

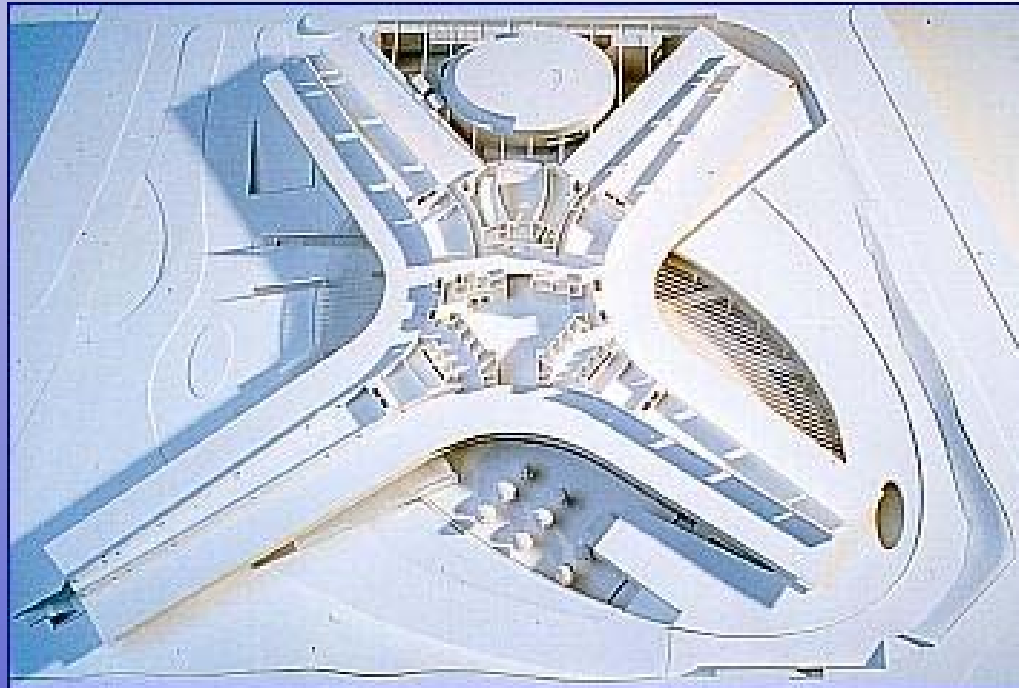


District heating/cooling in Greece: The role of CHP

Costas THEOFYLAKTOS,
President
Hellenic Assoc. for CHP



Trigeneration at the heart of Europe: Berlaymont 2000



And also the German, Finnish, Danish, Irish
and Dutch parliaments, Whitehall



Key Facts and Trends



- Challenges of environment, energy saving and fuel supply security
- New technologies open new doors
 - Micro turbines; Stirling Engines; Fuel Cells
- Natural gas the fuel of choice
- Liberalisation
- Traditional business is being squeezed
 - liberalisation, regulation and competition
 - cogeneration target 18% and should be more
 - Renewable target 12% of which 8-10% is electricity
- Environment means status quo is not an option
- Need to readjust and fast



