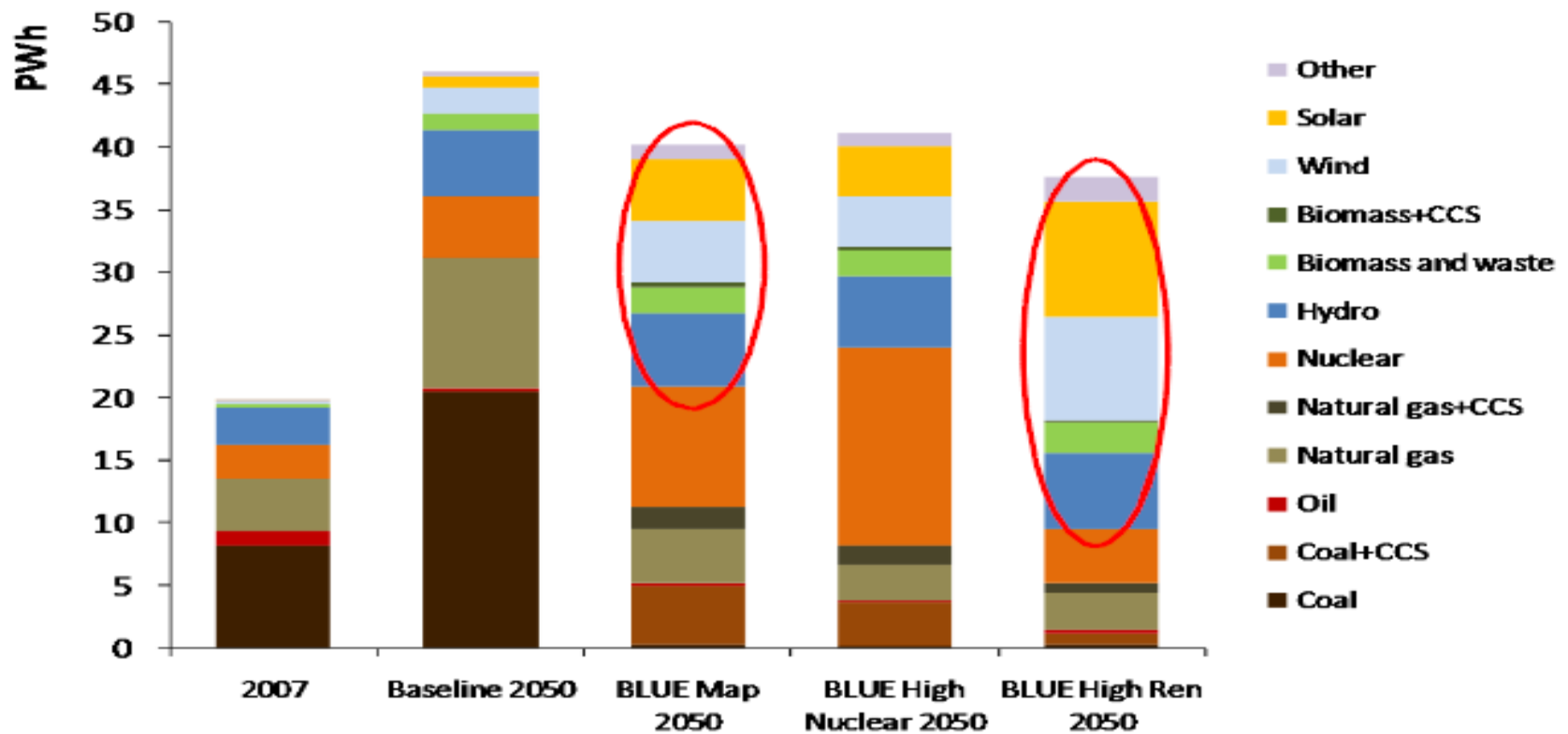
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8th July 2011

