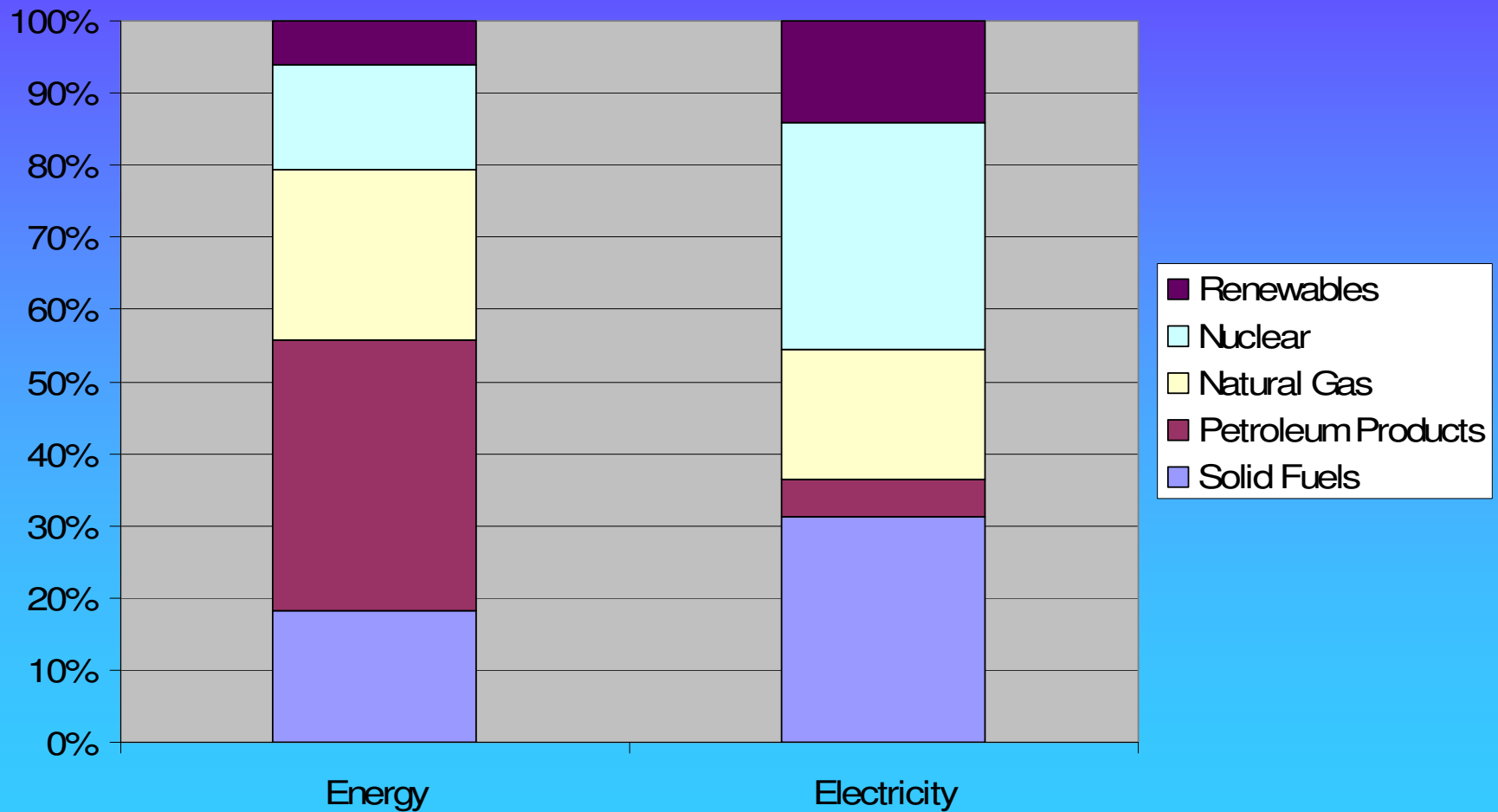


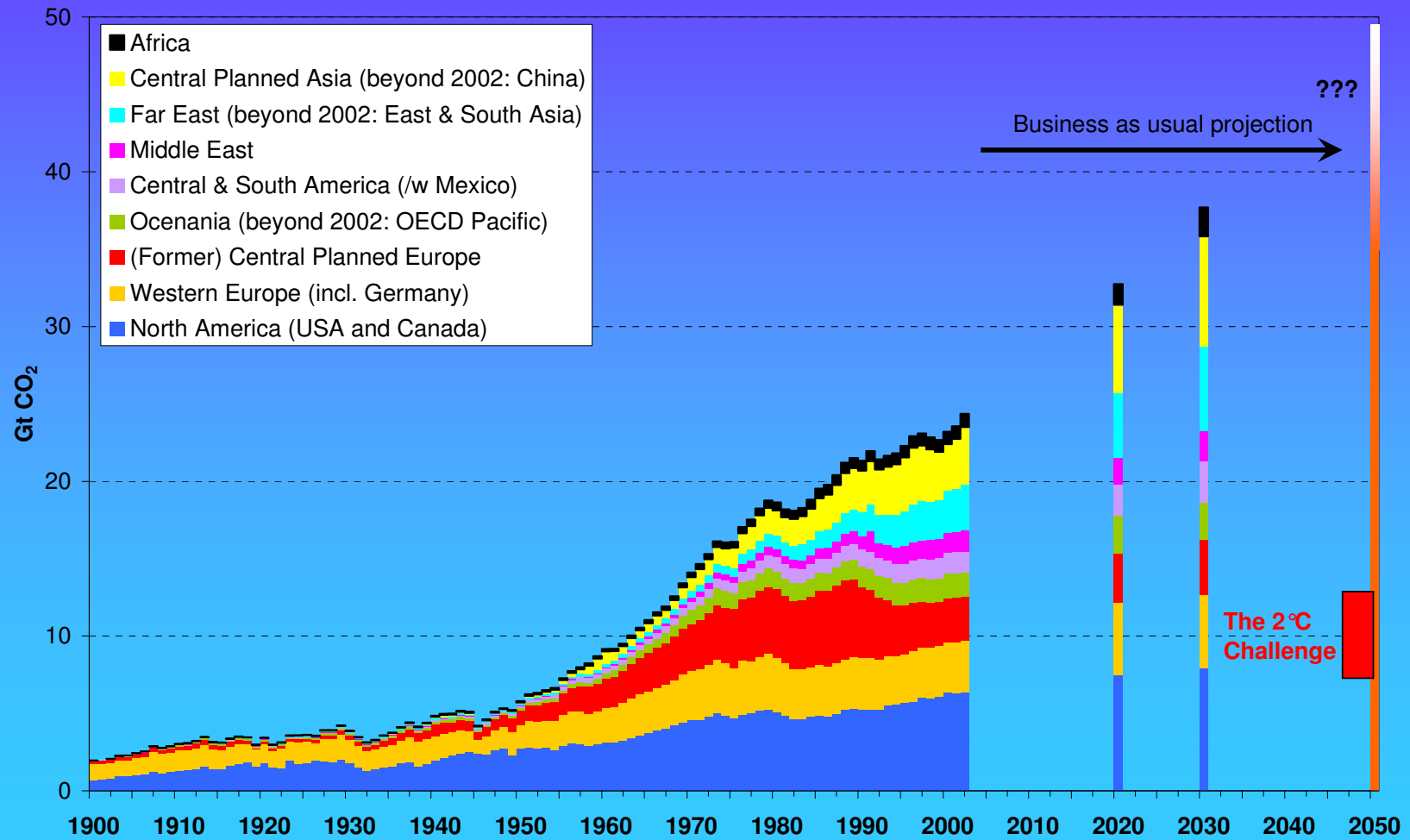
Public Funding For Nuclear Power

Antony Froggatt
Independent Consultant

