



New York, 22 February 2010

## Greening the transatlantic alliance: EU and US perspective on a global carbon market to combat climate change

III Panel - EU and US Partnership: the way forward

Mario Gamberale

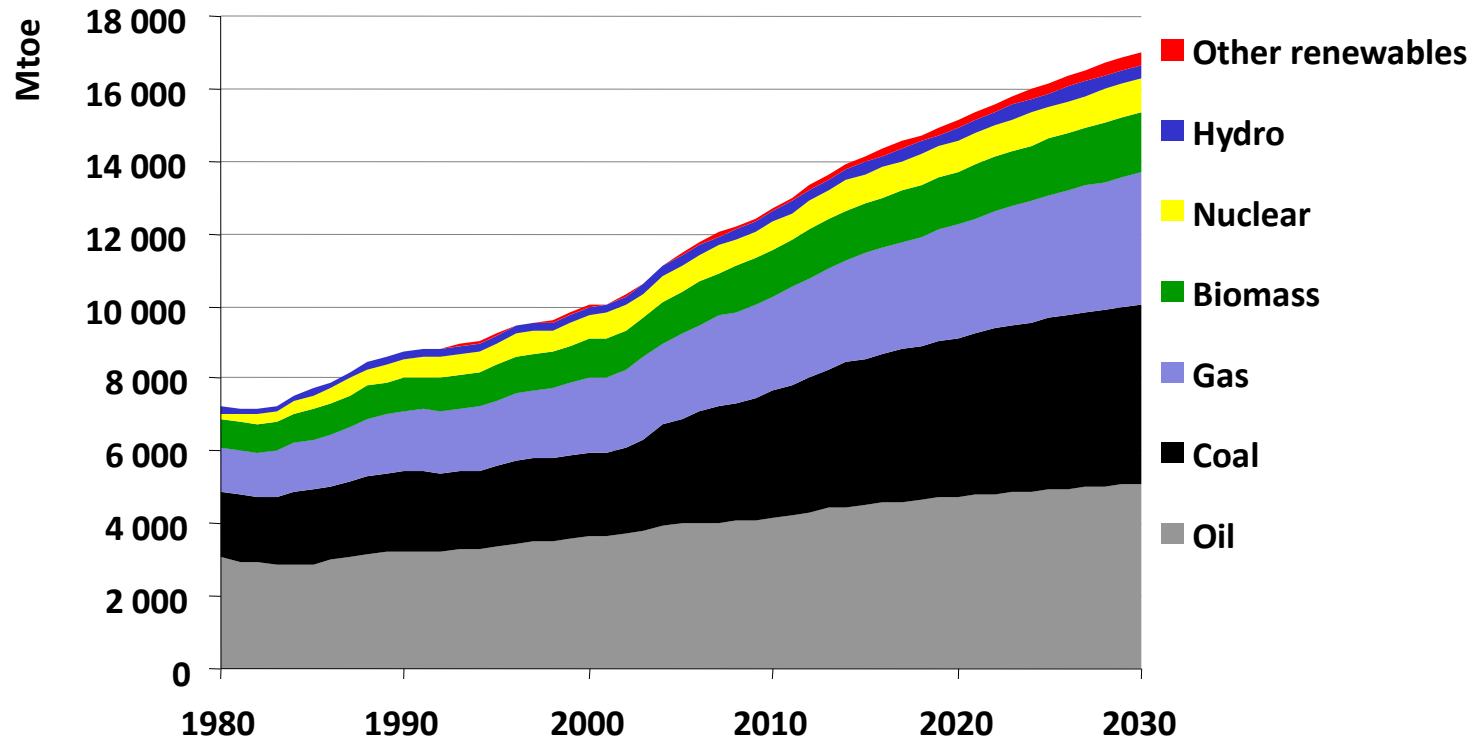


# Contents

- World energy consumption and standard scenarios: IEA Reference Energy Scenarios;
- Drivers for energy transition; energy security, climate change;
- Role of Europe: EU unilateral targets;
- Instruments for EU politics: wide mix of energy policies;
- Effects of EU policies on EU energy markets;

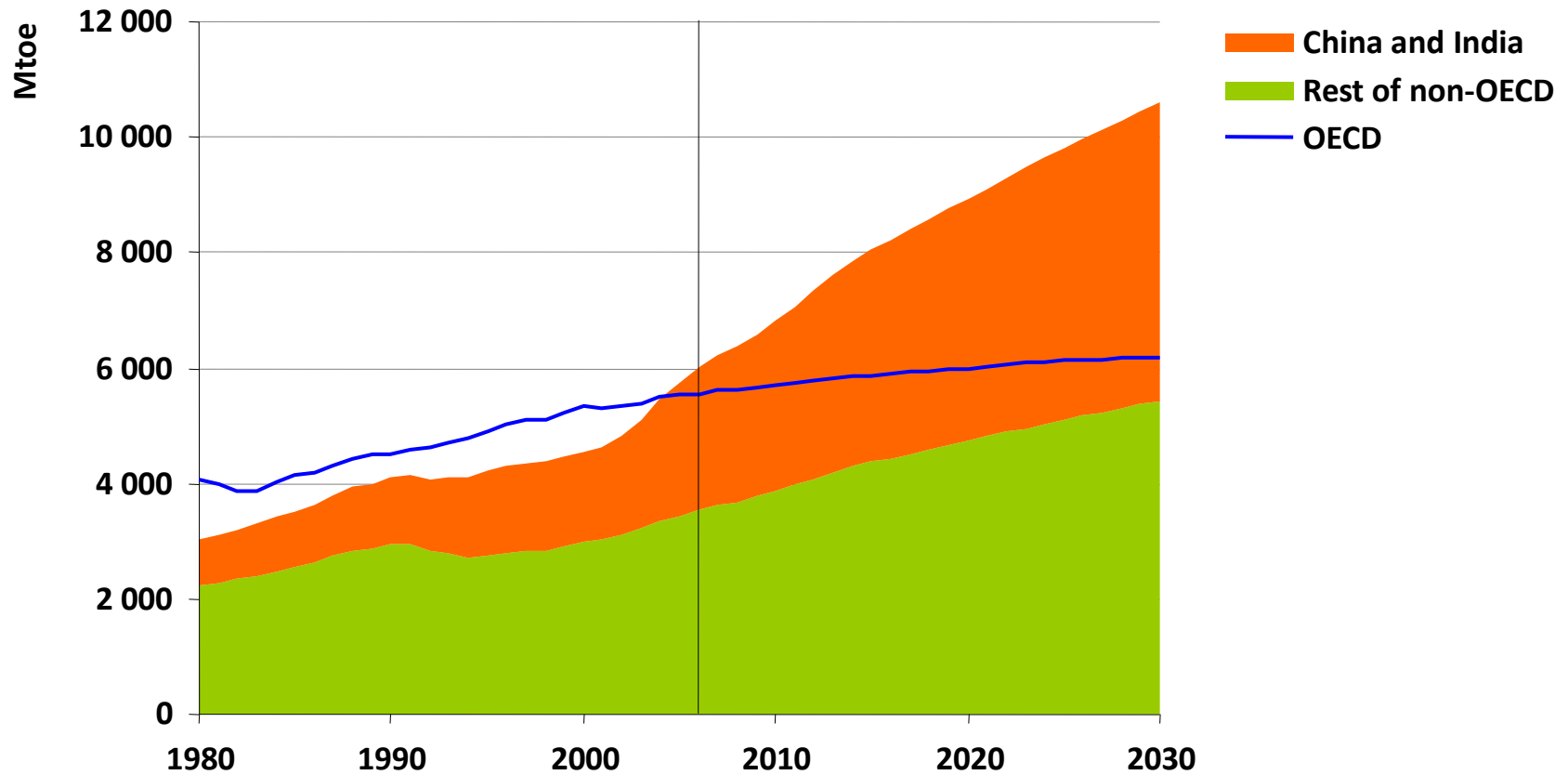
# The IEA Reference Scenario

World primary energy demand in the Reference Scenario: **this is unsustainable!**



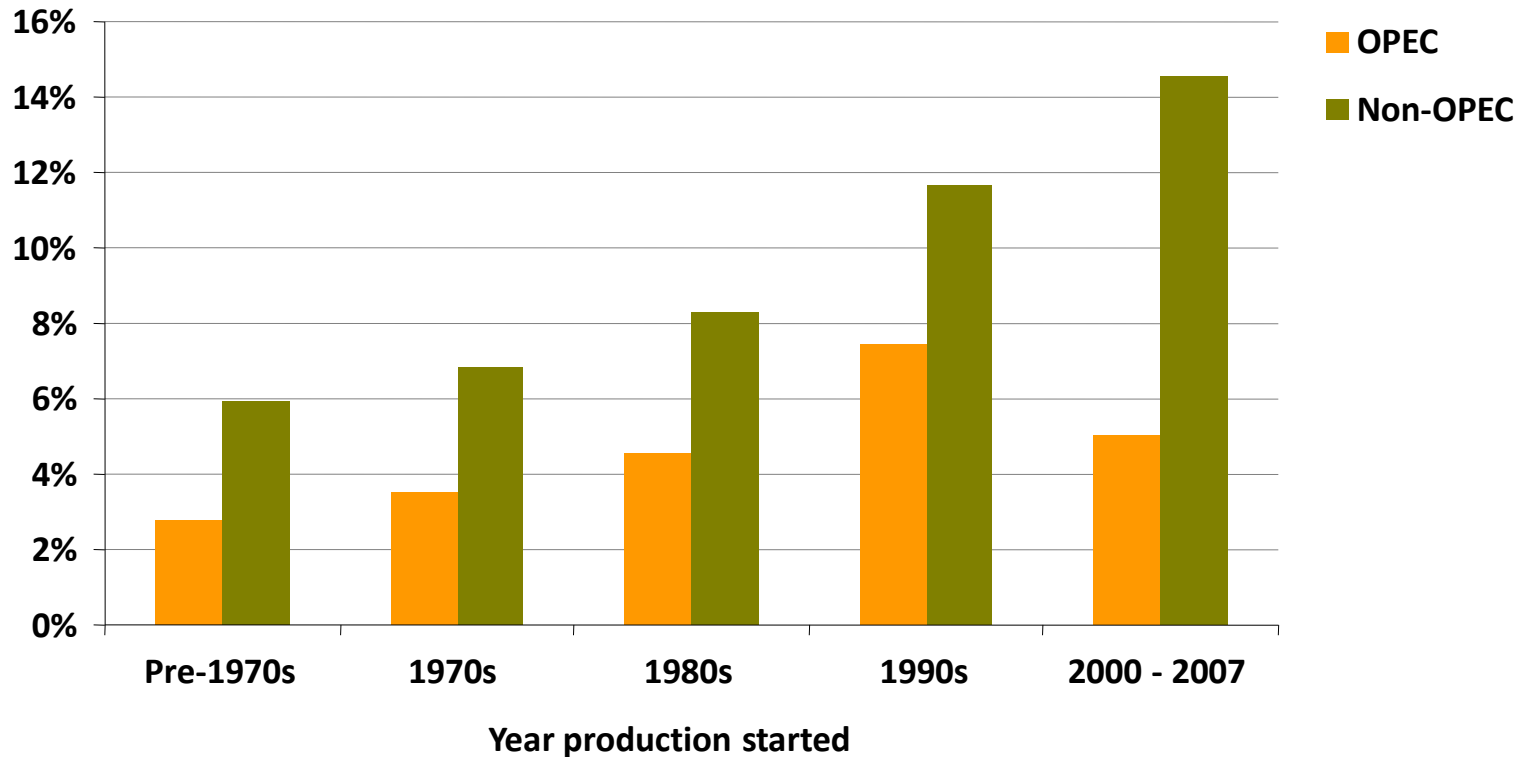
*World energy demand expands by 45% between now and 2030 – an average rate of increase of 1.6% per year – with coal accounting for more than a third of the overall rise*