Current CHP Situation



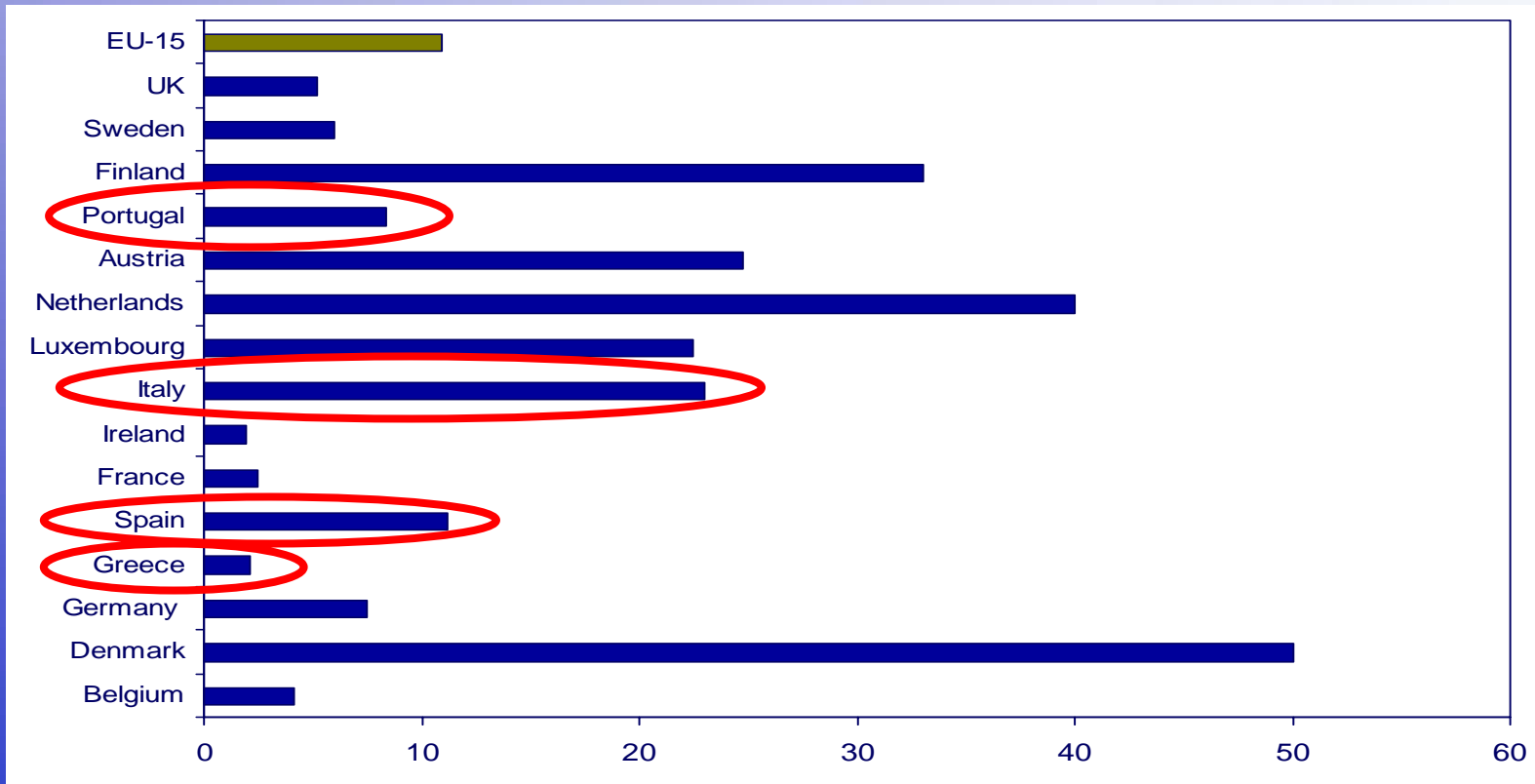
- Paradox
 - Short-term market is bad
 - Long-term is promising
- Diversity in EU rules, approaches and attitudes
- Three ages for CHP
 - First Age - 1980s - technological
 - Second Age - 1990s - policy
 - Third Age - 2000s - delivery



Cogeneration in Europe



Percentage of total electricity generation in 1999



Sources: Eurostat, COGEN Europe, Cogena



Why is it important?



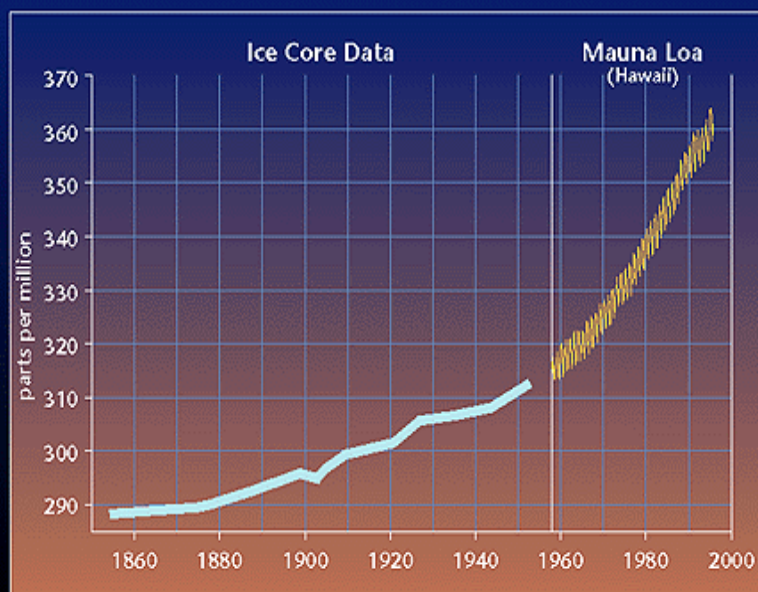
- Kyoto single biggest challenge
- Radical changes to the economy needed
- Cogeneration is one of the most cost effective solutions
- Cogeneration has been identified as one of the major solutions to challenge
-but short term vision and vested interest is affecting the market



