

# Climate Change: the 2020 European Union Objectives.

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**Copenhagen**

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# European Union Climate Change Objectives

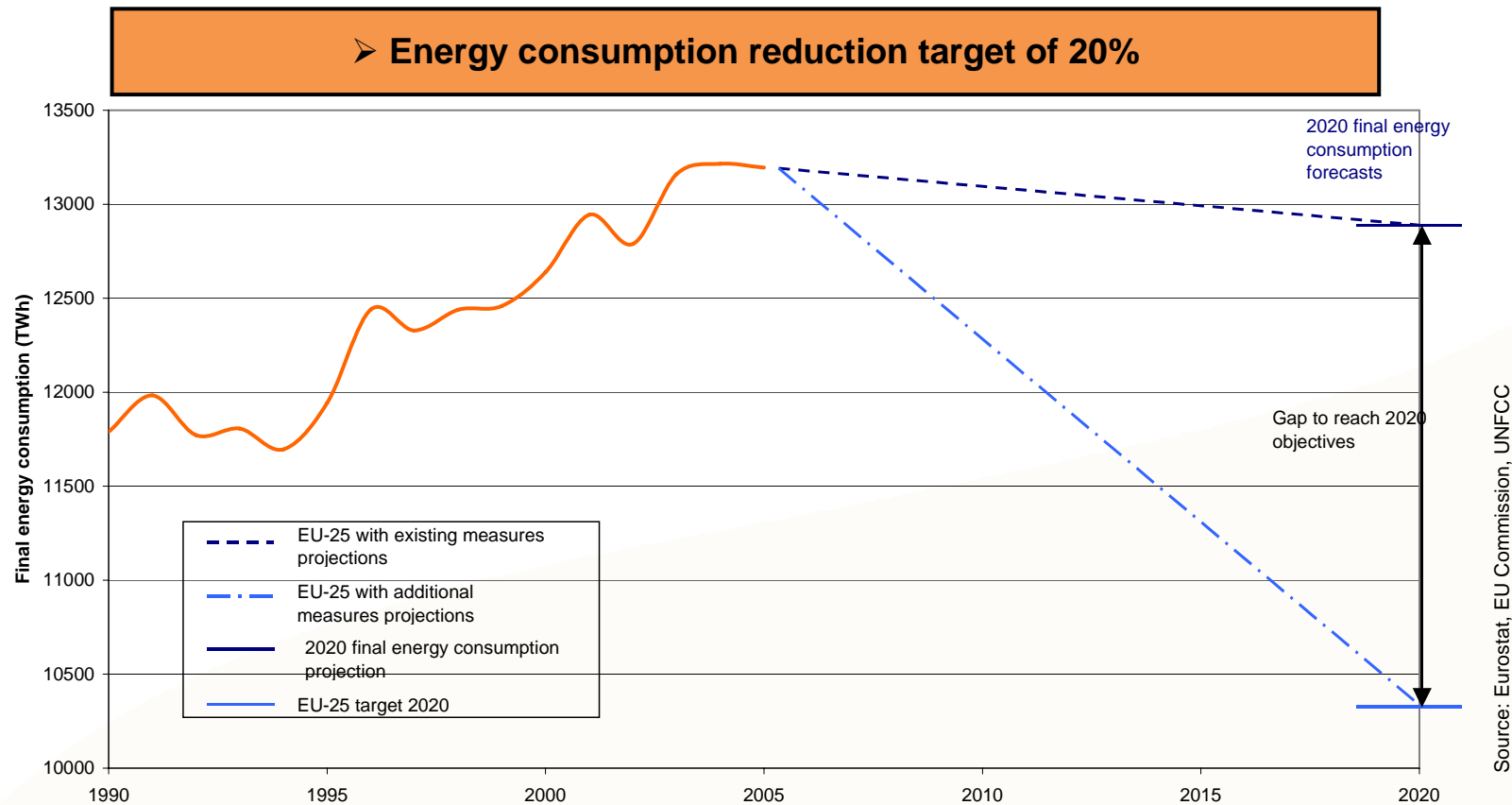
In March 2007, the European Union Ministers asked the Member States to commit to:

- Energy consumption reduction of 20%
- Green House Effect gases (mainly CO<sub>2</sub>) emissions reductions of 20%
- Portion of 20% of renewable energies in their energy production

**3 x 20%  
objective by  
2020**

- While these objectives were articulated in response to Climate Change issues, the underlying assumption is of course an improved security of energy supplies as well as a growing European economy.
- 2020 is a **short time horizon**:
  - compared to the lead time for construction of large plants as nuclear plants,
  - for the industrialization of carbon sequestration,
  - for renovation of the buildings and houses park,
  - for the switch of the car fleet to electrical cars.
  - For example:
    - More than 80% of the refrigerators bought in 2007 will still be in operation in 2020
    - Less than 1/3 of the industrial and utility infrastructure in place today will be renewed by 2020.
    - More than 20% of the cars bought in 2007 will still be on the road in 2020.