# The IEA Reference Scenario



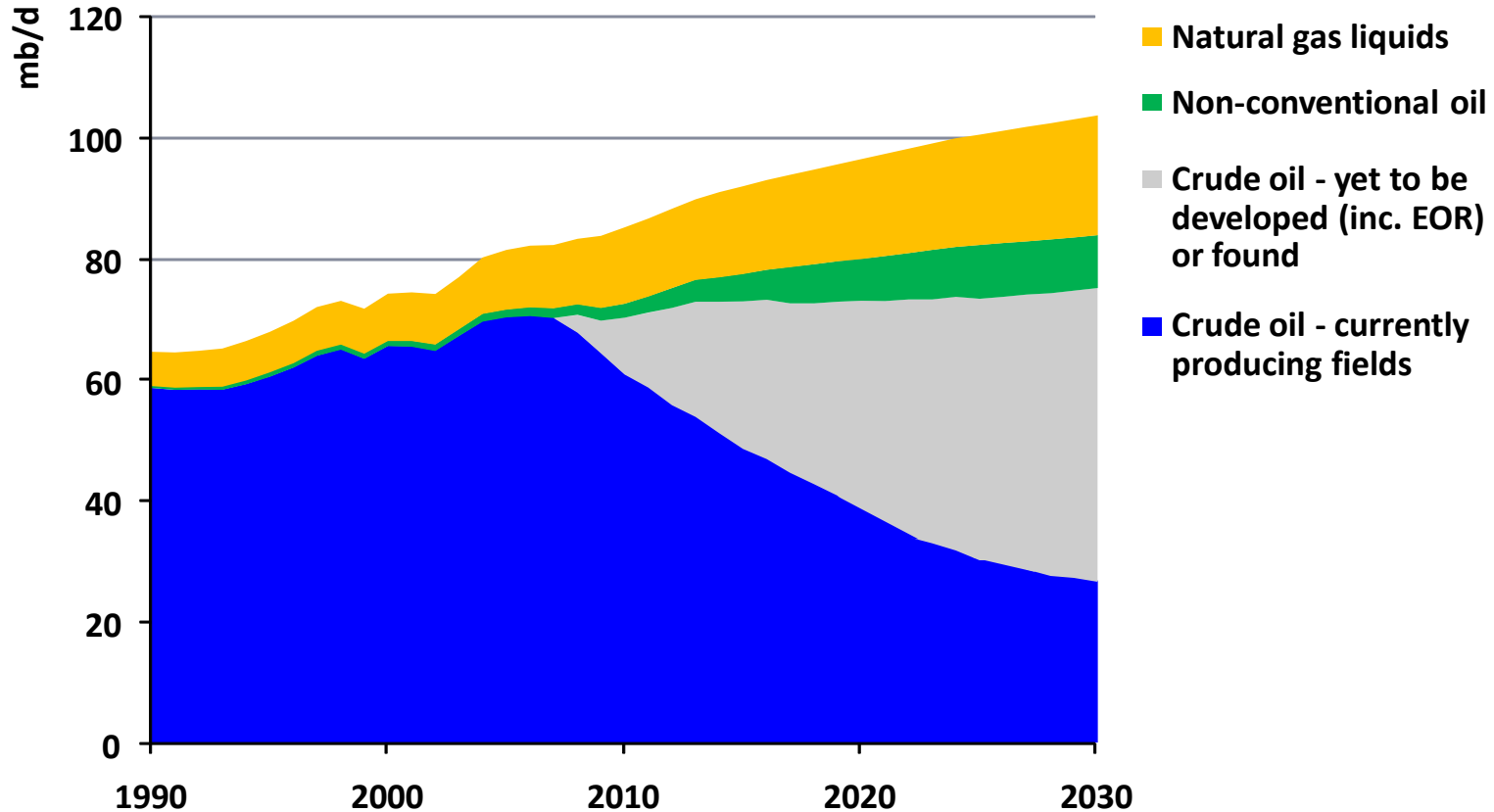
*Non-OECD countries account for 87% of the increase in global demand between 2006 & 2030, driven largely by China & India*

# Average observed oilfield decline rates



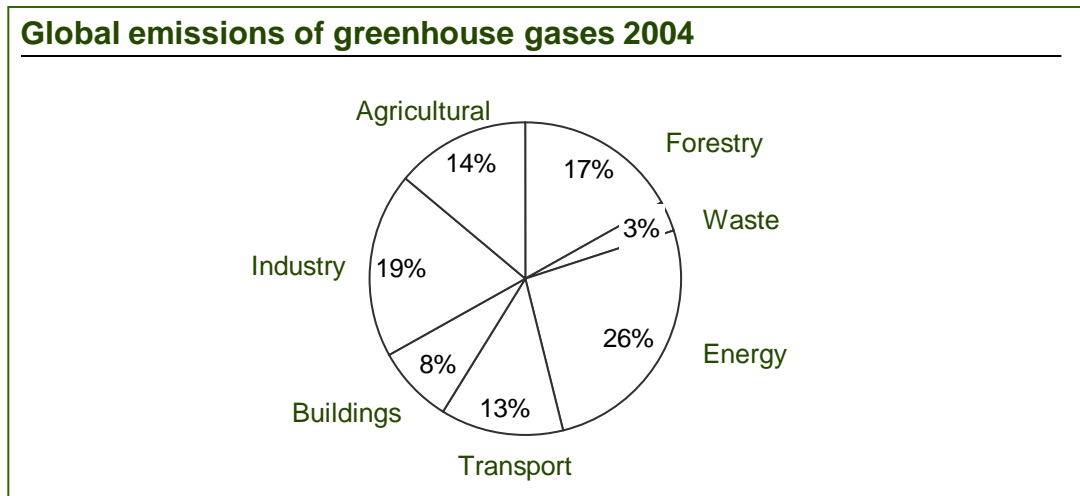
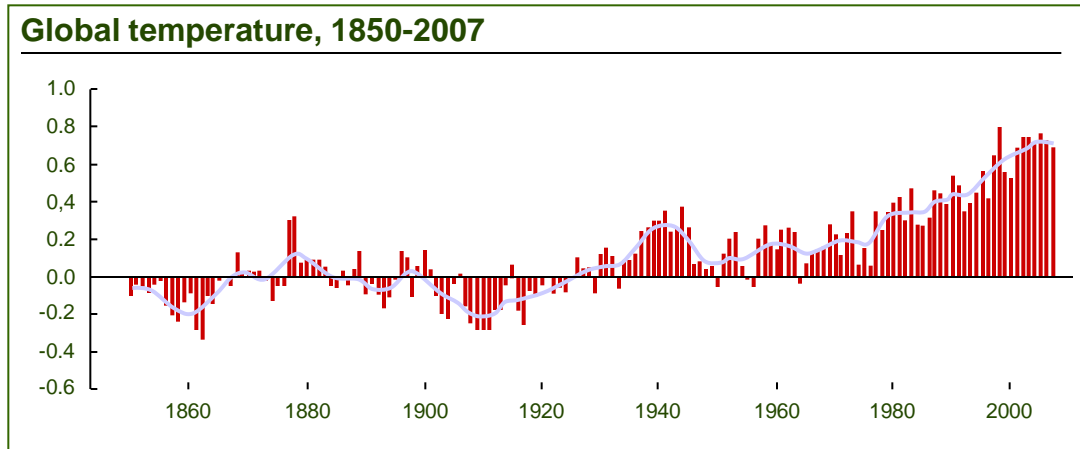
*The production-weighted average decline rate worldwide is projected to rise from 6.7% in 2007 to 8.6% in 2030 as productions shifts to smaller oilfields, which tend to decline faster*

# World oil production by source in the Reference Scenario



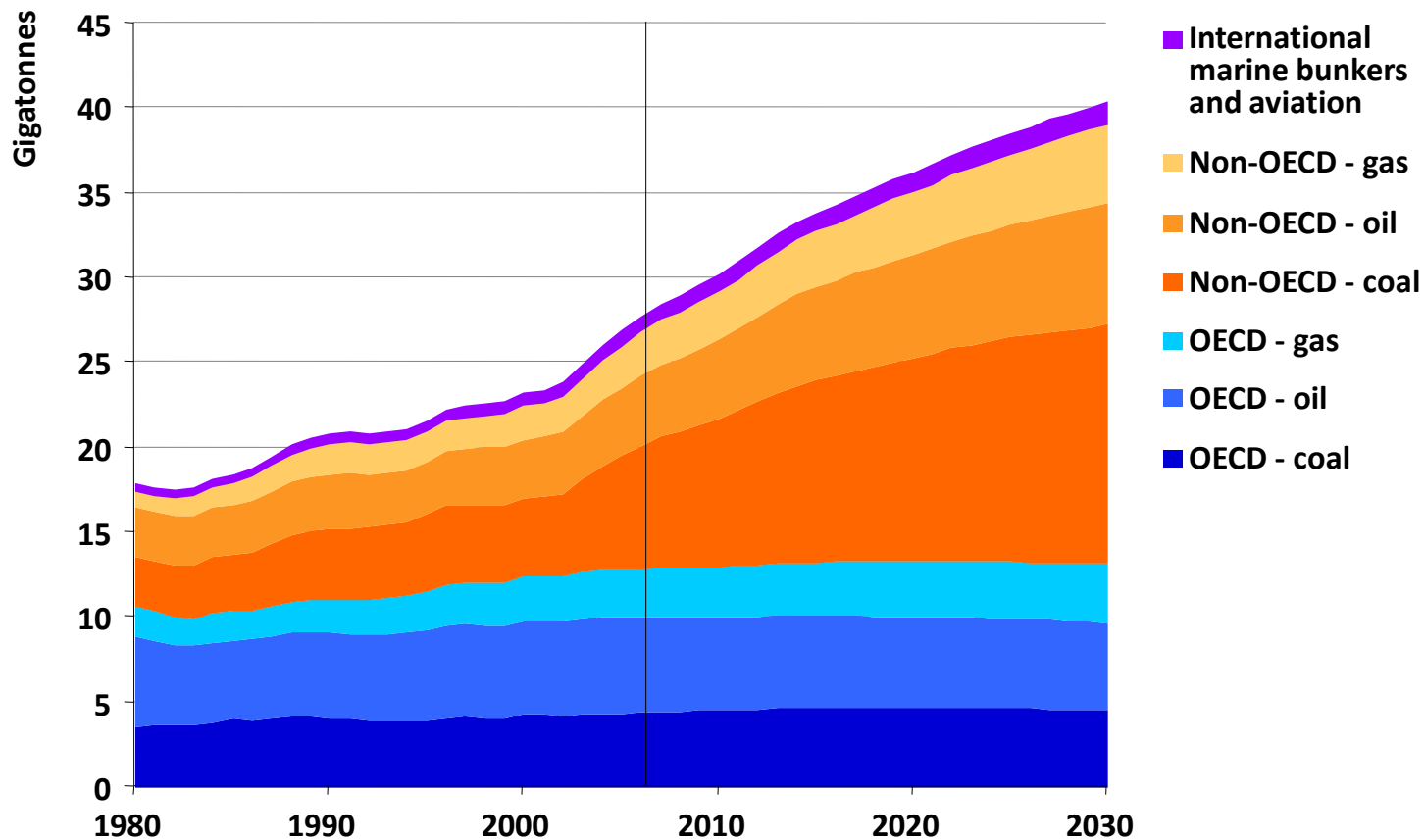
*64 mb/d of gross capacity needs to be installed between 2007 & 2030 – six times the current capacity of Saudi Arabia – to meet demand growth & offset decline*

# Temperature increase and GHG (CO<sub>2</sub>) emissions are closely connected



Need to actively manage CO<sub>2</sub> and other GHG released to the atmosphere to curb climate change effects

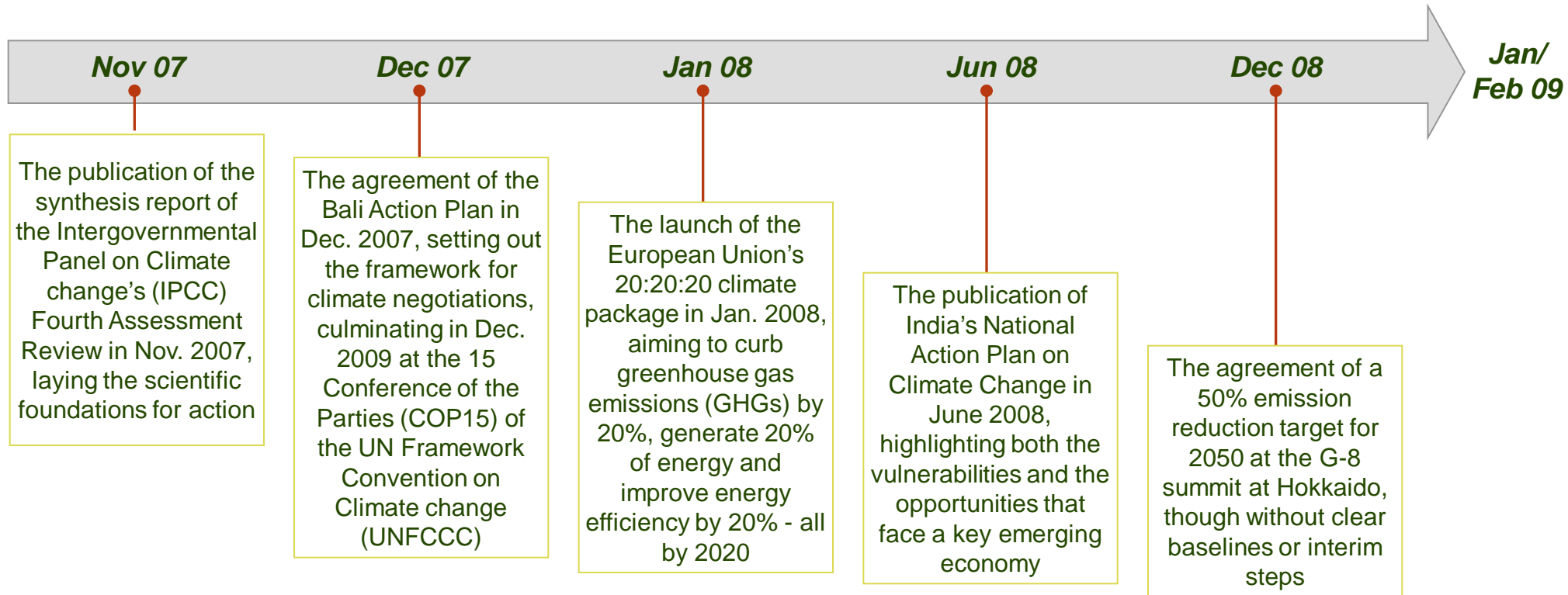
# Energy-related CO2 emissions in the Reference Scenario