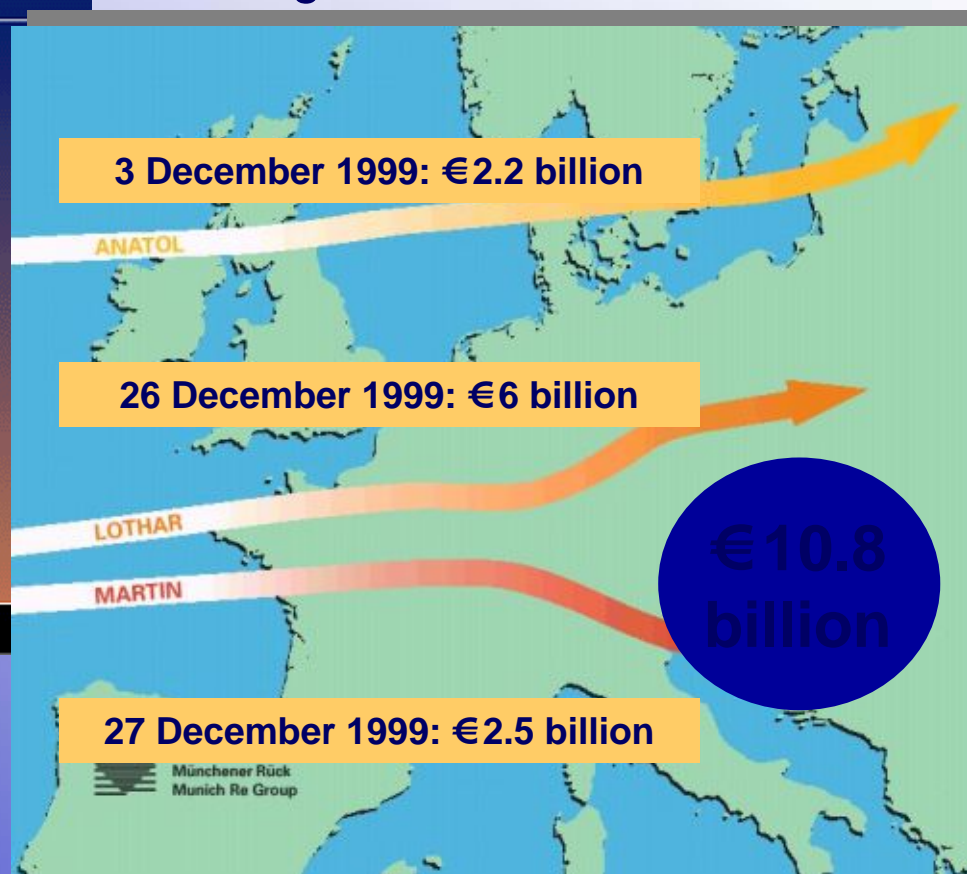
Climate change



Carbon Dioxide Concentrations



...cause weather extremes and damages worth billions of Euros.



Rising CO2 emissions...