# European Union Climate Change Objectives

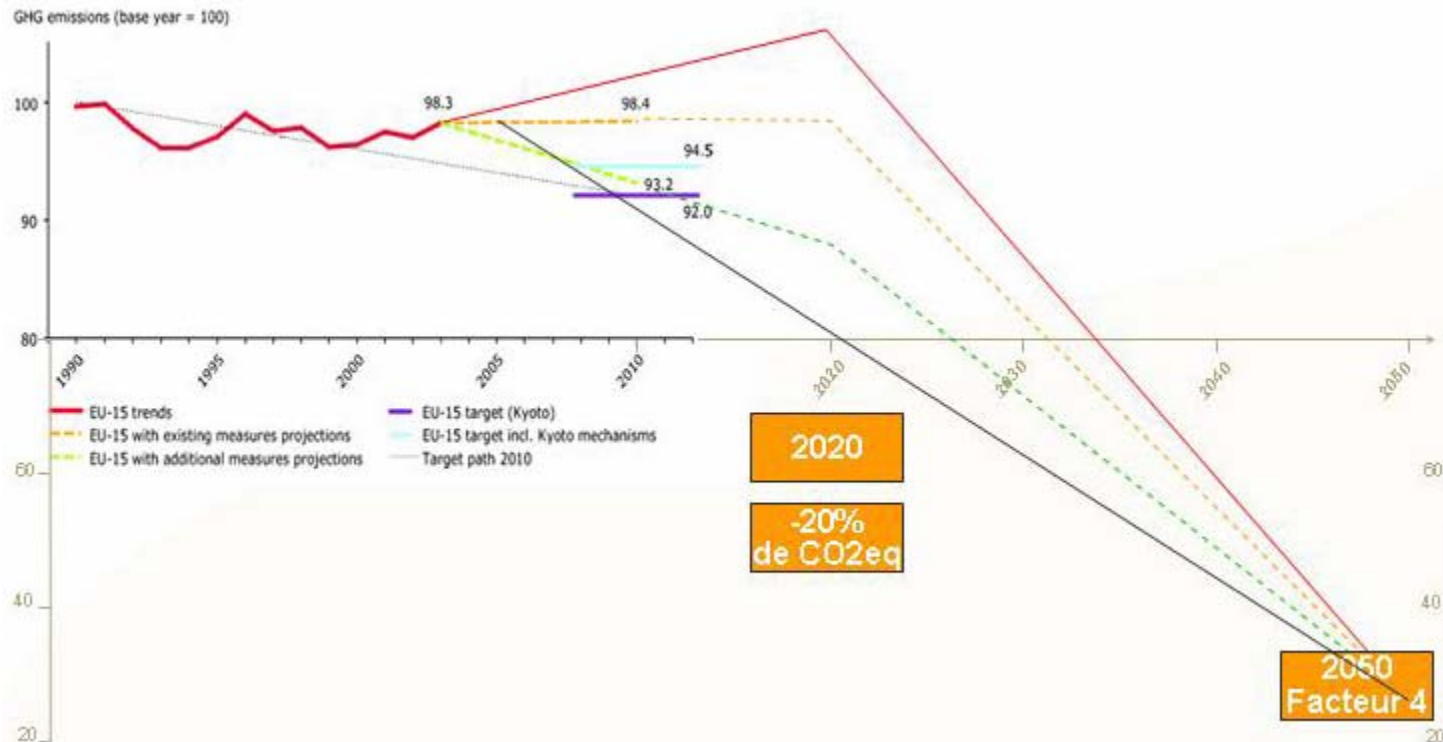


- **However, energy consumption continues to grow:** In the EU-25, the growth in total electricity consumption from 1999 to 2004 amounts to: (source: European Commission / Institute for Environment and Sustainability, 2007).
  - Residential sector: 10.8%
  - Tertiary sector: 15.6%
  - Industrial sectors: 9.5%