*97% of the projected increase in emissions between now & 2030 comes from non-OECD countries – three-quarters from China, India & the Middle East alone*



# Worldwide consciousness arising..



*This is generating a growing world wide consensus to develop a low-carbon economy.*

*Nobuo Tanaka, IEA Executive Director at COP 14 in Poznan, 8 December 2008:*

*“The global economic slowdown must be viewed as an opportunity, not a distraction from efforts to mitigate climate change. Countries planning fiscal stimulus packages should invest in energy efficiency and clean technologies to build sustainable energy infrastructure.”*



# More than 70 countries issued public policies to stimulate adoption of renewable sources ...

NOT EXHAUSTIVE

## EU-directive 20-20-20

- Renewable energy: 20% (2020)
- Efficiency: +20%
- GHG Emissions -20%

## France

- Renewable energy: 23% (2020)
- Renewable electricity: 21% (2010)

## China

- Renewable energy: 10% (2010), 15% (2020)
- Renewable electricity:
  - . Wind-100,000MW,
  - . Hydropower-300,000MW,
  - . Biomass-30,000MW

## Japan

- Renewable energy: 3,1% (2010)\*
- Renewable electricity:
  - . PV-4,820 MW
  - . Wind-3,000 MW
  - . Waste power-4,170 MW
  - . Biomass-330 MW (2010)

## Germany

- Renewable energy: 18% (2020)
- Renewable electricity: 12,5% (2010); 20% (2020)

## UK

- Renewable energy: 15% (2020)
- Renewable electricity: 10% (2010), 20% (2020)

## US

- State RPS targets vary between 11% and 30% for various states (2020)

## Brazil

- Renewable energy: 10% from wind, biomass and hydro electric sources (2027)

## Spain

- Renewable energy: 20% (2020)
- Renewable electricity:
  - . Wind-20,155 MW
  - . PV-371MW
  - . Solar thermal-4,9m sq m
  - . Solar thermal electric-500MW
  - . Biomass-1,695MW (2020)

## Italy

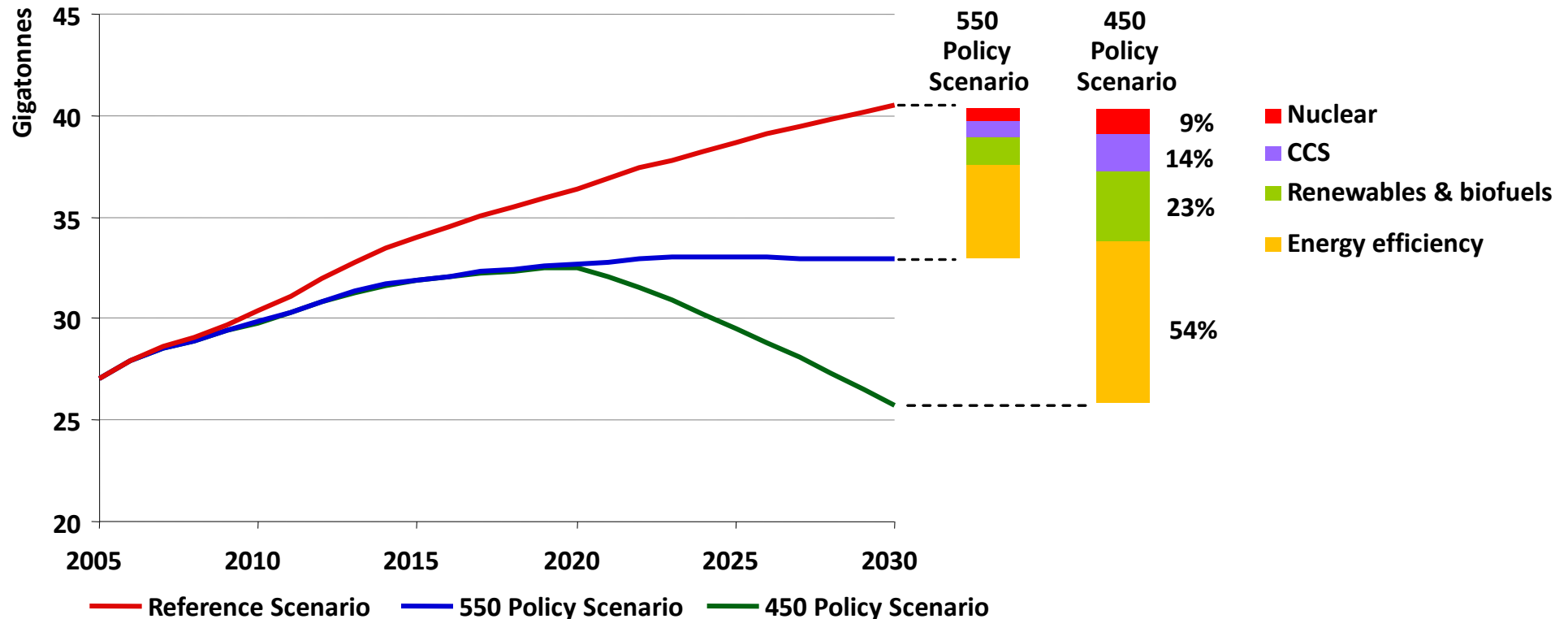
- Renewable energy: 22% (2020)

\*Excludes hydroelectric and geothermal energy

Source: IEA 2007; HSBC

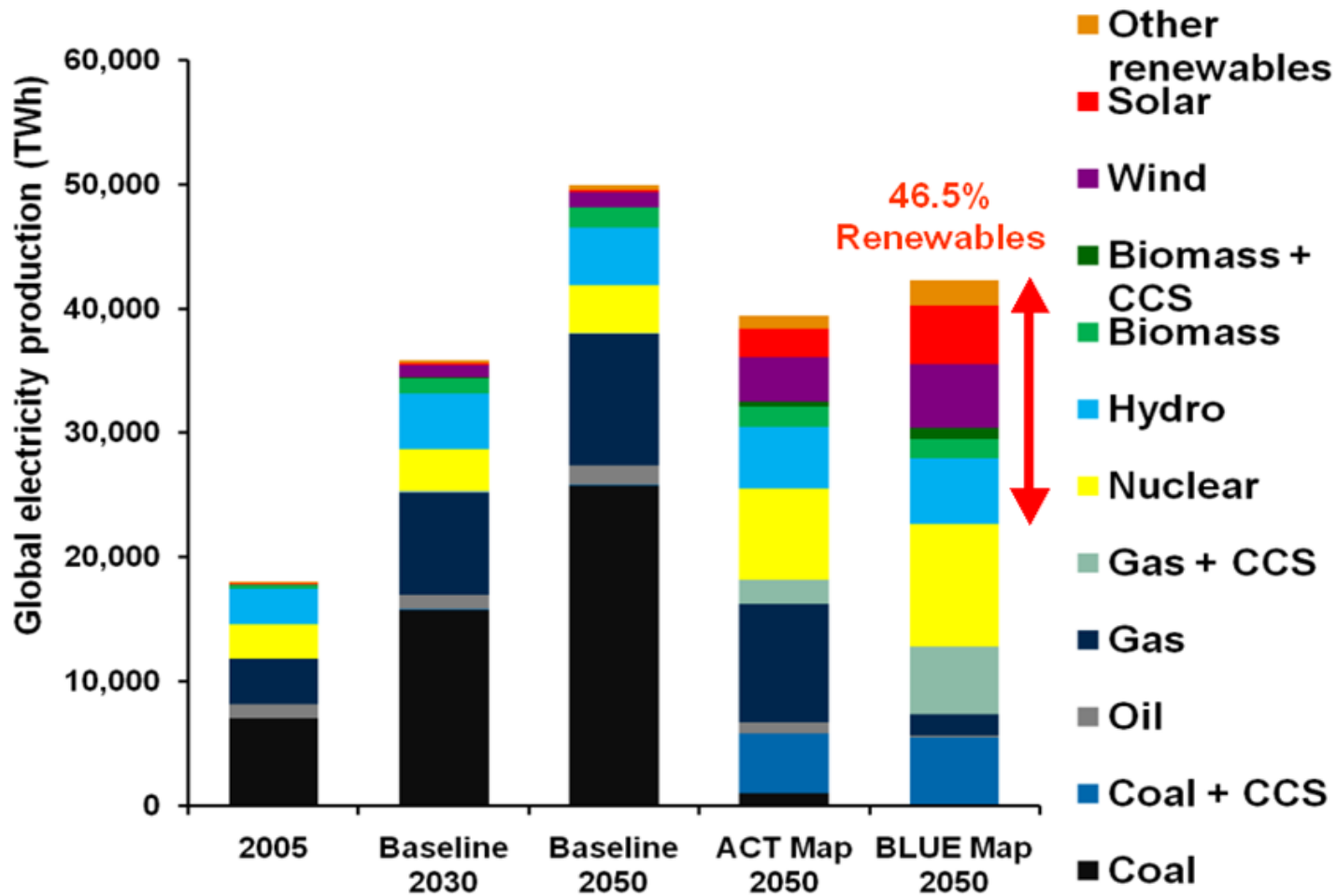
...40 of which set up also public incentives to sustain renewables

# Reductions in energy-related CO2 emissions in the climate-policy scenarios



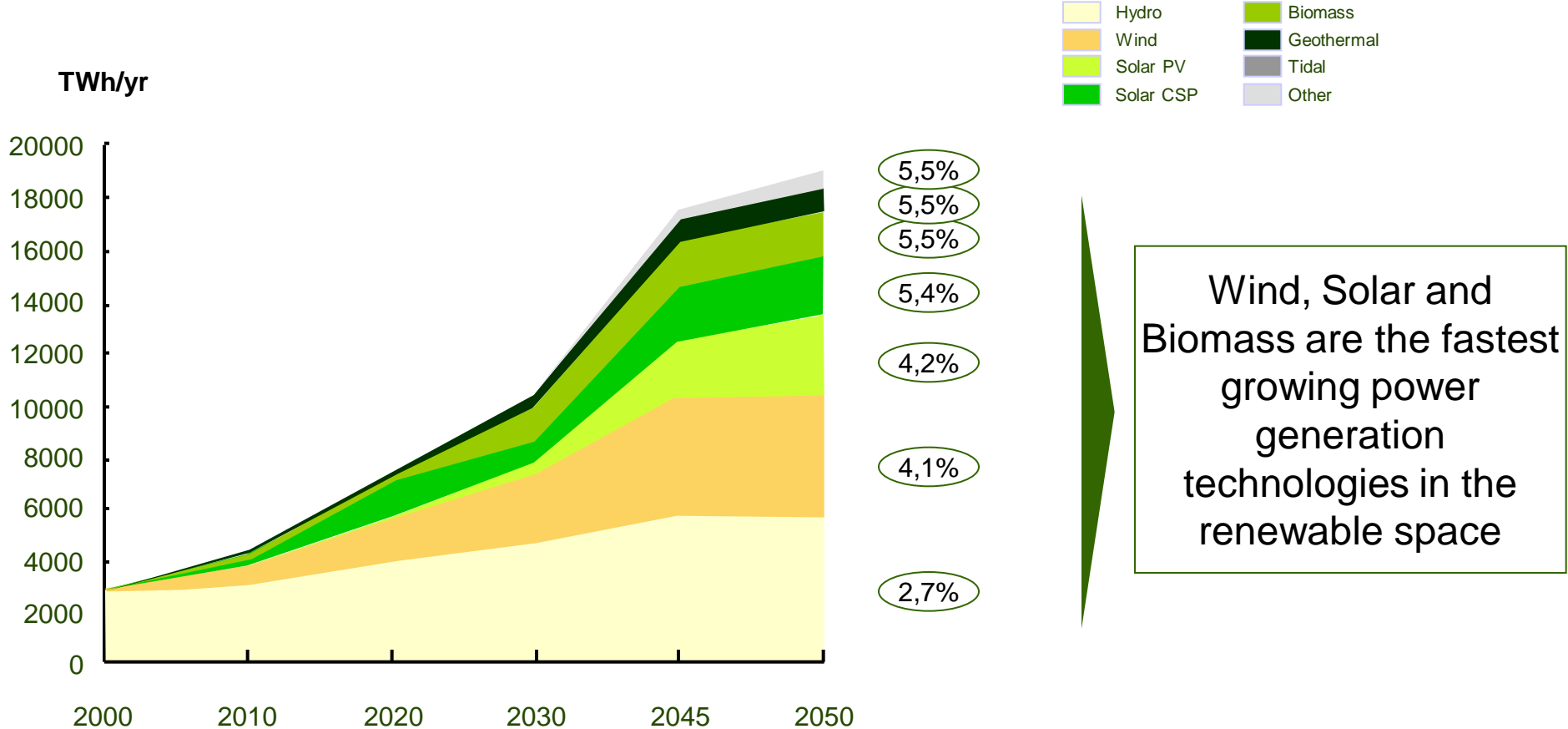
*While technological progress is needed to achieve some emissions reductions, efficiency gains and deployment of existing low-carbon energy accounts for most of the savings*