Energy and Electricity Mix in Europe



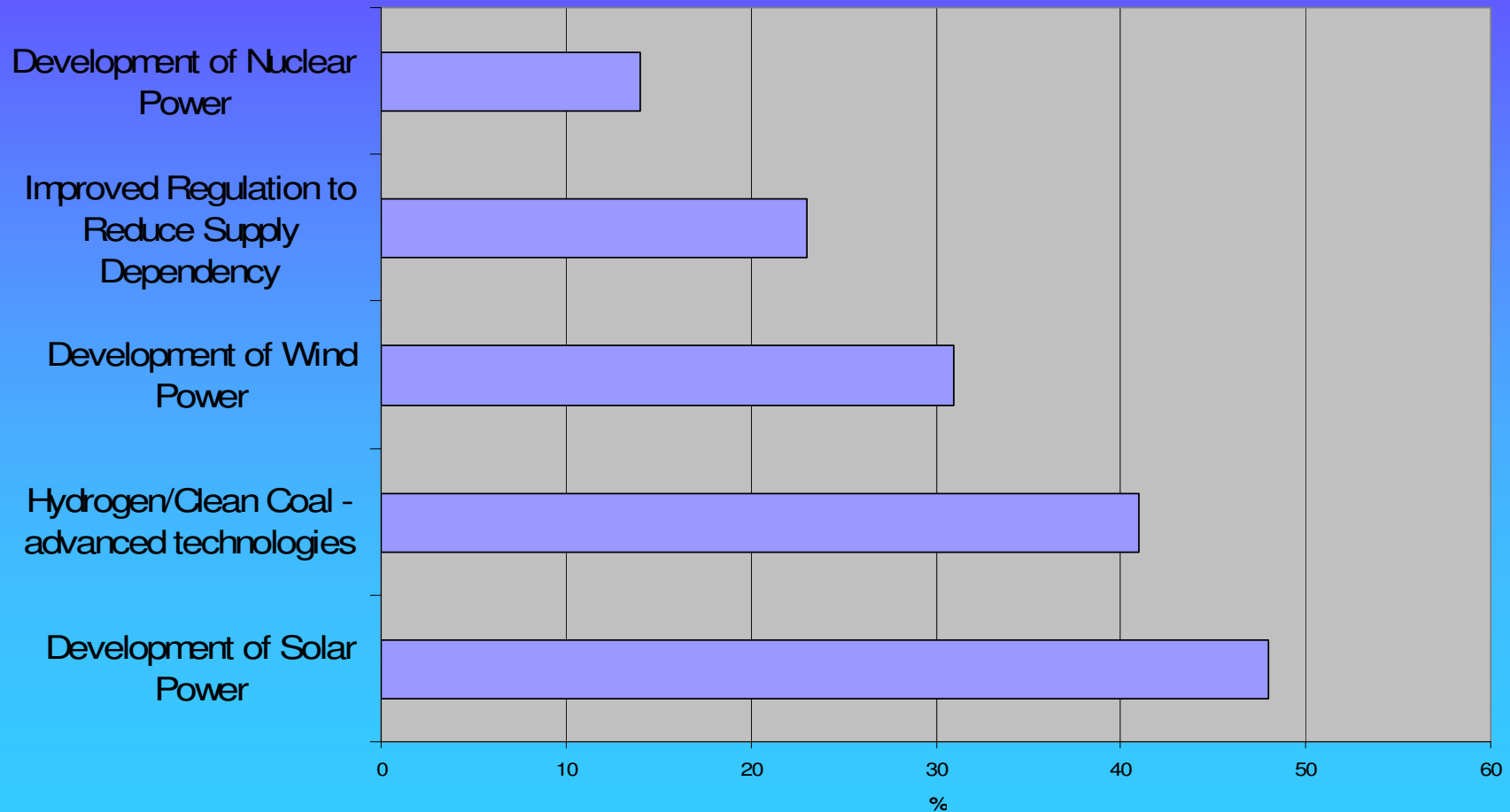
Expected CO2 Emissions Increase



Public View ?