**Before reverting the trend, we have first to stop it.**

# European Union Climate Change Objectives

➤ Green House Effect gases (mainly CO<sub>2</sub>) emissions reductions of 20%

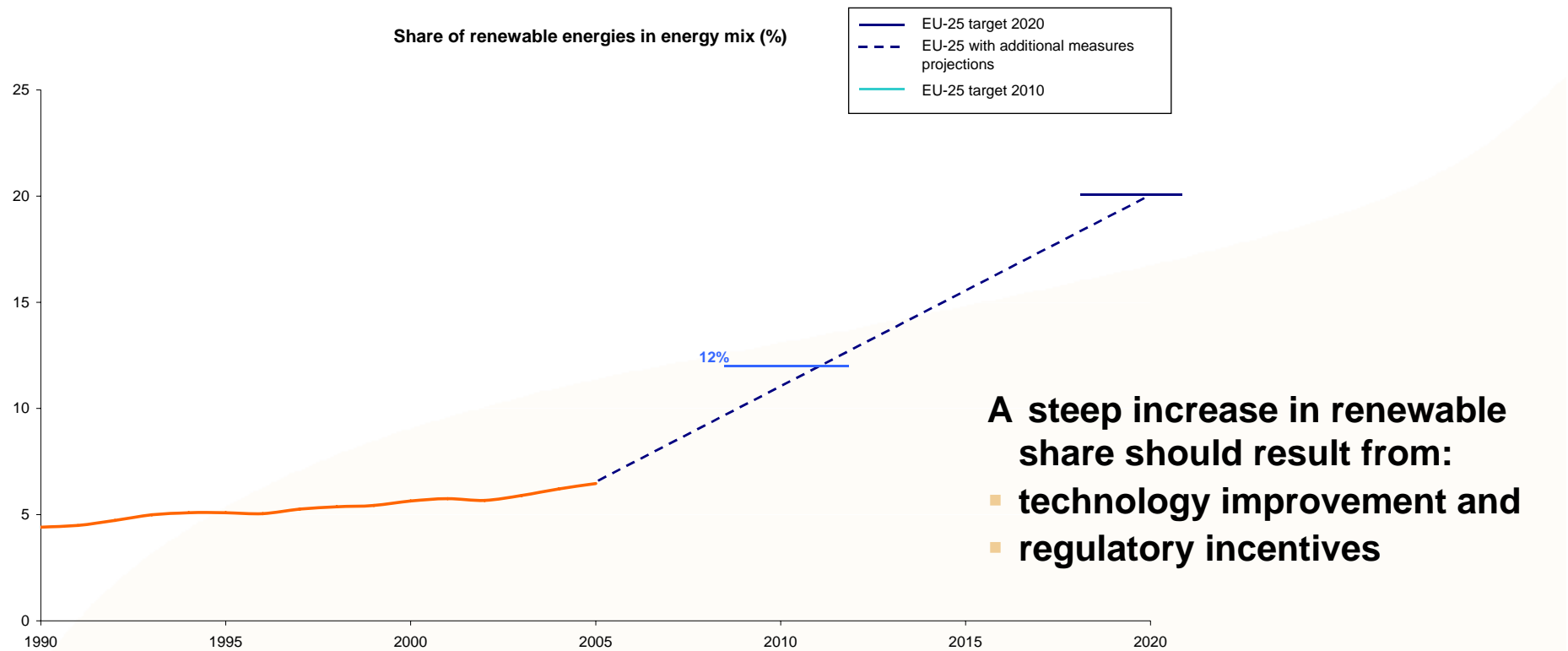


To limit the average worldwide temperature increase to +2° or +3° degrees, it is necessary by 2050 to:

- Divide by 2 the CO<sub>2</sub> emissions at the worldwide level (Factor 2)
- Or two divide by 4 the emissions of industrialized countries (as the developing countries will not be able to follow) (Factor 4)

# European Union Climate Change Objectives

➤ Portion of 20% of renewable energies in EU energy production



How will Europe achieve these targets?  
How much will it cost?  
Could it jeopardize EU competitiveness?