Sunway Resort Hotel & Spa

IEA BLUE Map Scenario

The primary role of renewables in the BLUE scenarios

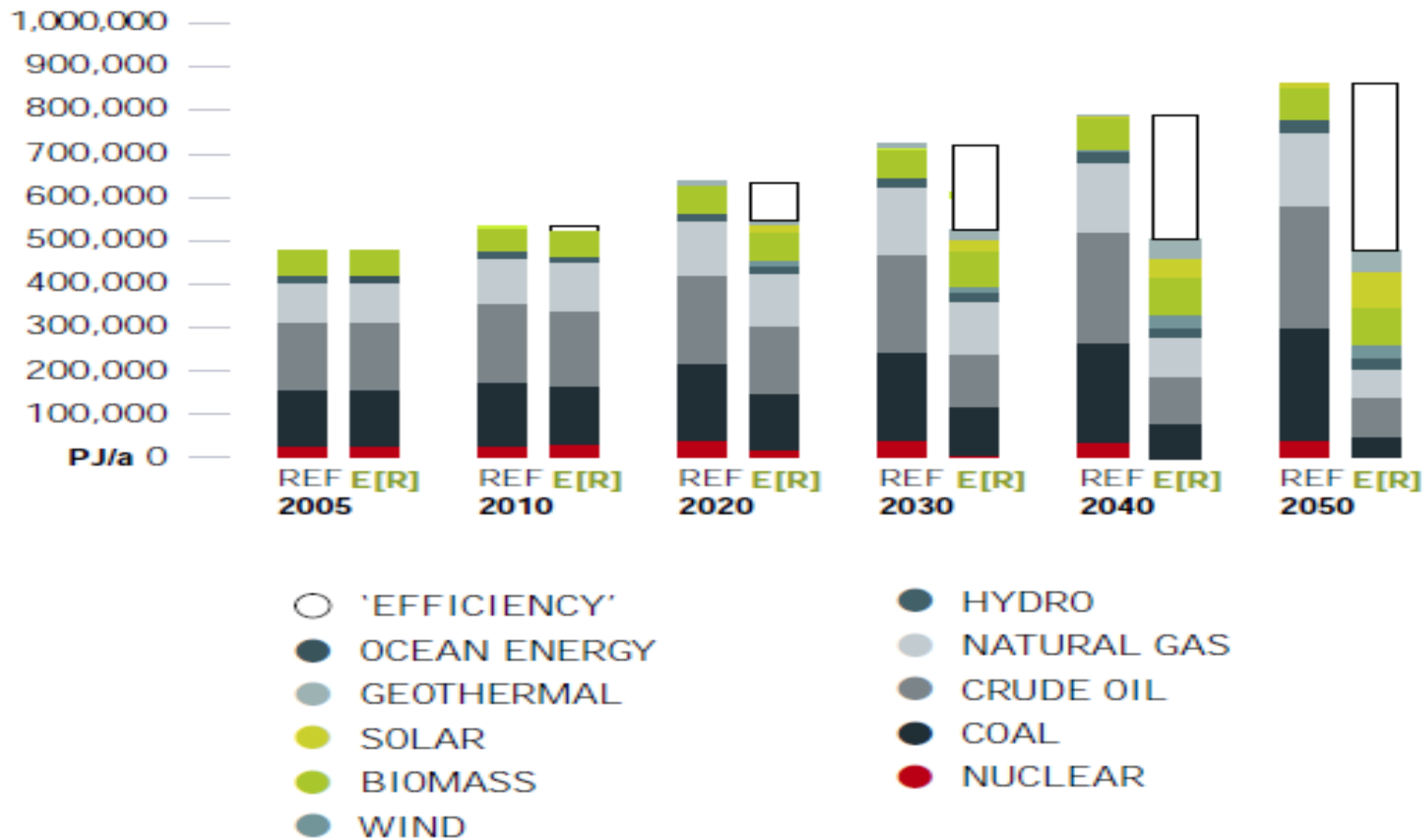


Renewables provide from almost half to three quarters of the global electricity generation in 2050

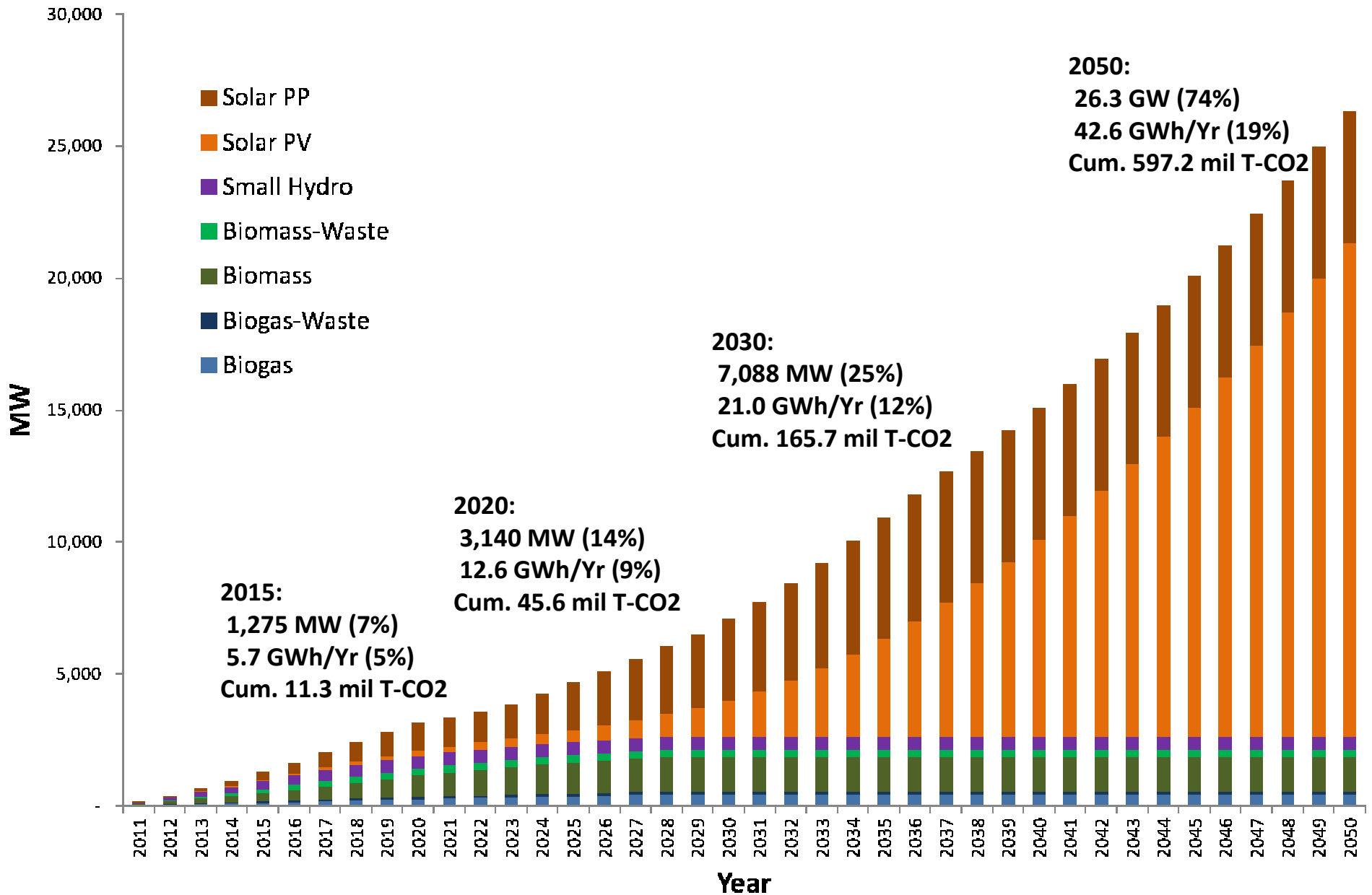
Energy (R)Evolution

figure 0.1: global: development of primary energy consumption under the two scenarios