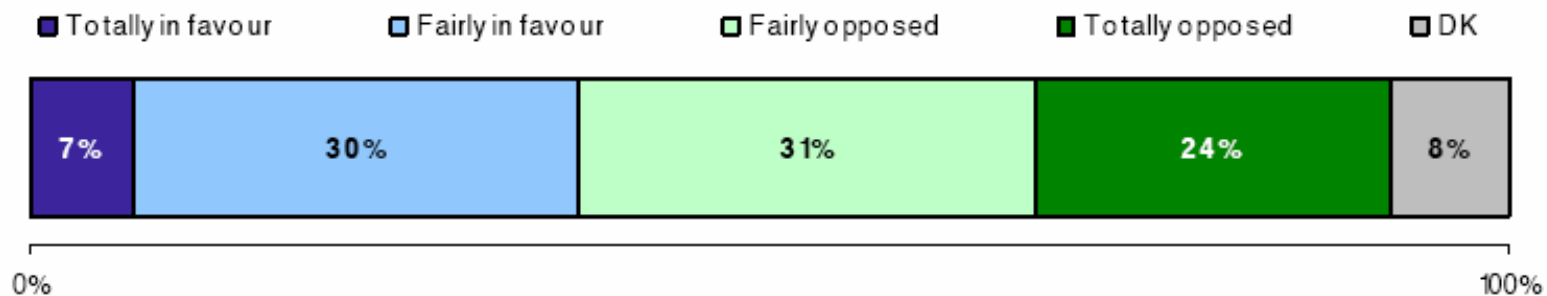




























Which Technologies Should be adopted to increase security of Supply (2 choices)