# €1000 billion needed to be invested in new power plants during the next 25 years in Europe

**Security of supply**

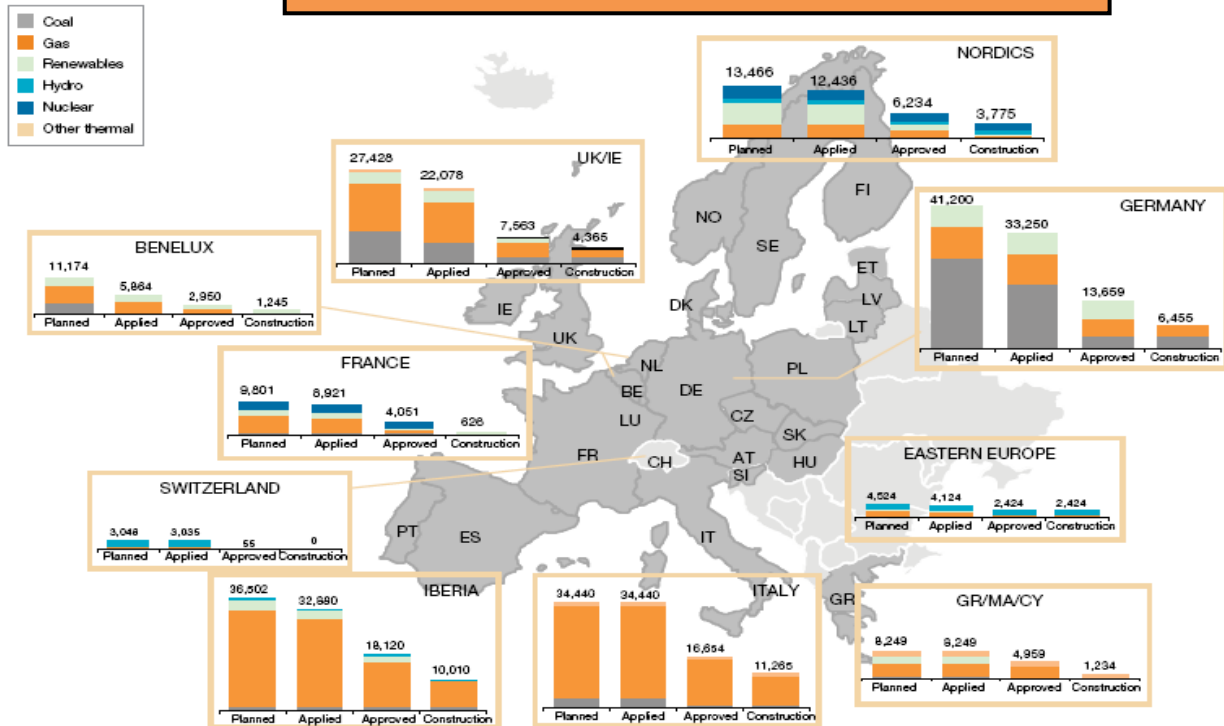
## Investment are needed to

- Meet the consumption increase
- Replace ageing plants
- Match the “peak load” demand
- Increase the carbon free generation capacity

## They have started but not with the right energy mix

- 81% of the planned generation plants (190 GW) will be fossil fuelled, a majority gas fired they
  - Are CO<sub>2</sub> emitters
  - Are contributing to increasing European dependencies on imported gas
- Without consistent long-term environmental regulation, Utilities are choosing the less risky short-term solution

## Projects of new generation capacities, in MW (2006)



Source: Platt's - Capgemini EEMO9

## Several factors could slow down or stop these investments:

- Scarcity of engineering and construction/ components capacity and of consented sites
- Lengthy regulatory procedures and local opposition

## Diapositive 6

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**RU2**

Gas fired vs Gazprom - this plays into their hands...Does the 1 trillion include all the renewable plants?

Doug

Registered User; 03/03/2008

# How to achieve the energy savings targets?

## The national action plans should include:

- **Regulatory measures for example:**
  - Compulsory insulation norms for new buildings and refurbishment; assessed in any sales transaction.
  - Expand white certificates mechanisms -already in place in UK and France- across all EU countries.
- **Rewarding mechanisms for energy conscious individuals or institutions for example:**
  - Smart meters allows and enables the end customer to have a proactive energy saving attitude.
  - Smart meters enable Utilities to give incentives for consumption decrease, particularly during peak hours and thus contribute both to the energy savings and CO2 savings objectives
  - Replacement of all meters by smart meters (as in Sweden, Ontario and California) should be imposed at EU level

**Florida Power and Light's smart meter success**

US utility Florida Power and Light, estimates that over the past 20 years, smart metering technology has saved it over \$1 billion dollars in grid investments and a further \$3 billion from avoiding the costs of constructing new power plants. It also claims over a 99% customer retention rate during the same period.

- **R&D and innovation funding followed by regulations to accelerate the usage of new the technologies and devices**
  - Light Emitting Diodes (LED) have reached the industrial level, have a long life time and allow a reduction in electricity consumption of 85%. Their cost should decrease over time (Lighting = 10 – 19% of electricity consumption)
  - Some computing companies have reported 80% energy savings after consolidating applications run in different data centres onto a “virtual” machine and implementing automatic switch offs for computers

**While Industry has achieved significant savings, the results are more questionable in tertiary and residential sectors**

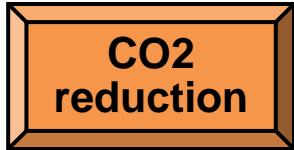
# Stringent and substantially funded energy saving plans at national levels are required

Energy savings

- The target of a 20% demand reduction is very ambitious given that demand is currently rising. This requires a reduction of more than 37% off the current trend for electricity consumption.
- To reach this 20% reduction in energy consumption, strong action plans need to be launched both at EU and national levels. Some examples :
- In August 2007, **German** ministers agreed on a 30-point program to reduce CO2 emissions by **35% in 2020 (compared to 1990)**. Energy and CO2 reduction should come from cars, industry, public buildings and private homes.
- In **France** a large debate took place around the “**Grenelle de l’environnement**” in October 2007. Upon this different measures should be adopted by the French Parliament:
  - Buildings: after 2010 new “low energy consuming” constructions, compulsory renovation before 2015 of existing public buildings, financial incentives for insulation...
  - Transportation: CO2 emission reducing cars, promotion of railroad, air traffic taxation
- The **Danish** government reached a broad parliamentary Agreement in February 2008 on i.e.:
  - Gross energy consumption overall is to be reduced by 20% in 2011 compared to 2006
  - 35 mill. DKK is earmarked for research in energy efficient hybrid cars
  - R&D within energy technologies will be funded with 1 billion DKK in 2010
  - A “**Climate Commission**” is to suggest steps towards independency of fossil fuels