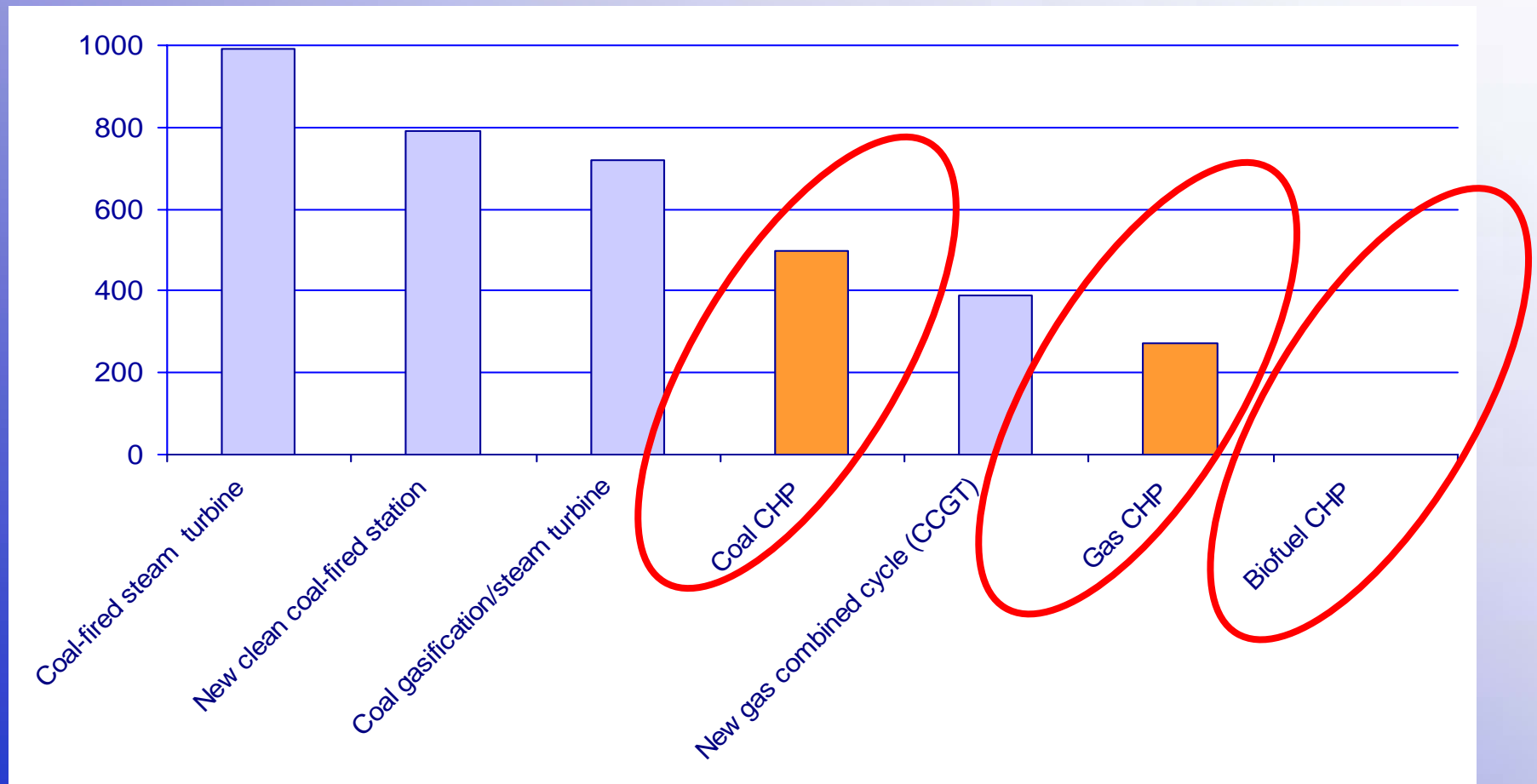
Source: Münchener Rückversicherungsgesellschaft