('EFFICIENCY' = REDUCTION COMPARED TO THE REFERENCE SCENARIO)

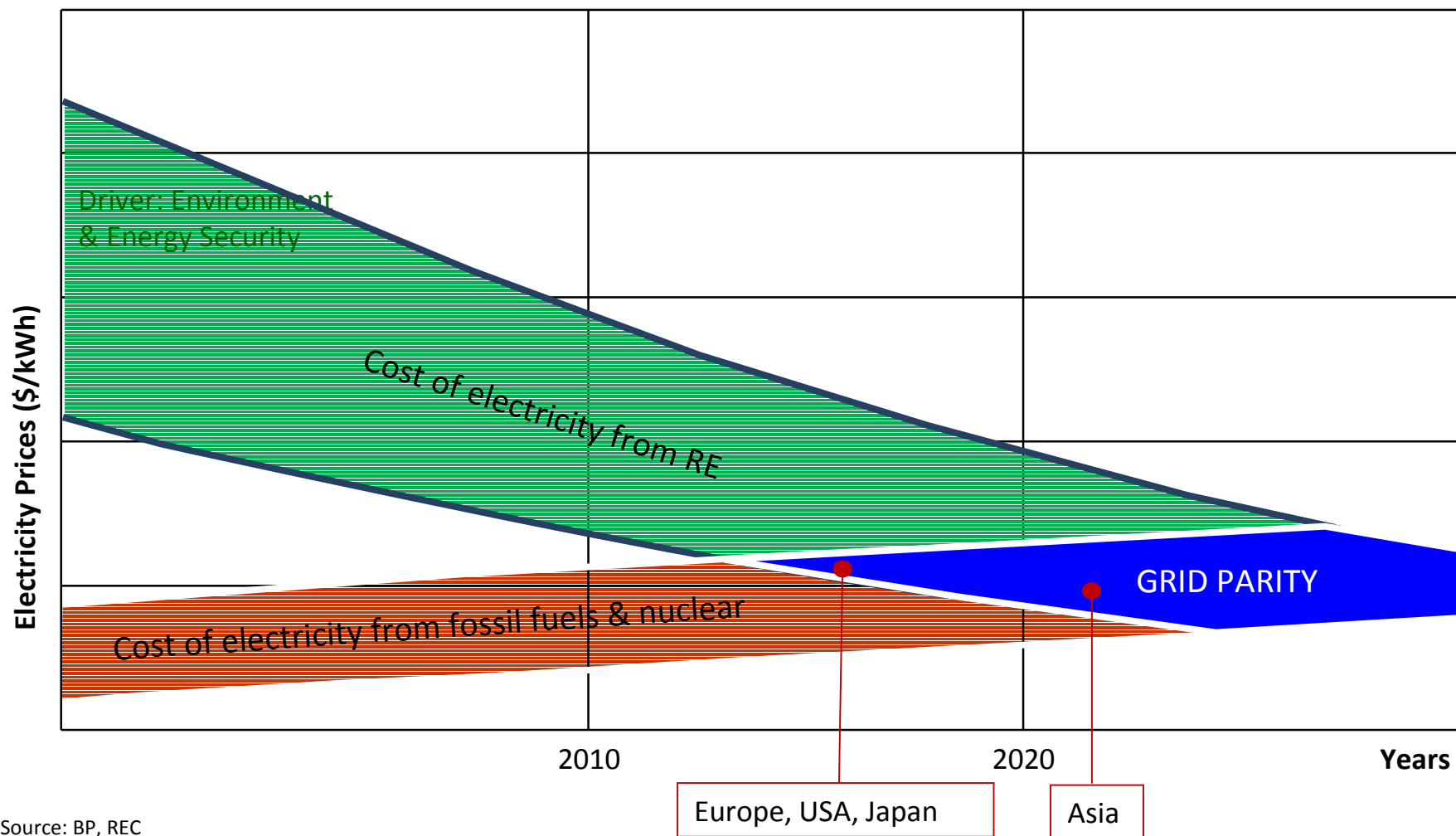


Malaysia: RE Goals



Source: Ahmad Hadri – National RE Policy, NKEA-OGE (EPP10)

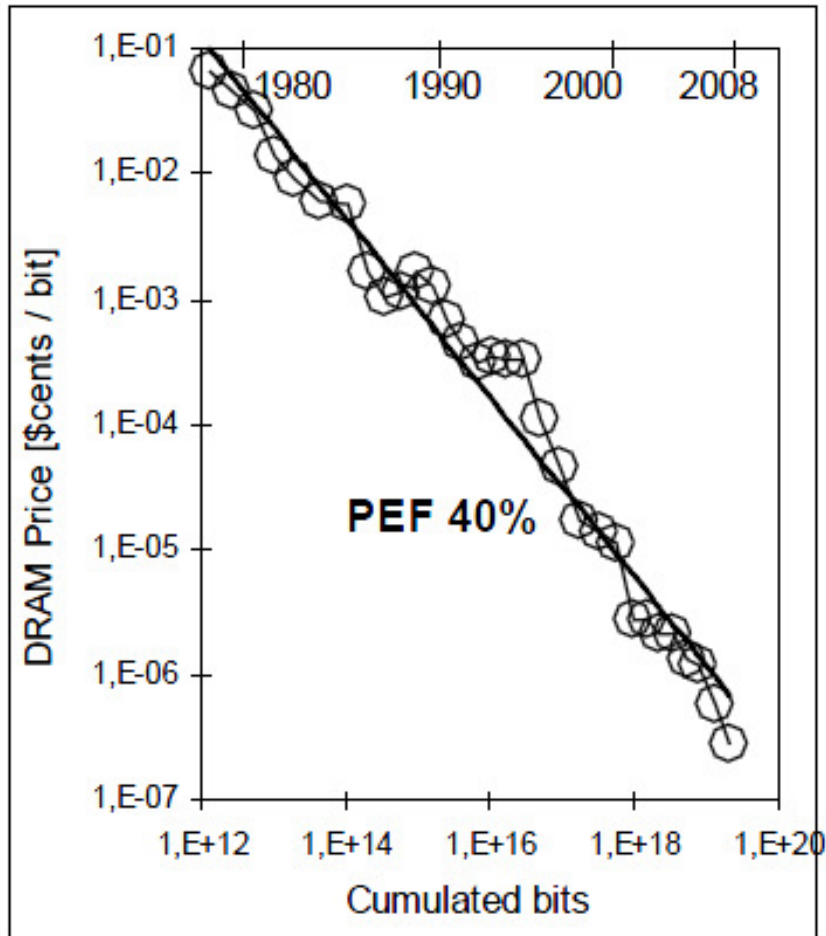
Powering The Future: Grid Parity for RE?