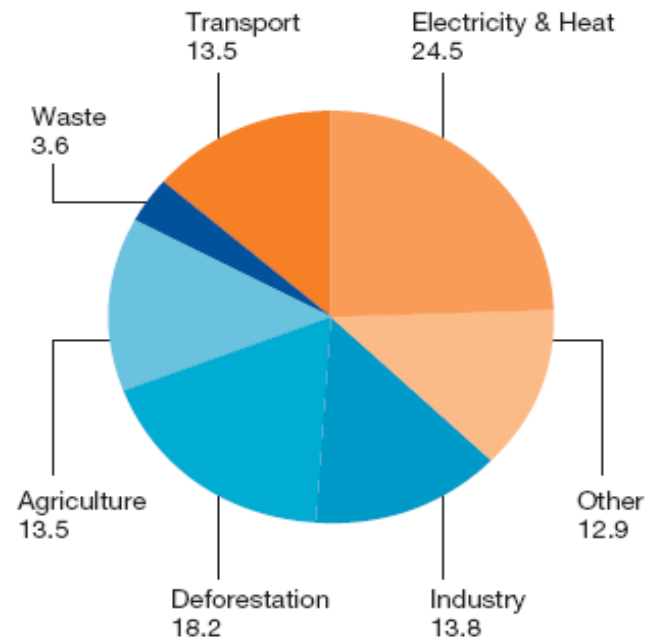
**Energy conservation is key to allow for security of supply and CO2 emissions reduction – but how to make it happen?**

# CO2 emission reductions will come from:



- Energy conservation results
- Better optimization of the generation fleet through Europe via a more fluid grid
- Modification of the primary energy mix, towards carbon free generation
  - *Safe nuclear energy*: we are witnessing a renaissance
  - Clean coal plants with CO2 Capture & Storage
  - Renewable energies
- Improvement of the present CO2 Emission Trading System by extending it:
  - to more sectors
  - to more Green house effect gases
- Organisation of the end user's CO2 market in order to:
  - Put a reality behind each Company's Corporate Social Responsibility announcement
  - To avoid fraud
  - To avoid CO2 reduction double counting

World greenhouse-gas emissions by sector (2000, in %)