# IEA Blue Map Scenario



*Most of IEA scenarios foresee an high share of renewables and energy efficiency*

# IEA Blue Map Scenario: 2050 renewable growth in every sector



*Yearly renewable energy production to increase significantly by 2050 to match CO2 abatement targets\**

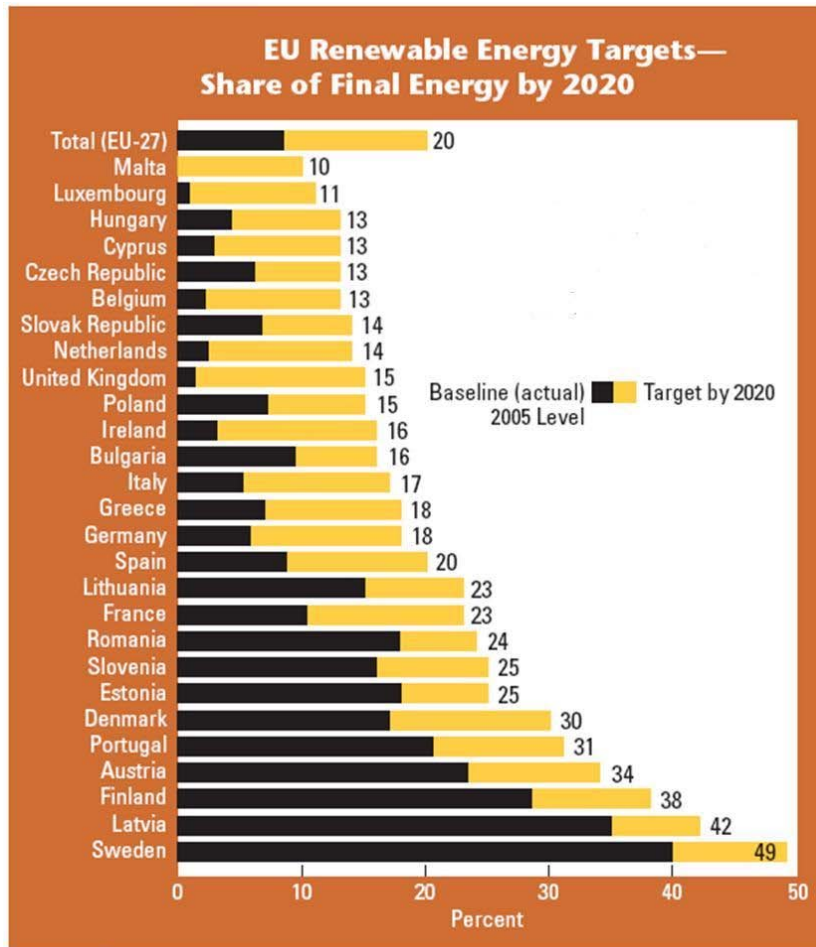
Source: IEA 2007; HSBC  
 \*IEA Blue MAP scenario 2008



# EU active role

- **EU 2008-12 targets:** -8% in respect to 1990 (Kyoto Protocol), Italy -6,5%;
- **EU 2020 targets:** unilateral reduction up to 20% (Italy -13%)
  - energy efficiency increase of 20%
  - Renewable energy share on gross energy consumption equal to 20% (Italy 17%, three times today penetration to be performed just in 13 years)
- **UE al 2050** cut of 60-80%;

# 2020 EU targets in all EU countries



- EU must perform an overall 20% RES penetration on Final Energy by 2020;
- This entails an extremely ambitious target for every EU country in terms of RES thermal and electrical penetration and energy efficiency;
- Italy RES penetration must pass from 5,5% up to 17% (3 times);
- To tackle the target, renewable electricity must reach a 30% share on final consumption;
- **RES potential must be fully exploited together with energy efficiency**

(Source : Renewable Energy Policy Network for the 21st Century Ren21 rapporto rinnovabili, 2007)

# Instruments and effects

1. Cap & Trade Mechanism
2. Feed-in tariffs
3. Capital cost incentives
4. Investment Detaxation
5. Standards

What is the effects of such a policy?



# Incentiving Mechanisms: adv. & disadv.

	<b>Advantages</b>	<b>Disadvantages</b>
Cap& Trade mechanism	Push best performing technologies; Obligation entails a stricter control on targets; prize results	Do not allow "early stage" technologies development; complex; difficult to be managed
Feed-in tariff	Very simple; appreciated by banks and investors; accessible by everyone; can push also early stage technologies;	More expensive if not well controlled; detached from a compulsory national target
Capital cost incentive	Less expensive; company receive financial resources in advance	Stop and go; slow process; heterogeneous
Detaxation	Very effective and simple;	Need control on maximum accepted costs;

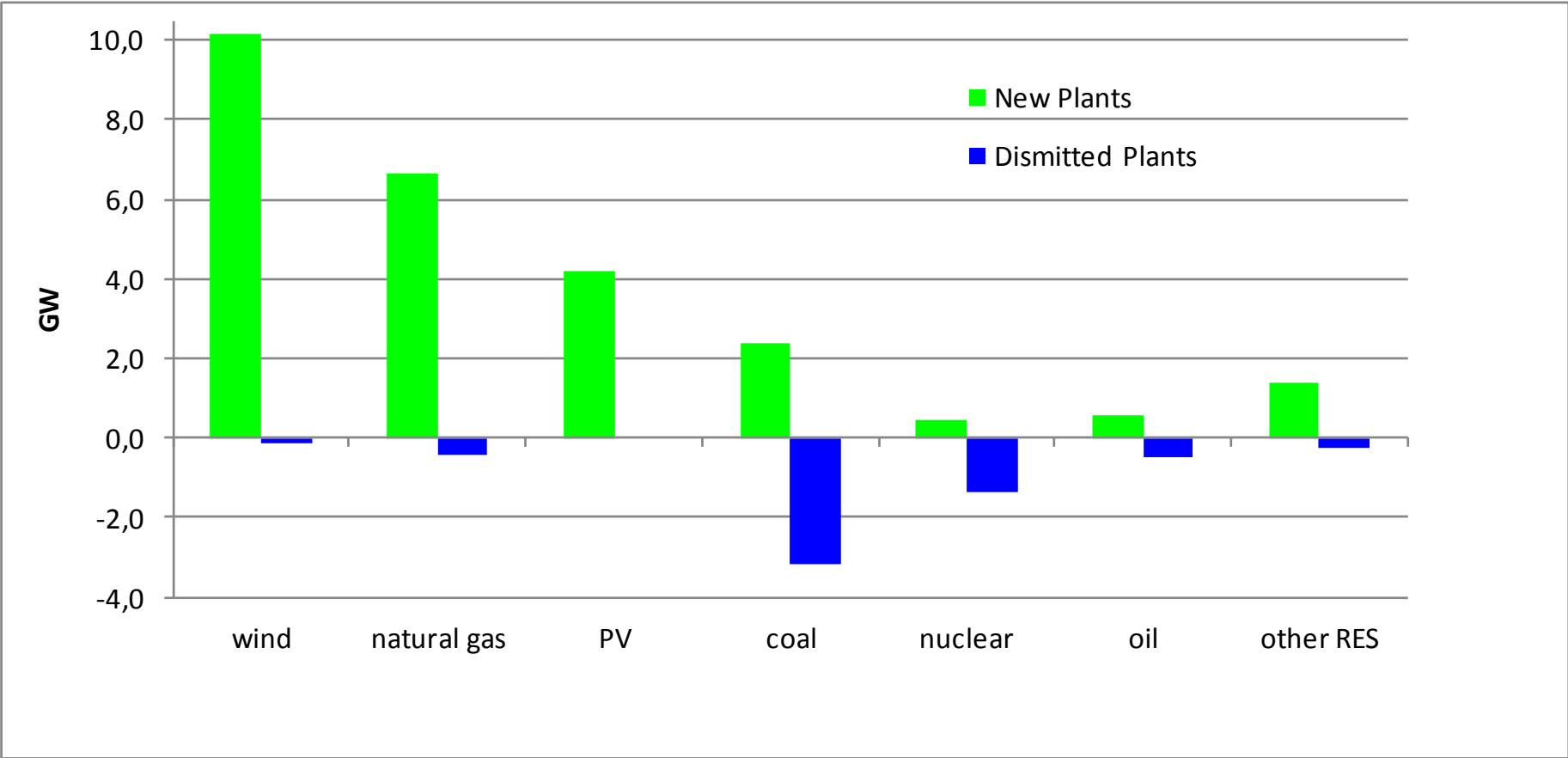
# Several countries across EU have established incentive programs

## Selected European solar feed-in tariff plans

Country	Tariffs	Digression	Duration	Tax Credit	Other
<b>Germany</b>	€0.44 – 0.47 / kWh	8-11% annually through 2011	20 Years	No	<ul style="list-style-type: none"> <li>• Not capped, but digression impacted by market growth</li> </ul>
<b>Spain</b>	€0.32-4 / kWh	Inflation – 1%	25 Years	No	<ul style="list-style-type: none"> <li>• Capped at 500MW in 2009 &amp; 400MW in 2010 – still pending</li> </ul>
<b>France</b>	€0.30 / kWh, €0.50 / kWh for BIPV	N/A	20 Years	50% (max €8000)	<ul style="list-style-type: none"> <li>• Rooftop FIT, 500MW cap</li> </ul>
<b>Italy</b>	€0.35-0.40 / kWh	2%	20 Years	No	<ul style="list-style-type: none"> <li>• 1200 MW cap</li> </ul>
<b>Greece</b>	€0.40-0.45 / kWh	1% monthly	20 Years	No	<ul style="list-style-type: none"> <li>• Developers could qualify for 40% capital subsidy from EU infrastructure funds. Cap is currently 500-700MW with potential for additional 750MW rooftop only cap</li> </ul>

*What is happening then?*

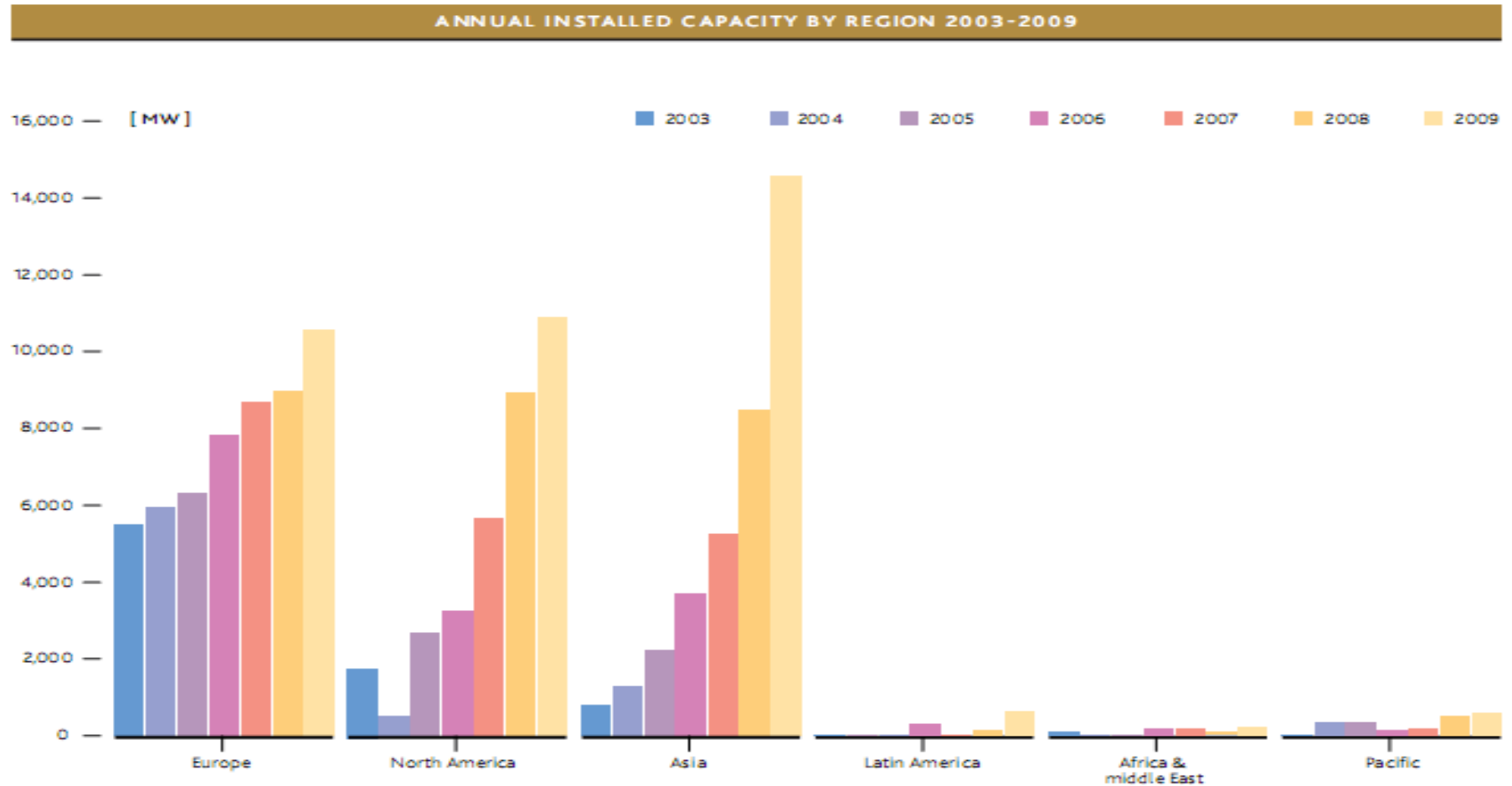
# New electric power installed in Europe in 2009: renewable share 61%!!