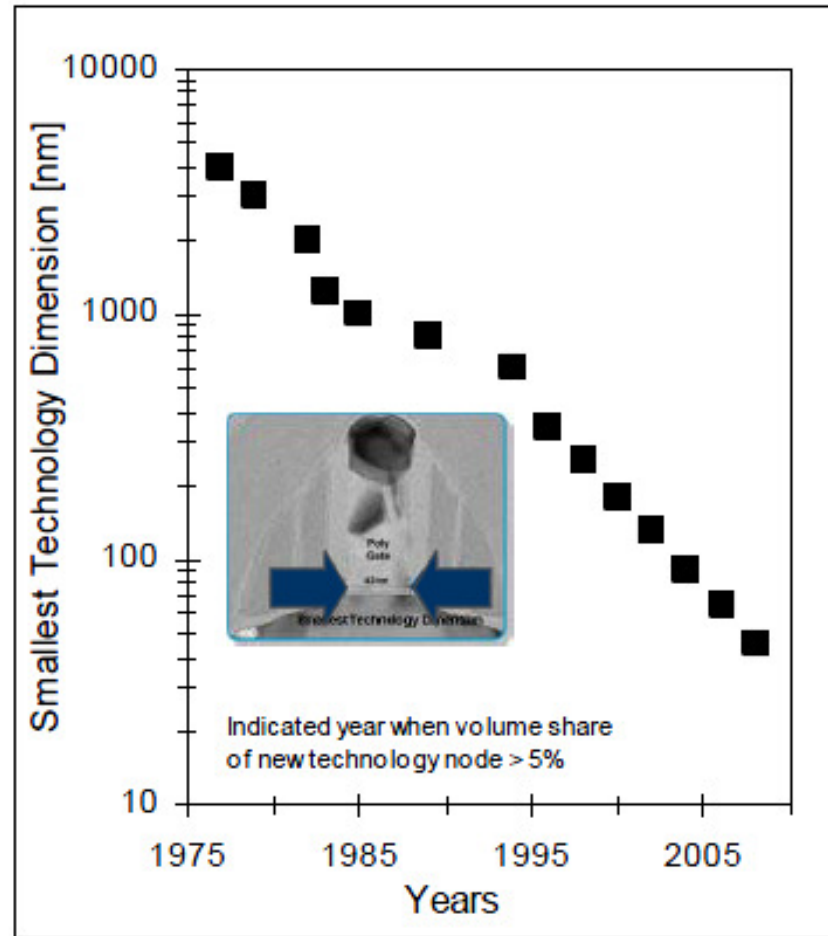
Source: BP, REC

DRAM – Moore's Law

Experience Curve



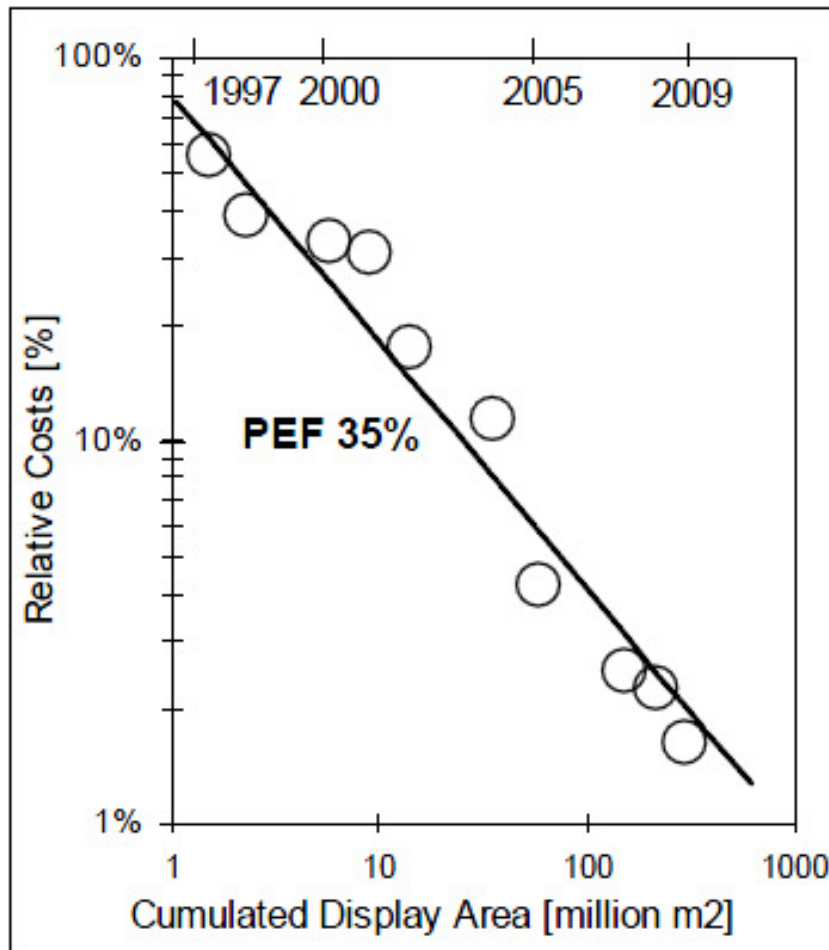
Driven by Technology



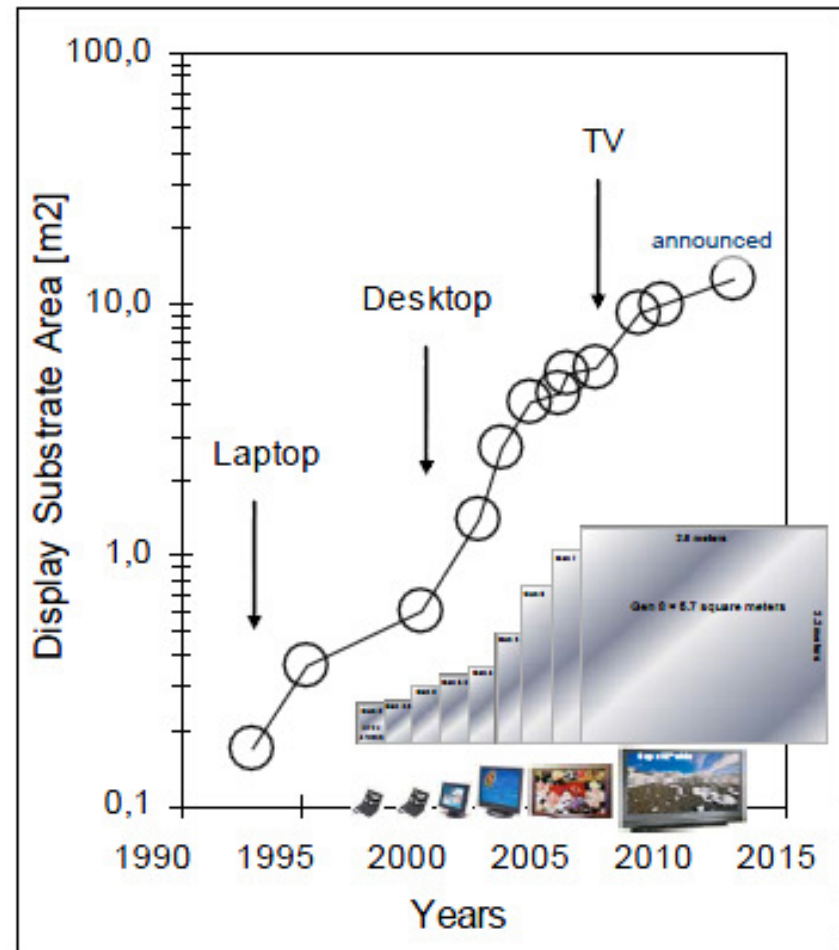
Source: Applied Materials

Flat Panel Displays

Experience Curve



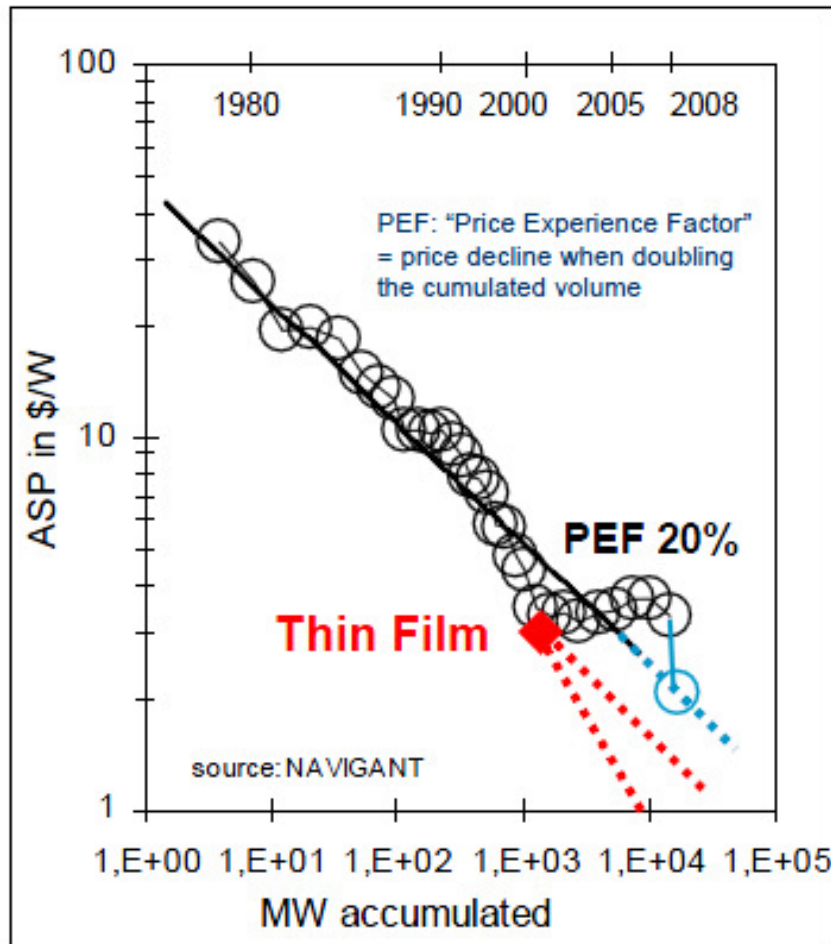
Driven by Technology



Source: Applied Materials

Photovoltaic (RE)

Price Experience Curve



Driven by Technology

- **Economy of scale**
0,1MW → 200MW
- **Automation**
Industrial manufacturing
- **Wafer thickness**
0,7mm → 0,15mm
- **Kerf loss**
0,5mm → 0,10mm
- **Efficiency**
8% → 22%

Source: Applied Materials

What are the differences?