CO₂ emissions compared

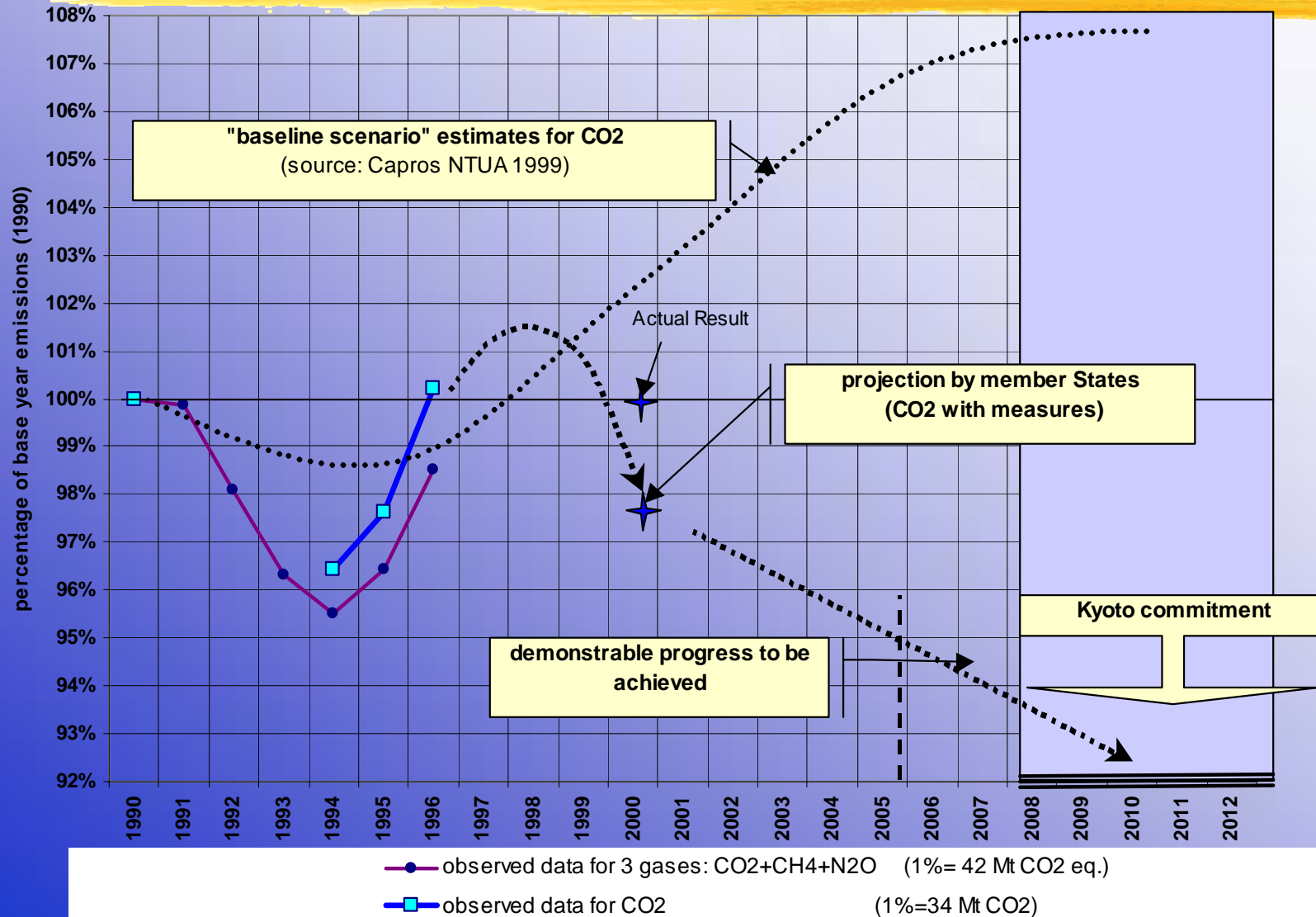


CO₂ emissions - kg CO₂/MWth





Greenhouse gas emissions for the EU 1990-2012





What's in a name?



- Deregulation, Re-regulation, Liberalisation and Privatisation
- Deregulation leads to chaos!
- All markets need regulation so re-regulation is necessary, from state owned to new structures
- Privatisation is the ultimate result of liberalisation as state owned companies will struggle in a truly open market
- Liberalisation is just a process and needs to be framed correctly



Liberalisation

- Allows new entrants, greater transparency, less discrimination on top-up and emergency supplies
- Uncertainties remain
 - Transport tariffs?
- Must be correctly regulated and framed
- Directive on CHP = progress but compromises...
- Globally positive, in particular for industrial CHP - in the long term at least



Energy Market Liberalisation



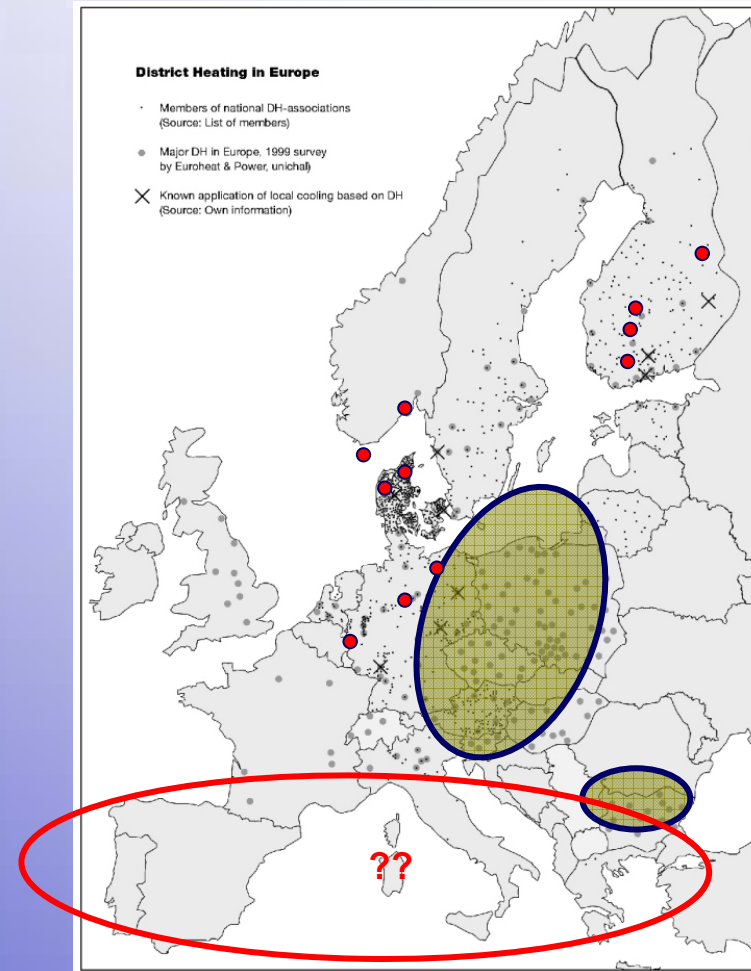
- Big problem as it is incomplete
- CHP is a barometer
- Only Partial Opening
- Benefits incumbents
- Downtown in cogeneration market
- 30% of current capacity may go in NL
- 50% in Germany
- Most markets Stagnant