*Net reduction of coal, nuclear, oil against a growth of all renewables*



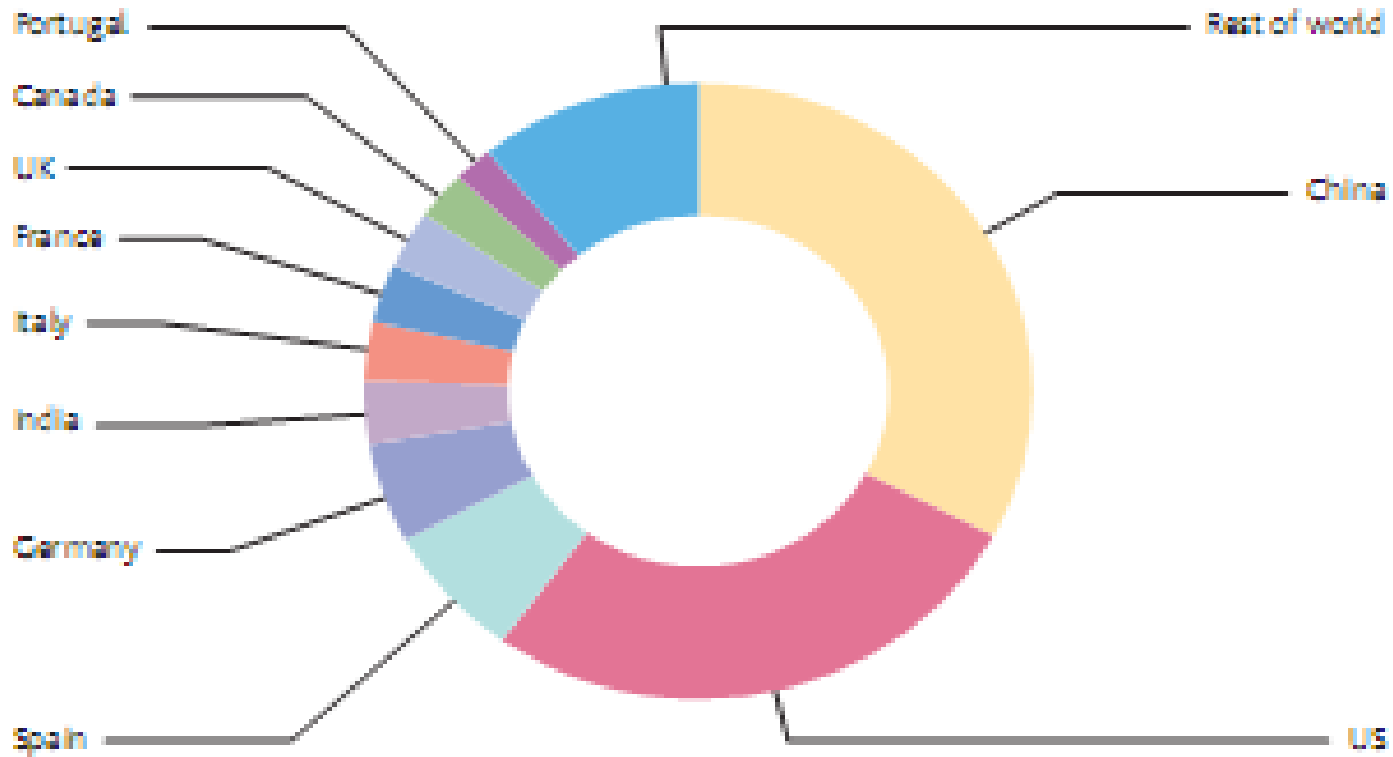
# The wind boom (37,5 GW in 2009)



*Europe is running but US is taking its leadership back in wind applications.*

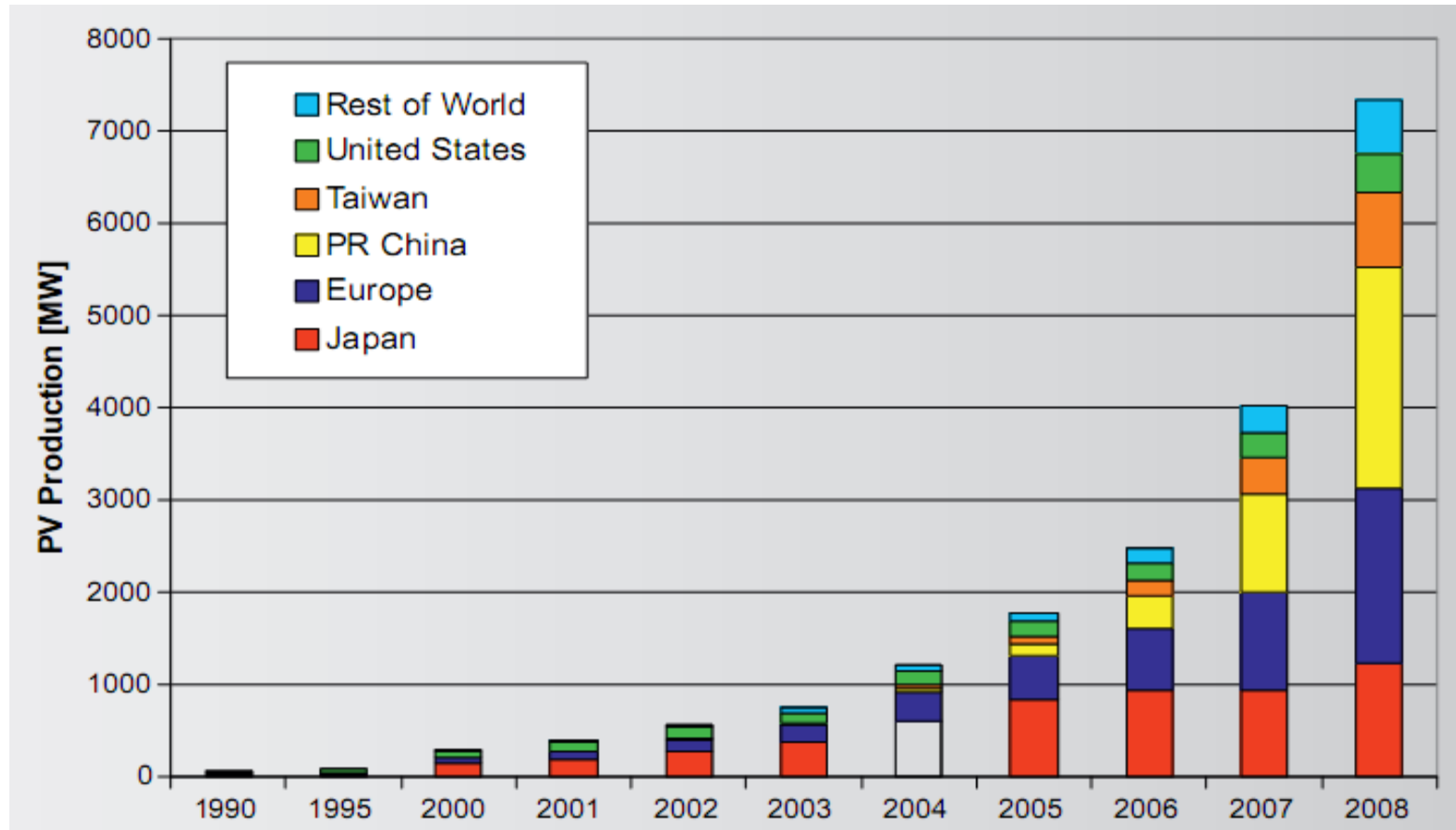
# The wind boom (37,5 GW in 2009)

## TOP 10 NEW INSTALLED CAPACITY JAN.-DEC. 2009



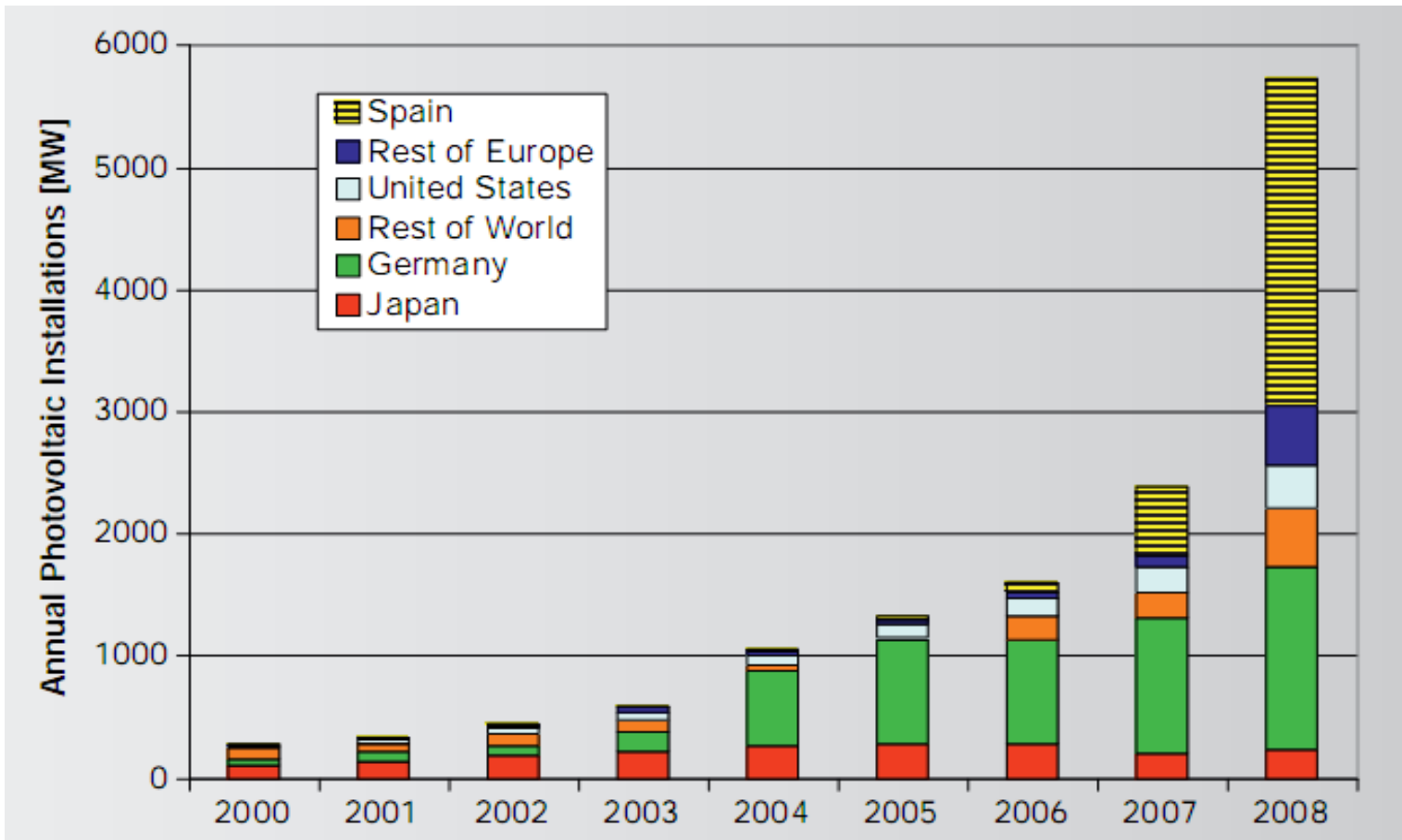
*2009 installations: US second after China in wind new installed capacity*