Consumer Goods	Strategic Goods
<ul style="list-style-type: none">▪ Mobiles▪ Laptops▪ Flat panel displays▪ Automobiles▪ Etc.	<ul style="list-style-type: none">▪ The way electricity is produced▪ The way transportation is done▪ The way people are living in urban environment
Only need global trade fair because consumers want the new products	Do need initial political and public support

Quoted from Dr. Winfried Hoffmann

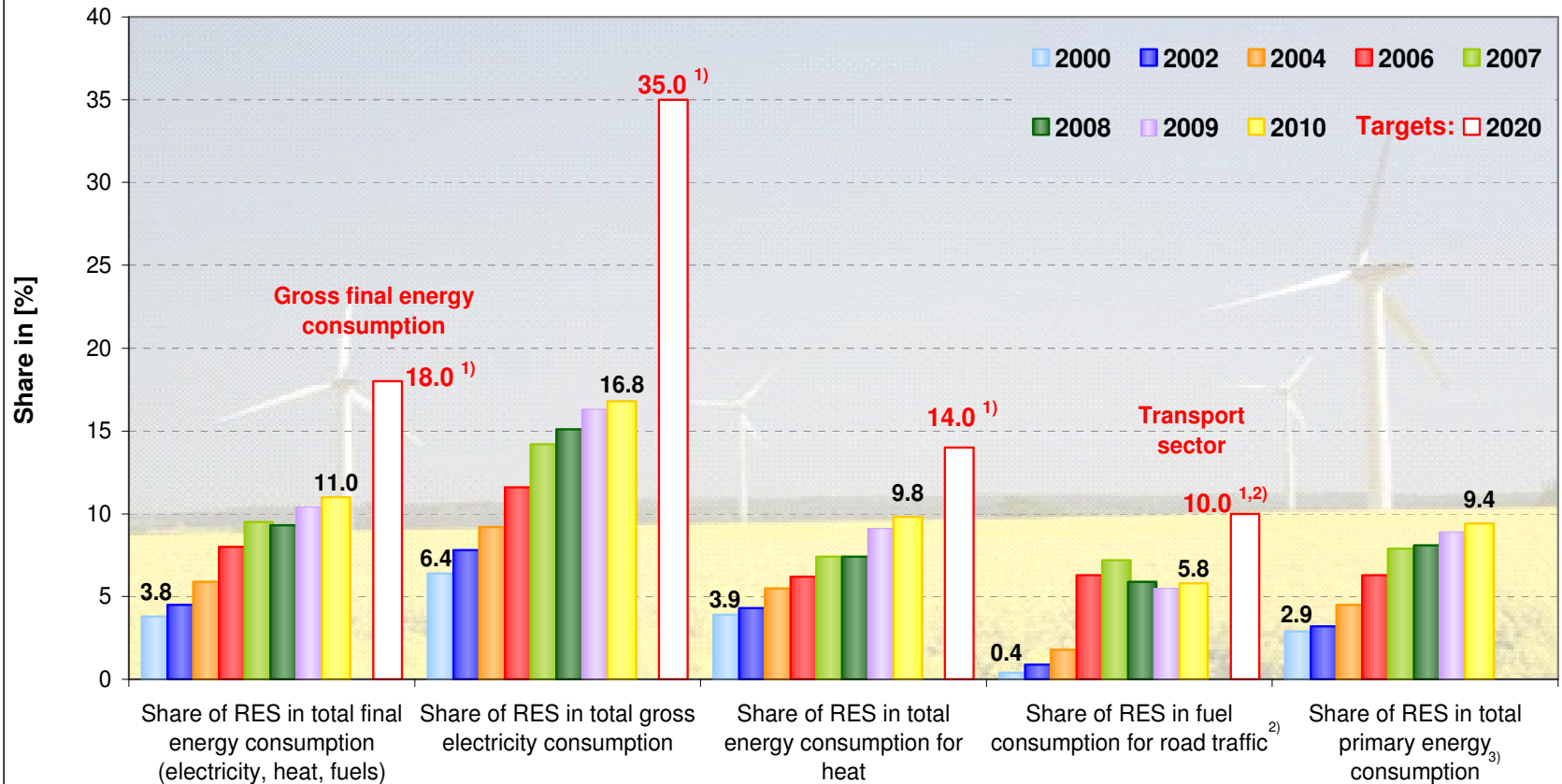
In summary:

- New technologies in the beginning always have high costs (prices)
- Cost (price) can only reduce with large demands (Price Experience Curve)
- Only **market pull** with technology drive (innovation) will create the Price Experience Curve, not technology push by its own

Q: What is the best market pull mechanism?