District Heating and Cooling



- Four networks in Greece, 27 in Italy, none in Spain and Portugal
- Indications on high potential e.g. in Italy
- District cooling potentials likely
- District heating/cooling should be cogeneration
- But high initial investments necessary



Source: Euroheat and Power



Greek District Heating Systems





Technical characteristics of the existing DH systems



- Kozani DH: PPC- 81,4 MWth
- Ptolemais : PPC- 70 MWth
- Amyntaio : PPC- 40 MWth
- Megalopoli : PPC and Boiler with biomass
20 MWth

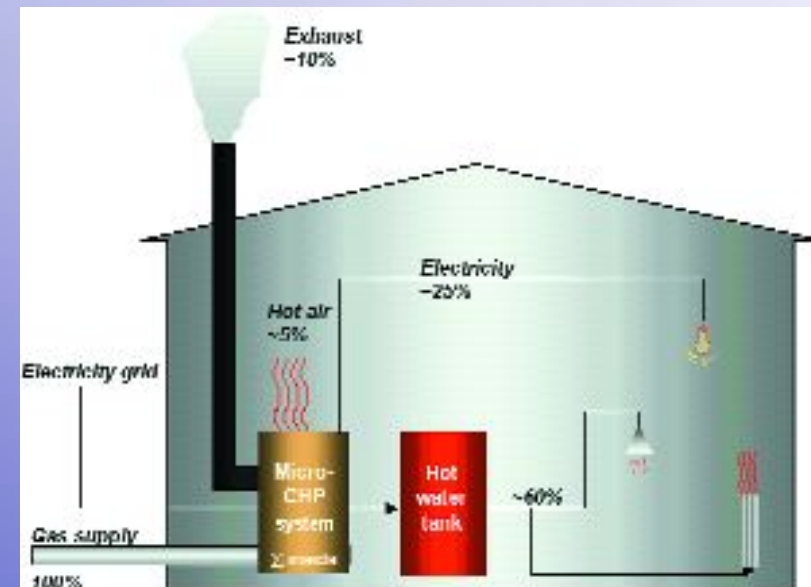




Cogeneration and Trigeneration in Buildings



- **Current penetration is limited**
- **Much smaller generators will be on the market in the next two years**
- **Cooling demand can be more relevant than heating demand. Difficult to replace conventional air conditioning**
 - Not always accepted by electricity utilities
 - New models of grid connection and systems operation required
 - EU Directive on energy performance of buildings