# PV production



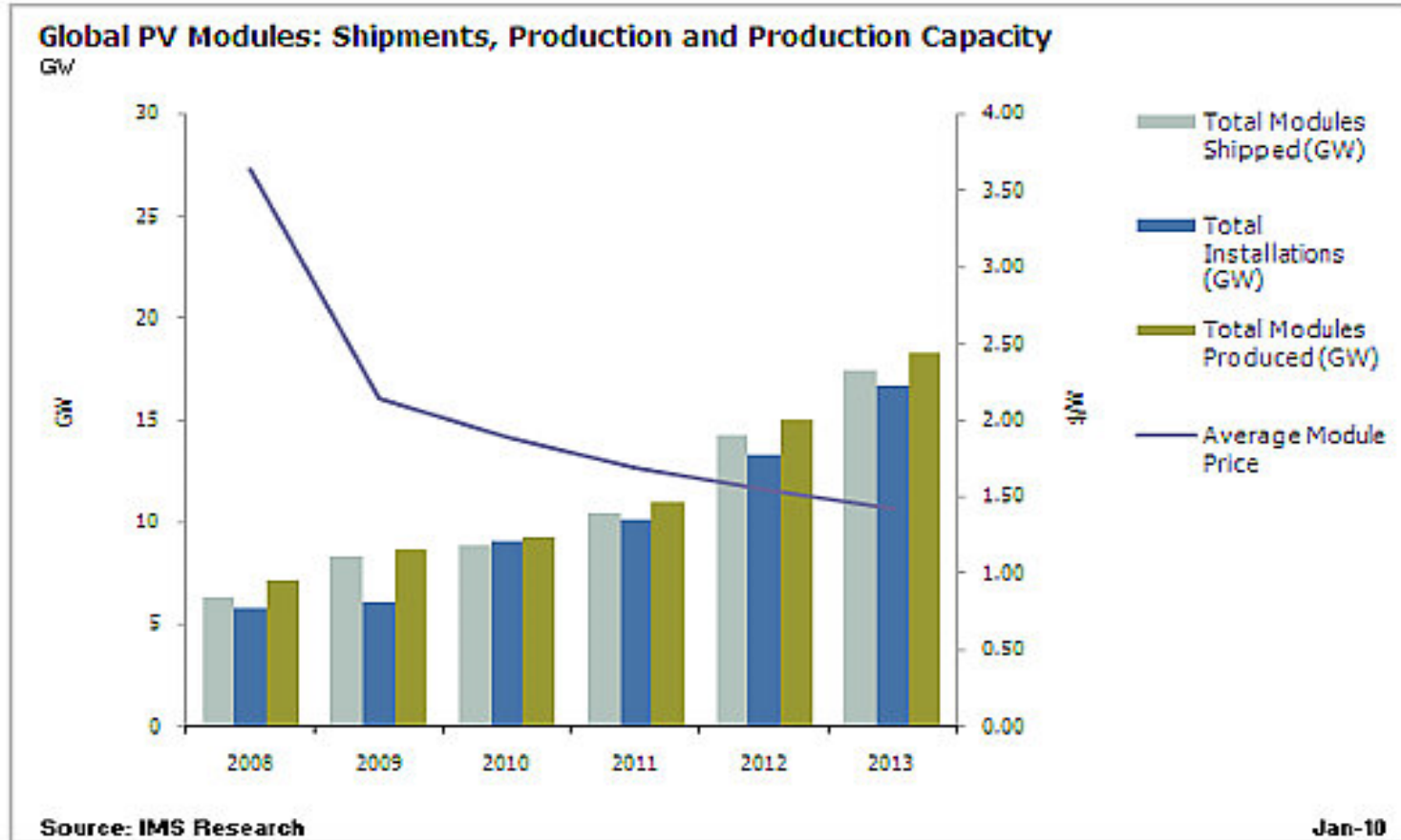
*Both for wind and solar technology EU anticipating Climate change policies had pushed the EU industry giving a strong role in exporting PV and wind technology to other countries*

# PV installations



*Feed-in tariff available in Europe have pushed installation in internal EU energy market*

# PV world scenarios

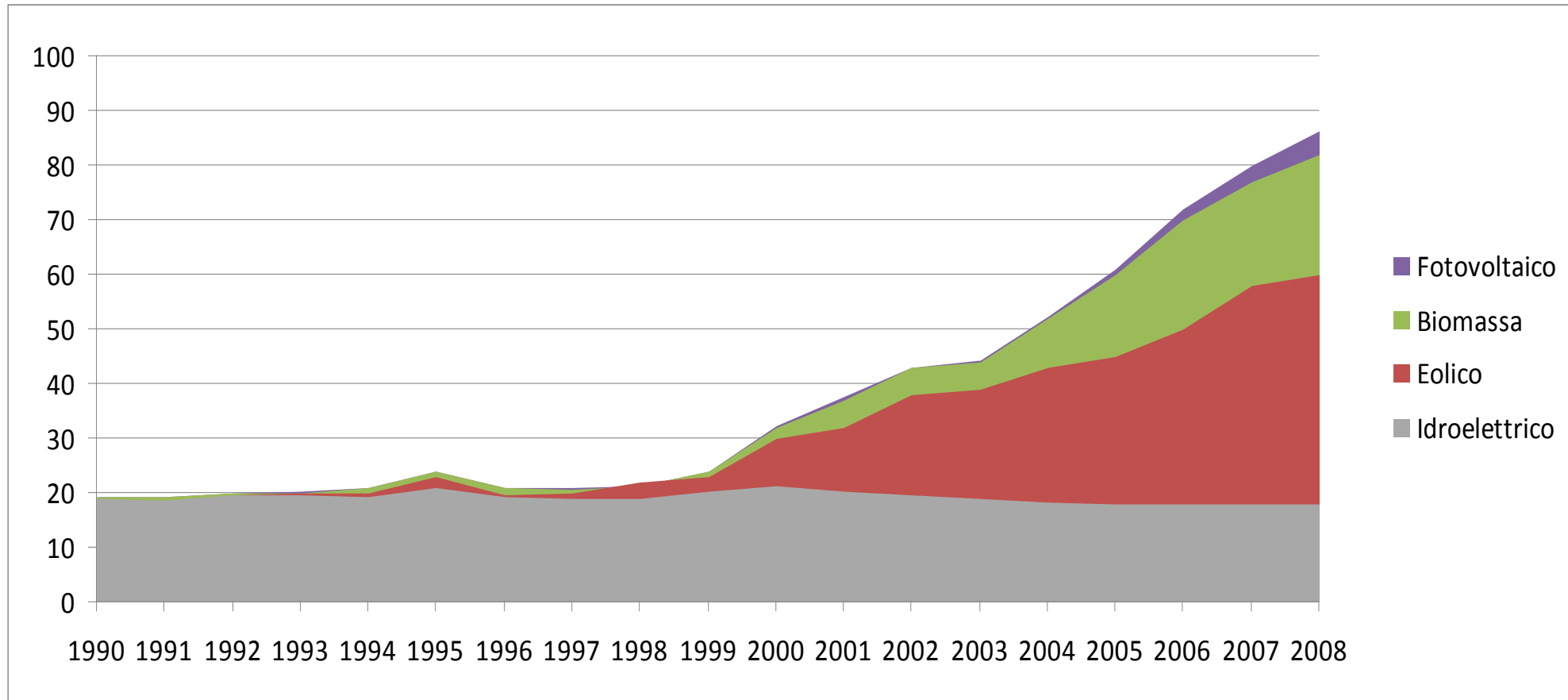


*Growing world PV production entailed a very steep learning curve driving PV toward competitiveness with conventional energy sources, faster than it was foresaw.*



# Case studied: Germany

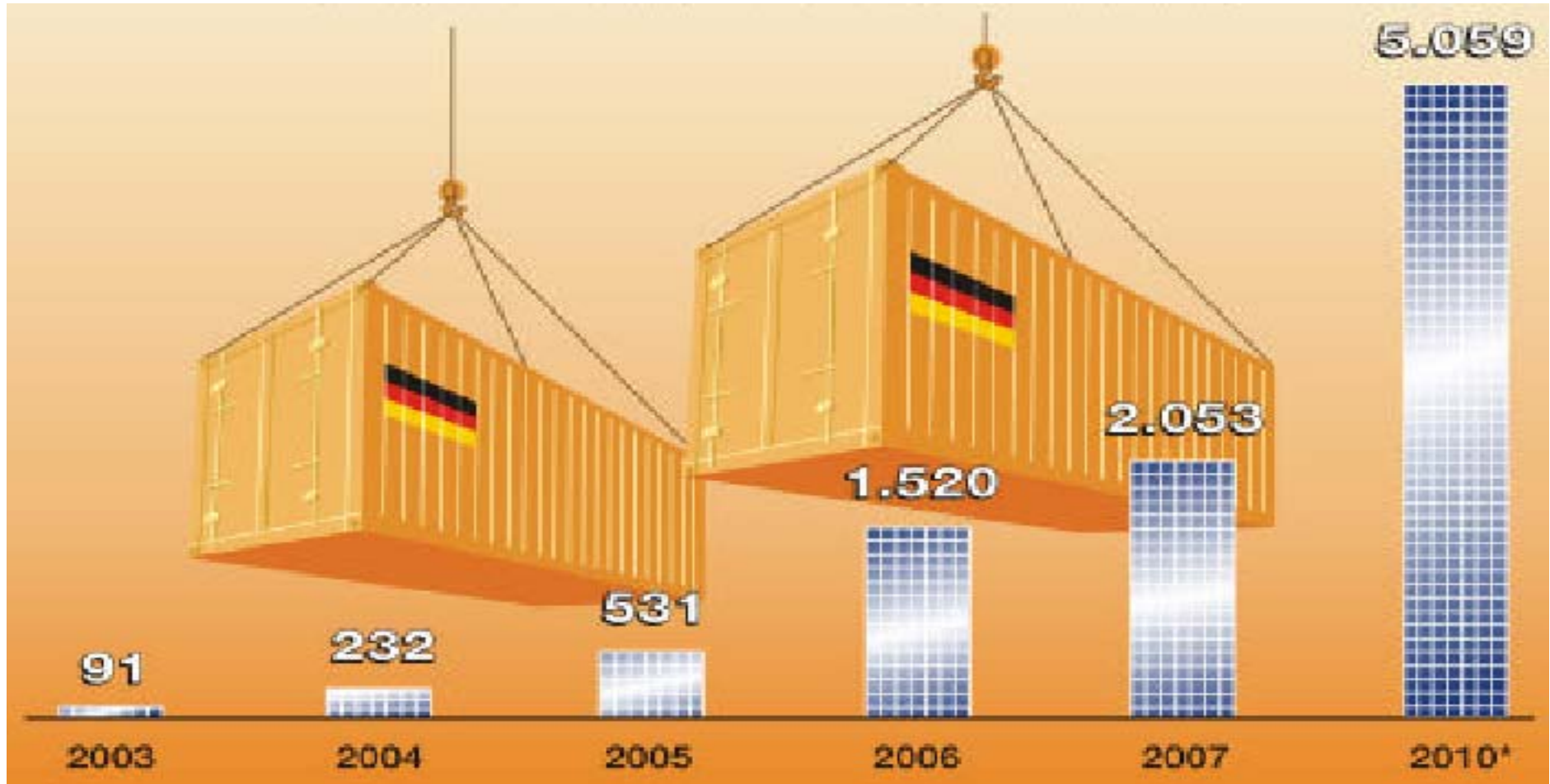
## Green electric production (TWh)



*The best performing EU country is Germany creating the most important renewable energy industry of Europe*

Case studied: Germany

PV industry annual exporting (million €)



Case studied: Germany

Solar employment (n° of occupied people)