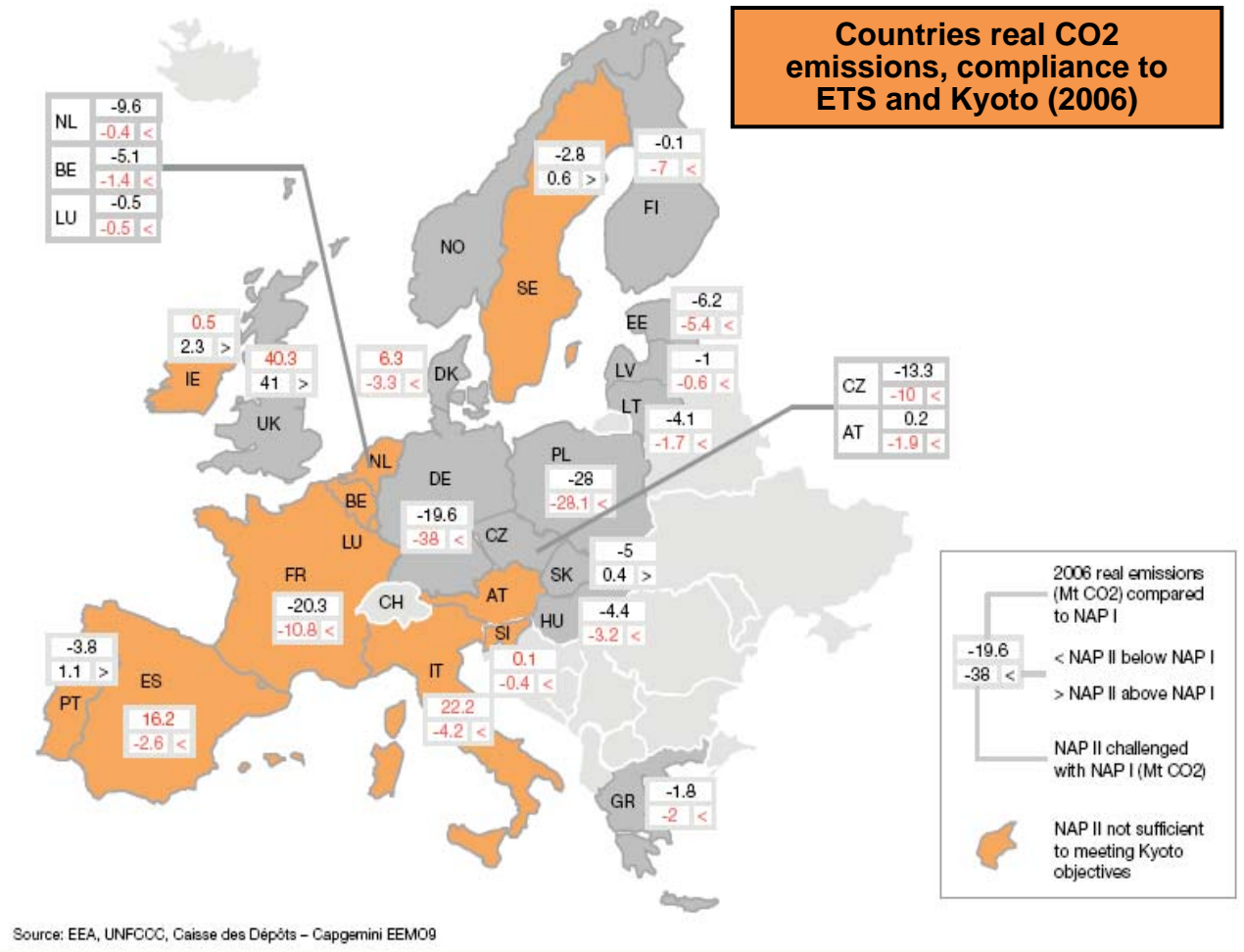
Source: World Resources Institute

**European Union is building a 2008-2020 plan**

# 2008-2012: New European National Allocation Plans



- Worldwide discussions aiming at renewing the Kyoto protocol have started:
  - Bali 2007 conference has established a roadmap
- Next steps are
  - NA attitude evolution (US elections outcome)
  - Copenhagen conference
- European Countries have accepted more stringent National Allocation plans
- However they are probably not sufficient
  - To meet the 2020 objectives
  - To boost CO2 prices easing renewable energies development and the switch from coal to gas



# 2013-2020: way forward (Jan 23 EU declarations)

## Renewable energies and CO2 (GHG) emissions country allocations

More sectors and more GHG will be included in the “non ETS” scheme allowances

The EC has varied the renewable and GHG emission reduction (non ETS) effort on the basis of an equal increase in each Member’s State’s share and part in proportion of according to their Gross Domestic Product per capita with an equal weight to each factor

**Will Countries accept these rules that need extra funding?**

Country	Renewable share by 2020 (vs. 2005)	GHG emission compared to 2005 (outside ETS)
Austria	34% (23%)	-16%
Belgium	13% (2%)	-15%
Denmark	30% (17%)	-20%
France	23% (10%)	-14%
Germany	18% (6%)	-14%
Italy	17% (5%)	-13%
Netherlands	14% (2%)	-16%
Spain	20% (9%)	-10%
Sweden	49% (40%)	-17%
U.K	15% (1%)	-16%

## Diapositive 11

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**RU3** It would be interesting to know what the price increase for electricity might be in, say France, if they used wind power to hit this target.

Doug

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## 2013-2020: way forward (Jan 23 EU declarations)

### CO2: ETS Review is bullish:

- **A phased reduction in the ETS cap** to 21% below 2005 emissions resulting in a 1,720 Mt/y 2020 limit compared with Phase 2( 2,081Mt/y)
- **Full certificate banking** from Phase 2 to Phase 3
- **100% auctioning for the power sector in 2013** which results in a 20 to 30 billion Euros extra costs for Utilities over the period. These funds will be *partially* reallocated on Climate change related R&D projects
- **Much tighter limits in Phase 3** on certificates acquired through the Clean development Mechanism or Joint Initiatives
- Concerns are raised by certain industrial sector's representatives and politicians on “**carbon leakage**”

**Will Utilities be able to pass these extra investment (in renewable energies) and ETS related costs to their customers?**

**Utilities and Oil and Gas Companies have to build an global plan allowing them to contribute to the overall “climate change” objectives**

## Diapositive 12

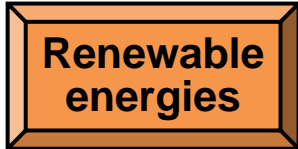
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**RU4**

You may want a glossary slide at the back of the presentation - there are a lot of terms in this presentation that may be new to people and to slow down and explain them will add time. So a glossary slide will allow you to refer them to it when they get the electronic copy.

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# Reaching this 20% share of renewable energies is a big industrial and financial challenge.