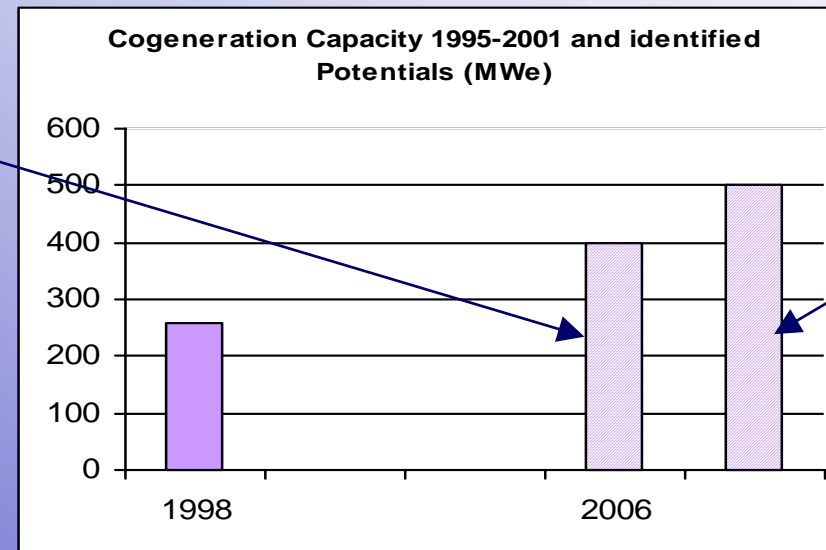




Cogeneration in Greece



**Estimation
of the
Hellenic
CHP
Association**

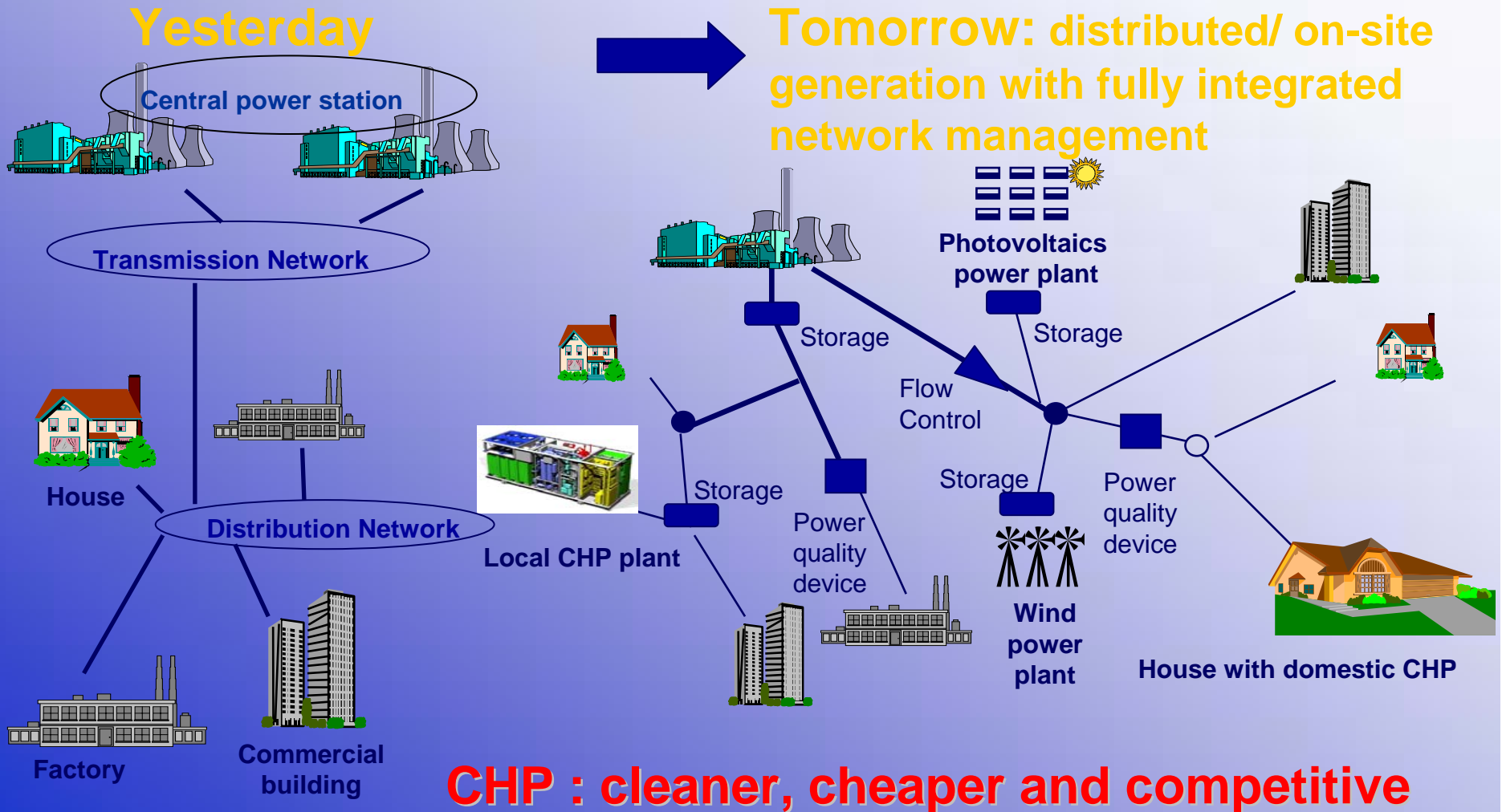


**Total
potential
estimated by
the Hellenic
CHP
Association**

- Very low share of cogeneration, mostly autoproducers
- Increasing market prospects for cogeneration 2000-2005
- 50% increase in the installed capacity in the industrial sector by the end of 2005 expected
- growth of small-scale systems in the tertiary sector likely but difficult to predict
- Administrative and economic obstacles



Breaking the Rules!





Boldness is Necessary



- There are 10 years left to double CHP's share of the market.
- This is 60-70.000 MWe in the EU 15
- Plus 20.000 MWe replacement of existing plant
- Plus Transition Economies (0 to 30 GWe)
- Thus ~ 100 GWe or 10.000 MWe per year
- Around 4-8 times current activity