*2020 solar employed in Germany will be equal to FIAT employers, for example.*

# Instruments in Italy

Cap & Trade Mechanism: green certificate and white certificate

Feed-in tariffs: for renewables with  $P < 1$  MW

Capital cost incentives: from regional authorities up to 50% of contribution

Investment Detaxation: for renewable energy thermal and energy efficiency

Standards: building codes

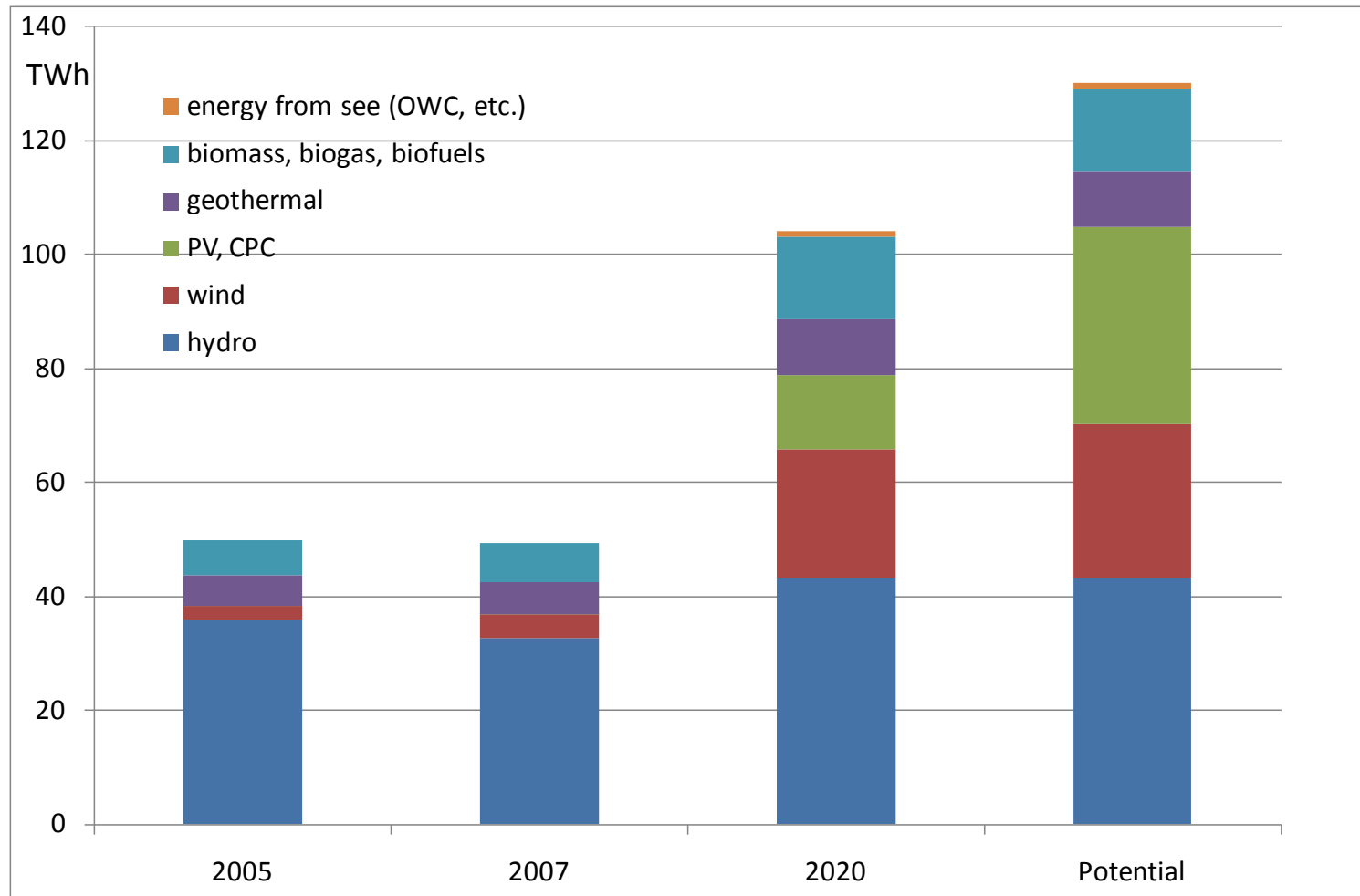
# Italy is well positioned among EU countries to exploit its current potential

Technology \ Target markets	Primary target markets GP ≥ 50	Secondary target markets 20 ≤ GP < 50	Tertiary target markets 10 ≤ GP < 20	Growth potential (TWh) All European markets
<b>Wind</b>	FR, GE, UK	IT, NL, SP, SW	DK, FI, GR, PL, PT	525
<b>Biomass</b>	FR	GE, IT, PL, SP, UK	FI, NL, RO, SW	340
<b>Tide and wave</b>	UK		SP, FR	125
<b>PV and solar</b>	SP	IT		115
<b>Hydro</b>		SP, IT	SW, FR	120
<b>Geothermal electricity</b>	IT			65
<b>Total (TWh)</b>	<b>530</b>	<b>350</b>	<b>155</b>	<b>1.290</b>

- Italy is considered to be a
  - Primary market of interest for Geothermal
  - Secondary market for Wind, Solar, Biomass, and Hydro

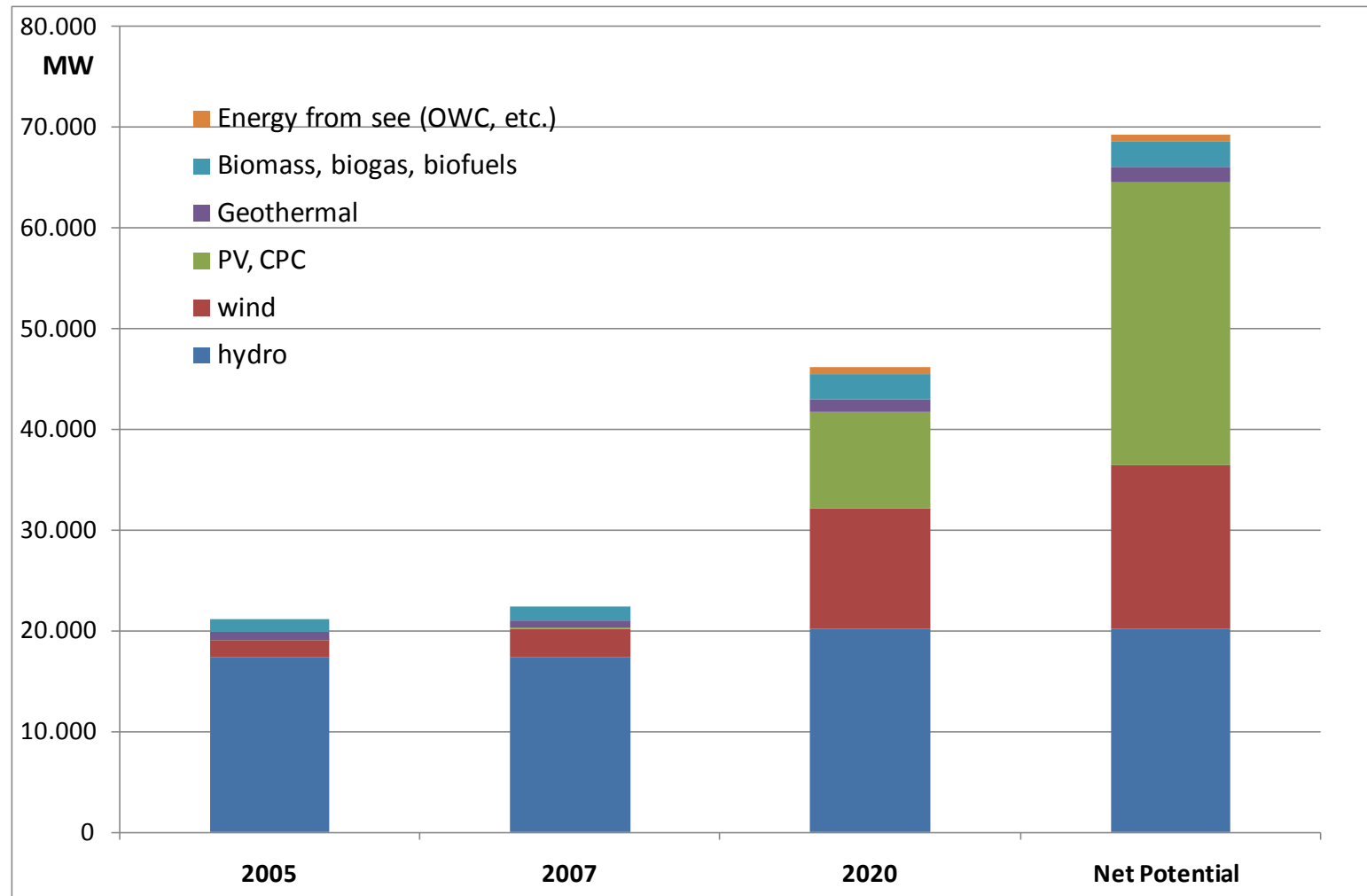
With an overall growth potential of over than 100 TWh till 2020

# Italian RES Electricity target vs RES Electricity Potential



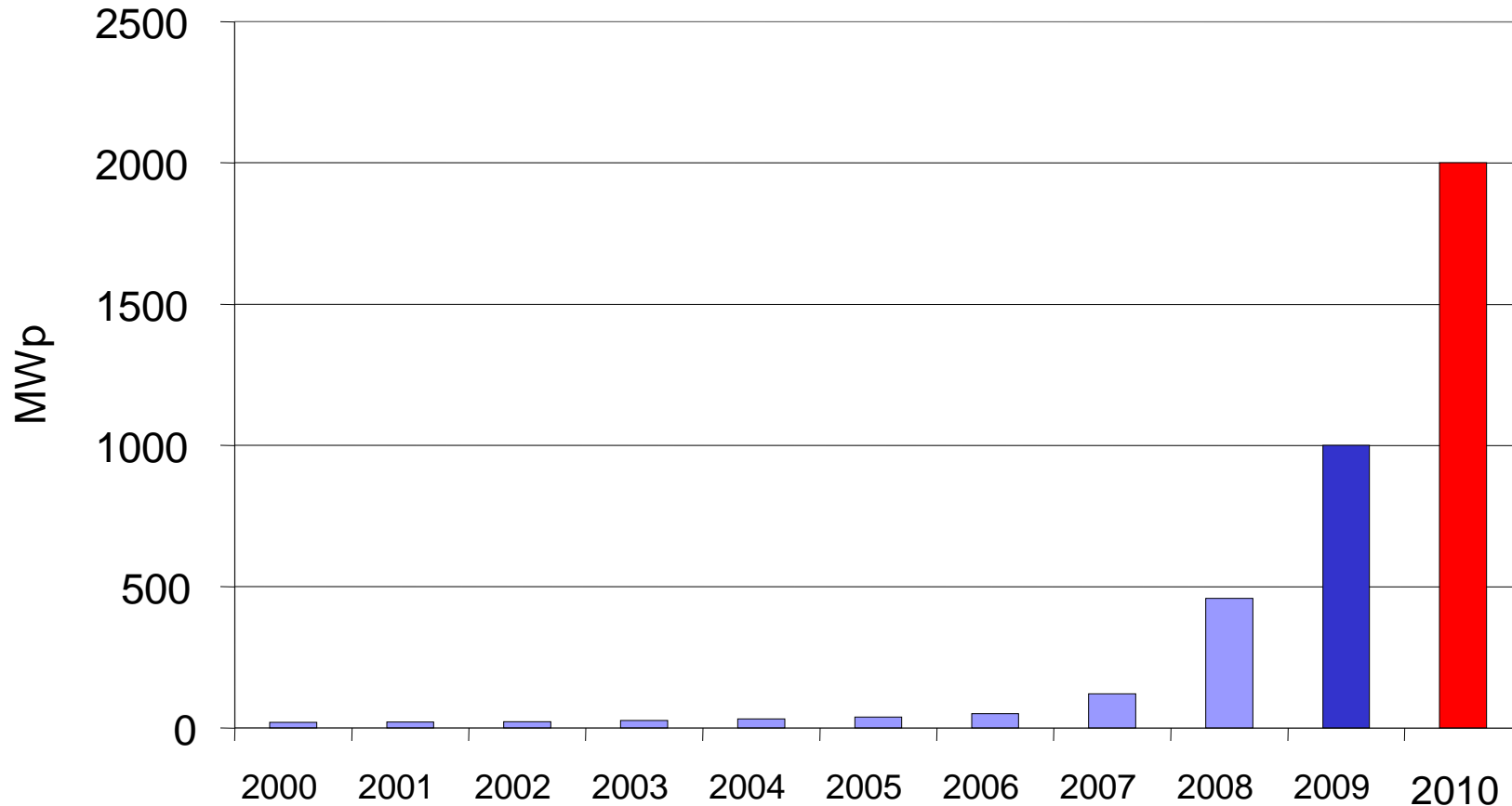
1. Renewable electricity production 2020 (source: Italian Government Position Paper - 10 settembre 2007) ; 2. Source: APER ; 3. Source OWEMES ; 4. Source: Ministry of Environment, CNES ; 5. Source: UGI,

# Italian RES<sub>el</sub> Power installed vs RES Power Potential



1. Renewable electricity production 2020 (source: Italian Government Position Paper - 10 settembre 2007) ; 2. Source: APER ; 3. Source OWEMES ; 4. Source: Ministry of Environment, CNES ; 5. Source: UGI,