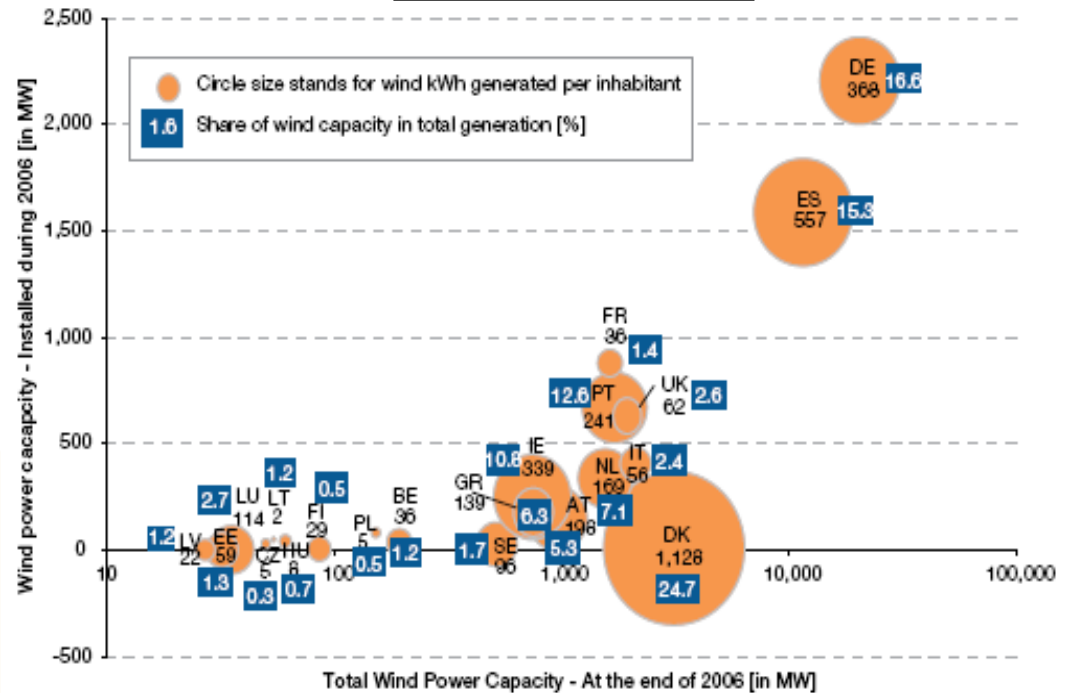
## Hydropower

- First source of renewable energy in Europe and has a further increase potential in the EU
- Only significant carbon free peak load generation option
- Will become indispensable as an energy reserve source to complement wind mill intermittent output.
- Its development should not be jeopardized by new stringent regulations.

## Wind power

- Wind power is developing fast
- It can benefit from the existing reserve capacity as long as it's share of the total generation stays modest.
- It raises grid management problems
- Its development is today boosted by governments subsidies and climate change issues.
- Windmills that operate in a wider range of wind conditions and other technology improvements are expected

Wind capacity (2006)



Source: EurObserv'ER - Capgemini EEM09

**Extra investment in renewable energies should amount to 18 billion Euros/year**

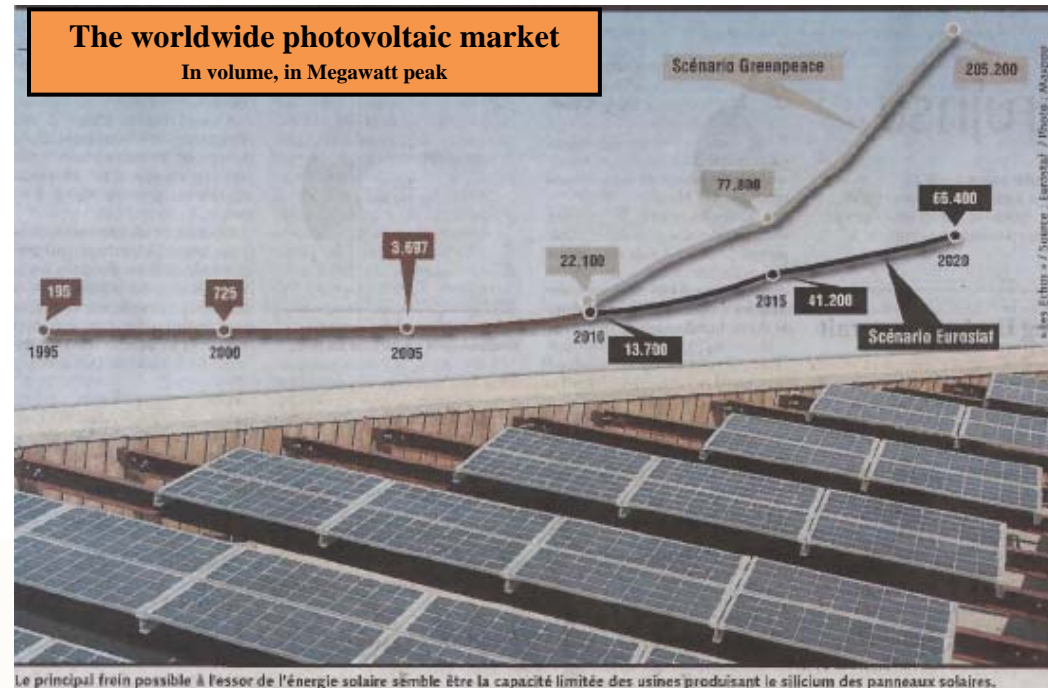
# Reaching this 20% share of renewable energies is a big industrial and financial challenge.