Leading Example: Germany

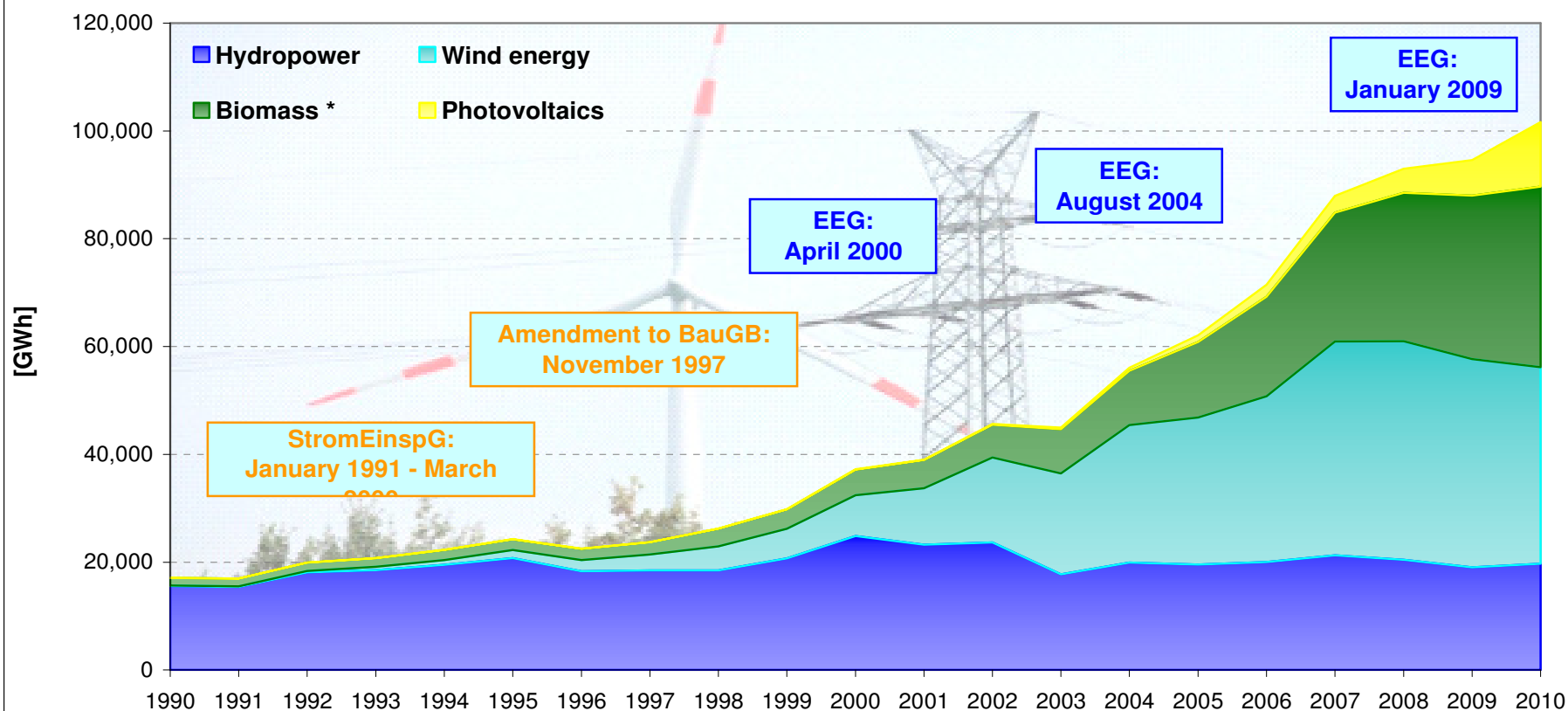
Renewable energy sources as a share of energy supply in Germany



RES: Renewable Energy Sources; 1) Sources: Targets of the German Government according to Energy Concept, Renewable Energy Sources Heat Act (EEWärmeG) and EU-Directive 2009/28/EC; 2) Total consumption of engine fuels, excluding fuel in air traffic; 3) Calculated using efficiency method; Source: Working Group on Energy Balances e.V. (AGEB); Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); image: BMU / Brigitte Hiss; as at: March 2011; all figures provisional

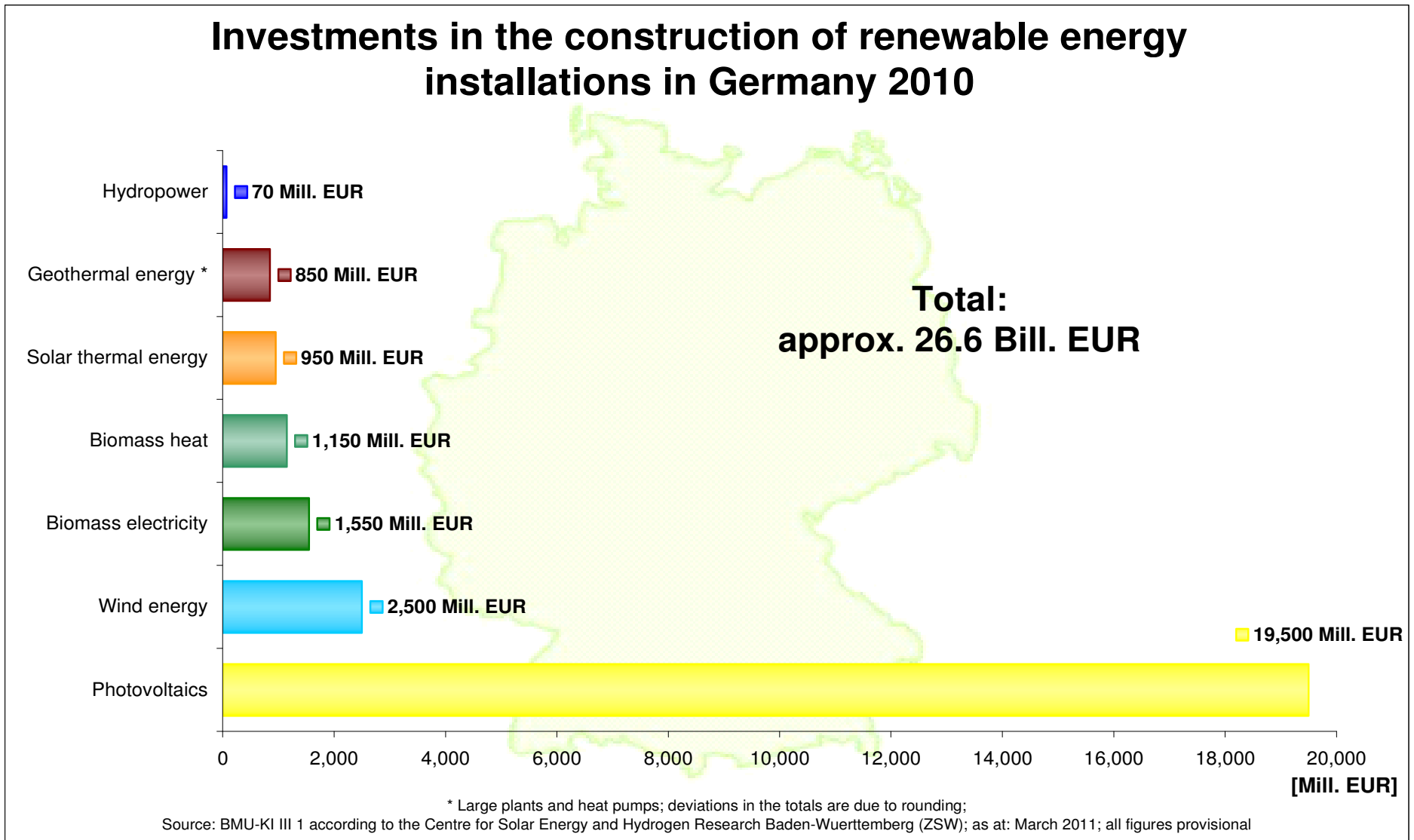
Feed-in Tariff: Market Pull for Renewables