# The future: cumulative PV installations in Italy

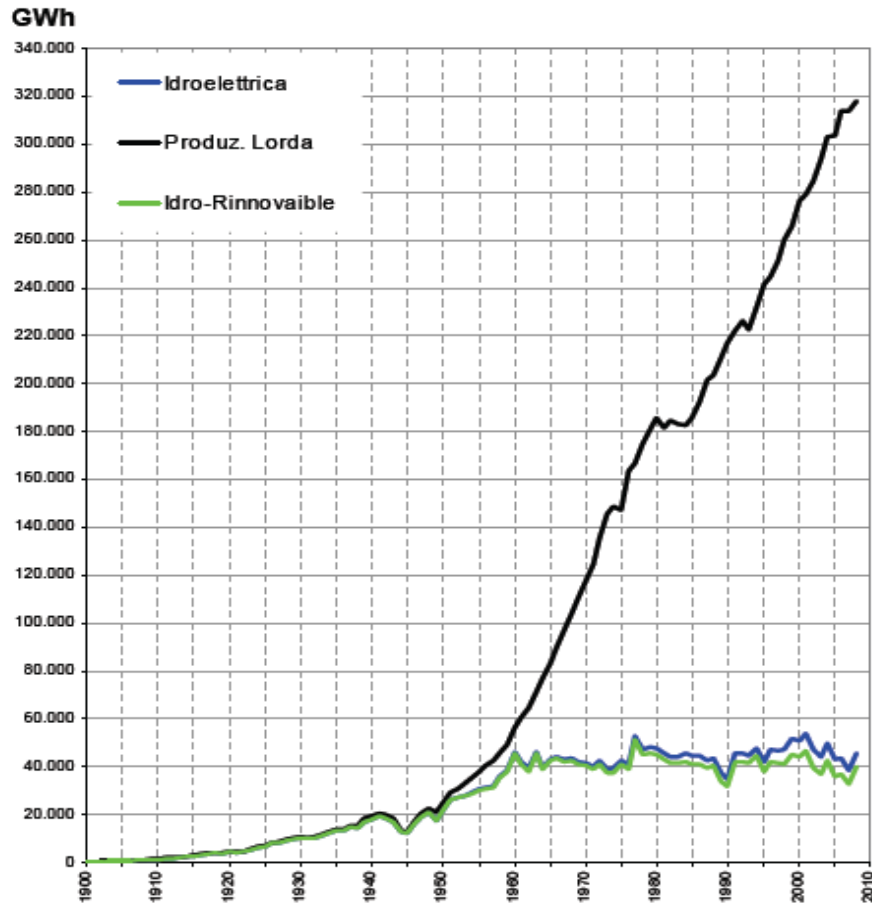


\* 2009-10 Kyoto Club estimate

*The new Italian feed-in tariff is doubling the PV market year by year. A new decree waited for June 2010 will put at 8000 MW the 2020 target for PV installations.*



# Is Renewable Energy development enough to reach 2020 EU targets?

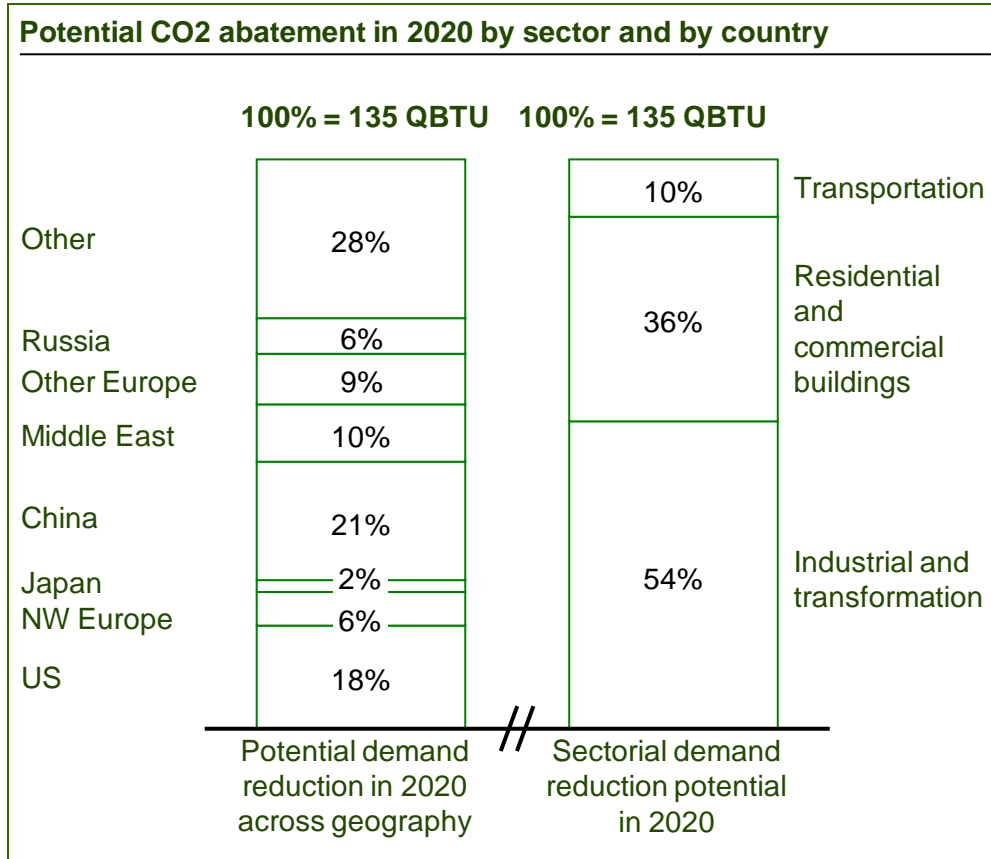


- If **final gross consumption** will continue to grow as it happened in the past 50 years, it will be absolutely impossible to reach the targets. of 2020 directive.

- **Renewable energy growth** will never succeed to reach the 17% penetration (and the 20% in EU) if a strong energy efficiency policy is not activated.

1. Renewable thermal energy production 2020 (source: Italian Government Position Paper - 10 settembre 2007) 2. Source: AGI ; 3. Source: Ministry of Environment CNES; 4.,5 Source: CNES/ITABIA

# Energy efficiency potential CO<sub>2</sub> abatement

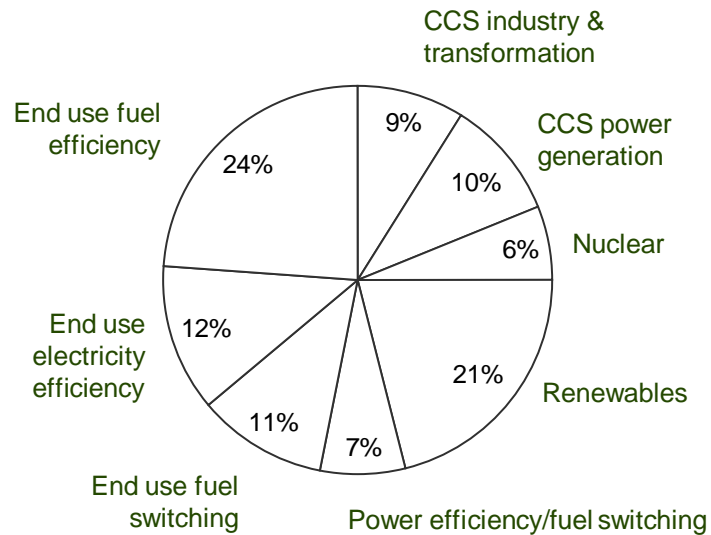


- Main Efficiency areas by end user sector -technology**
- Residential & commercial**
    - Efficient appliances/lighting
    - Buildings Insulation
    - Heating, ventilation and A/C optimization
  - Industrial**
    - Combined heat & power (CHP) generation
    - Motors Drives optimisation
    - Efficiency in industrial processes
  - Transportation**
    - Fuel economy
    - Fuel switch
    - Hybrid vehicles
    - Smart connection technologies
    - Fuel storage (Fuel cells)
    - Car sharing/pooling

*Energy efficiency is by far the most important untapped resource for CO<sub>2</sub> abatement*

# Carbon abatement potential

## Share of carbon abatement to deliver 50% cut in global missions by 2050



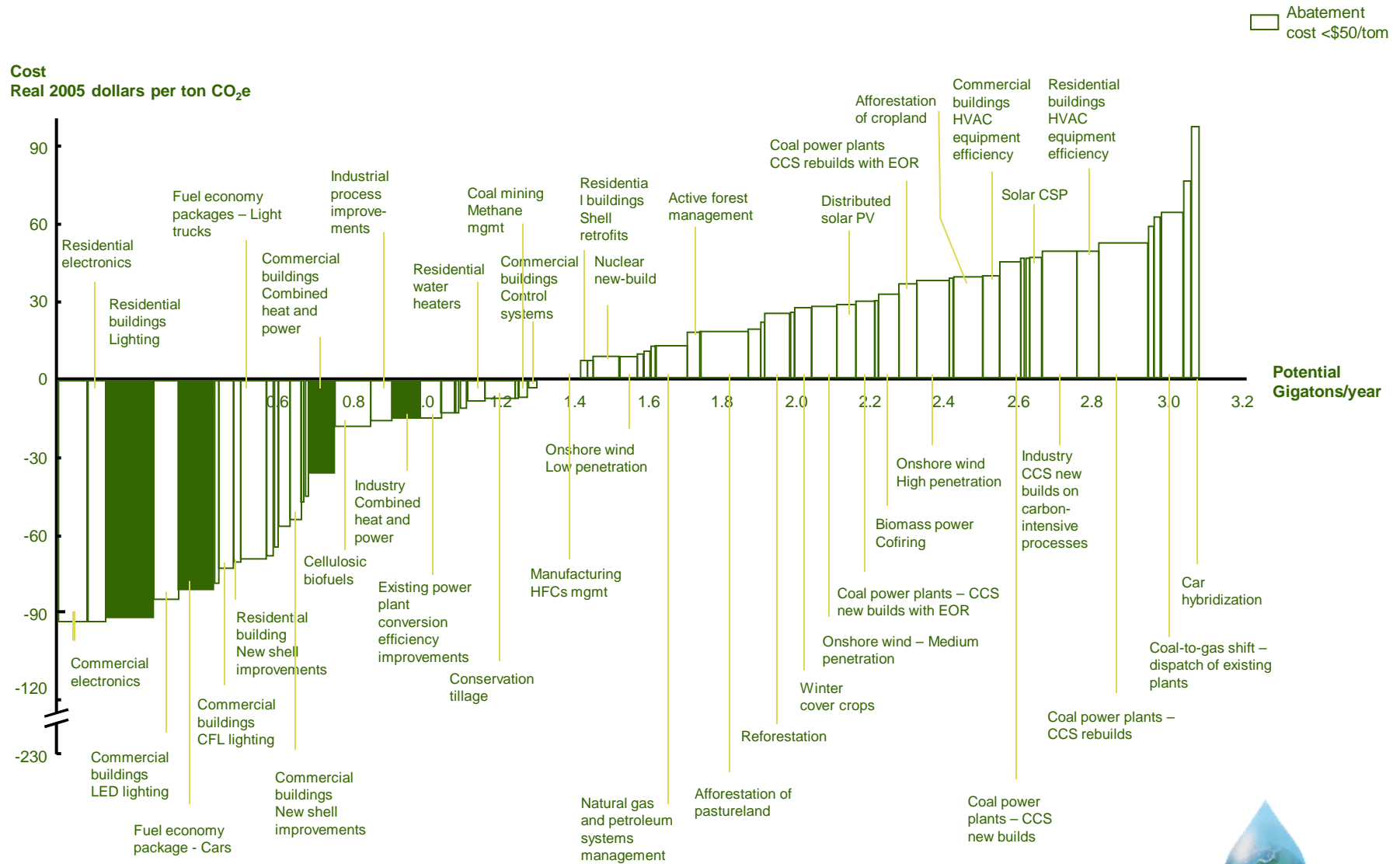
### Strong focus on:

- 1 Renewables
- 2 End-use energy efficiency
- 3 Carbon Capture and Storage

**IEA estimates that Investment required in this sector by 2050 will be USD 54 Trillion**

*End-user energy efficiency, Renewable Energy and CCS are the key investment areas to enable CO2 abatement: EE and RES weight for 45%*

# Energy efficiency competitiveness



Source: McKinsey Global Institute



# Conclusions

Worldwide consensus on GHG reduction and energy security is driving the adoption of renewable energies worldwide and stimulating an increasing focus on end use energy efficiency

Net power additions forecasted will be strong and supported by government backed incentives throughout Europe that guarantee investment returns

Energy Efficiency is a source for self-repaying cash-generating projects still to be exploited worldwide (next big investment wave?)

Without energy efficiency the 2020 targets will not be reached by most of the EU countries.

This sentence is valid also for US where energy intensity is fairly higher than EU levels.



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