Renewable energies

## Solar

- The use of solar thermal individual panels should be strongly encouraged
- Photovoltaic solar energy is still very expensive. However technology breakthroughs should happen (such as matrixes allowing efficiencies improvements from 15 to 40%).
- Significant decreases in manufacturing costs are needed. NanoSolar is claiming that the cell's manufacturing cost is under \$1 a watt - so the installed cost should be about \$3 a watt - down from the current \$15 a watt..
- Decentralized solar saves part of the grid costs(2/3 of final price)
- To make solar a reliable source, batteries have to be installed

**More R&D funding is needed at EU level**



## Bio-fuels

- Unclear first generation's impact on CO2 emissions and energy consumption
- Development of 2nd generation is underway
- In Europe it is questionable to use land and water needed to produce food.
- Well adapted for Brazil where the number of flex cars has now surpassed the classical cars.

| Energy, Utilities & Chemicals

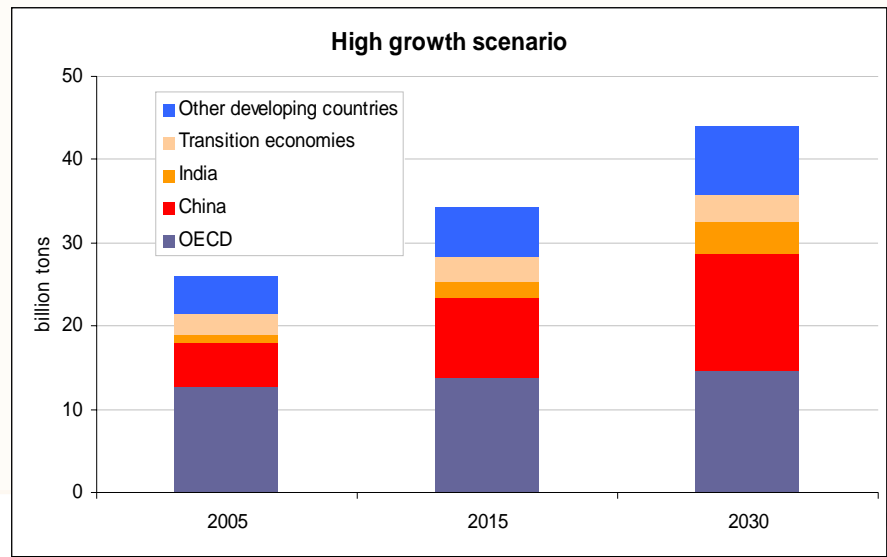
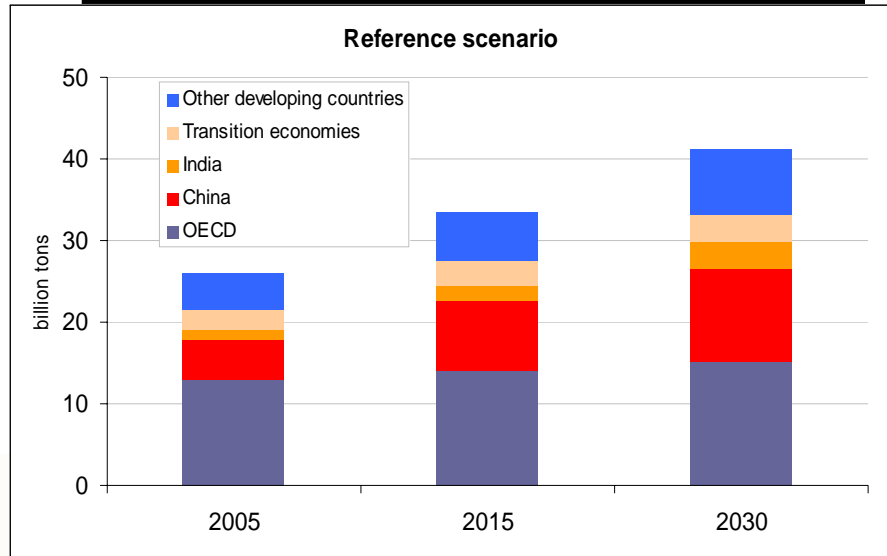
# European roadmap alone represent a drop of water in the ocean

Conclusion

- The cost of this “Climate Change” EU policy will amount to **75/90 billion Euros/y**
  - It **should** boost Research and Development and new European “clean” technologies **without**
  - Jeopardizing Europe competitiveness
- CO2 limitation measures should also be applied in high energy consuming areas such as North America and adapted for China and India :
- A recent IEA report shows that by 2030, worldwide **CO2 emissions should increase by 46%** in the reference scenario. China will be the largest emitting country (30% of the total)

**Other regions need to set quantitative objectives related to climate change**

Energy-related CO2 emissions for different regions in the world (2005-2030) in Billion tons



calls