Development of electricity generation from renewable energy sources in Germany



* Solid and liquid biomass, biogas, sewage and landfill gas, biogenic share of waste; electricity from geothermal energy not presented due to negligible quantities produced; 1 GWh = 1 Mill. kWh;
 StromEinspG: Act on the Sale of Electricity to the Grid; BauGB: Construction Code; EEG: Renewable Energy Sources Act;
 Source: BMU-KI III 1 according to Working Group on Renewable Energy Sources-Statistics (AGEE-Stat); image: BMU / Christoph Edelhoff; as at: March 2011; all figures provisional

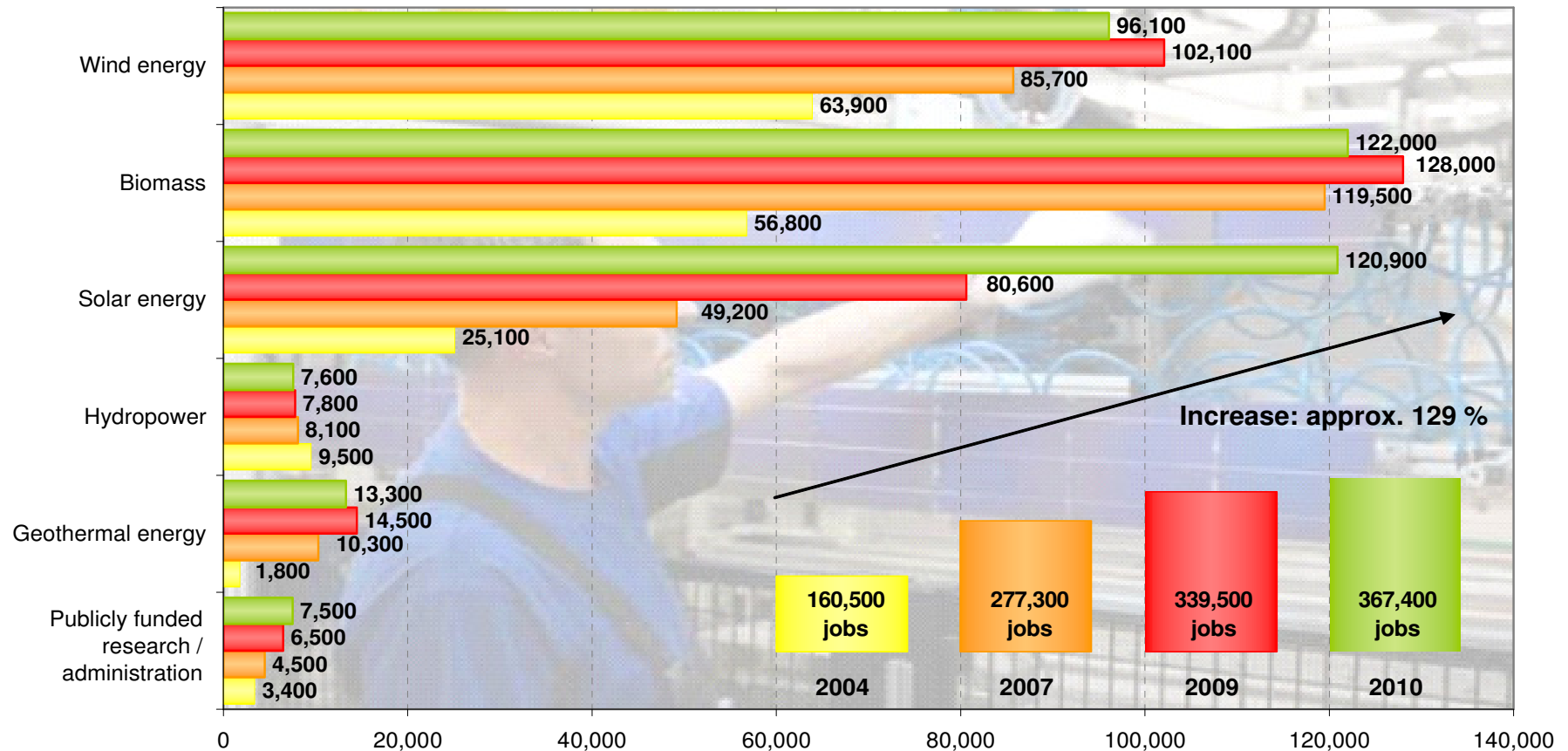
FiT: Impact to Industry (Germany)



Source: BMU – KI III 1

FiT: Employments (Germany)

Jobs in the renewable energy sources sector in Germany



Figures for 2009 and 2010 are provisional estimate; deviations in totals are due to rounding;

Source: O'Sullivan/Edler/van Mark/Nieder/Lehr: "Bruttobeschäftigung durch erneuerbare Energien im Jahr 2010 – eine erste Abschätzung", as at: March 2011; interim report of research project „Kurz- und langfristige Auswirkungen des Ausbaus erneuerbarer Energien auf den deutschen Arbeitsmarkt“; image: BMU / Christoph Busse / transit

Thank You

More info on Malaysian feed-in tariff is available from
www.mbipv.net.my

coming soon...
www.seda.gov.my