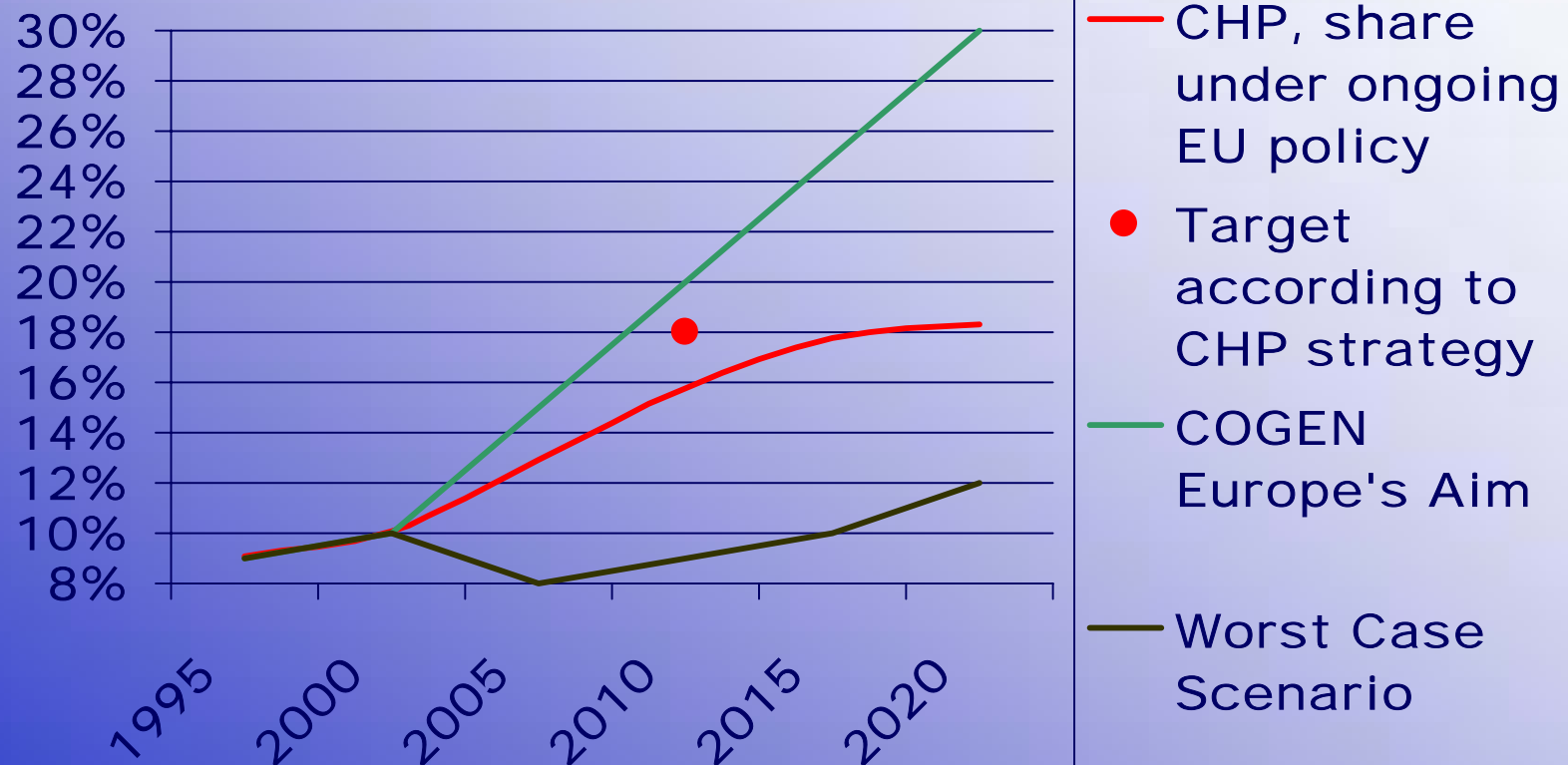
BUT..



- It will not happen without co-ordinated policies at both the EU and Member State level
- Therefore the Action Plan is essential and urgent at the EU level
- National Plans and Strategies need to be developed



CHP - Energy Outlook to 2020



Source: Primes, (Autumn 1999): CHP electricity production, share of total generation



Conclusions



- Potential to **double cogeneration** capacity by 2010
- Potential to supply **22% of generated electricity** in the EU and 15% in Greece
- Potential to save **127 million tonnes of CO₂** in EU by 2010 & **258 million tonnes** by 2020



Conclusions



- **Technological change** can open major new markets
- **Micro-cogeneration** can achieve major benefits
- **Gas** is the future fuel of choice
- **Biomass** could provide up to **11 GW_e** by 2010, with a further **8 GW_e** by 2020



Conclusions



- CHP is the perfect tool for clean decentralised energy services
- Single largest contributor to cutting CO₂
- Costs are neutral as well
- Uncertainties in EU remain but, if set in the right framework, liberalisation will have a positive impact
- Market potential is huge >30% of electricity supply is economic today



Thank you for
your attention
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