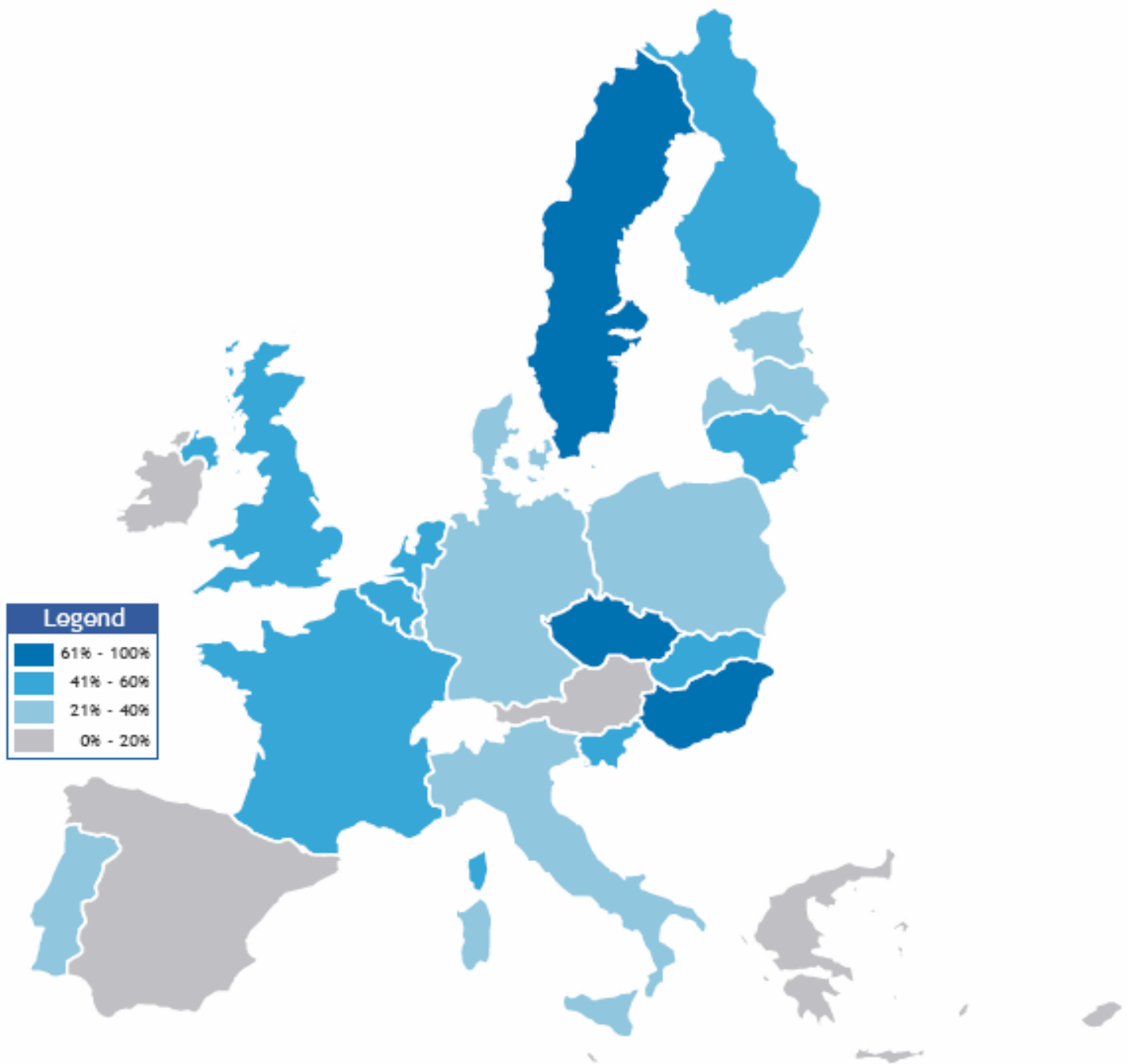


Public Support For Nuclear Power

Q2. Are you ... to energy produced by nuclear power stations? % EU



Member States Results		
	Hungary	65%
	Sweden	64%
	Czech Republic	61%
	Lithuania	60%
	Finland	58%
	Slovakia	56%
	France	52%
	The Netherlands	52%
	Belgium	50%
	United Kingdom	44%
	Slovenia	44%
	Estonia	40%
	Latvia	39%
	Germany	38%
	EU25	37%
	Luxembourg	31%
	Italy	30%
	Denmark	29%
	Poland	26%
	Portugal	21%
	Malta	17%
	Spain	16%
	Ireland	13%
	Cyprus	10%
	Greece	9%
	Austria	8%



Transparent Energy Sector

- All governments give financial support to their energy sectors and in particular to specific technologies.
- Historically and currently these have been given towards traditional energy sources. Through
 - Direct financial transfer (grants to producers and consumers)
 - Preferential tax treatment
 - Trade restrictions
 - Energy related services provided directly by government at less than full cost
 - Regulations of the energy sector

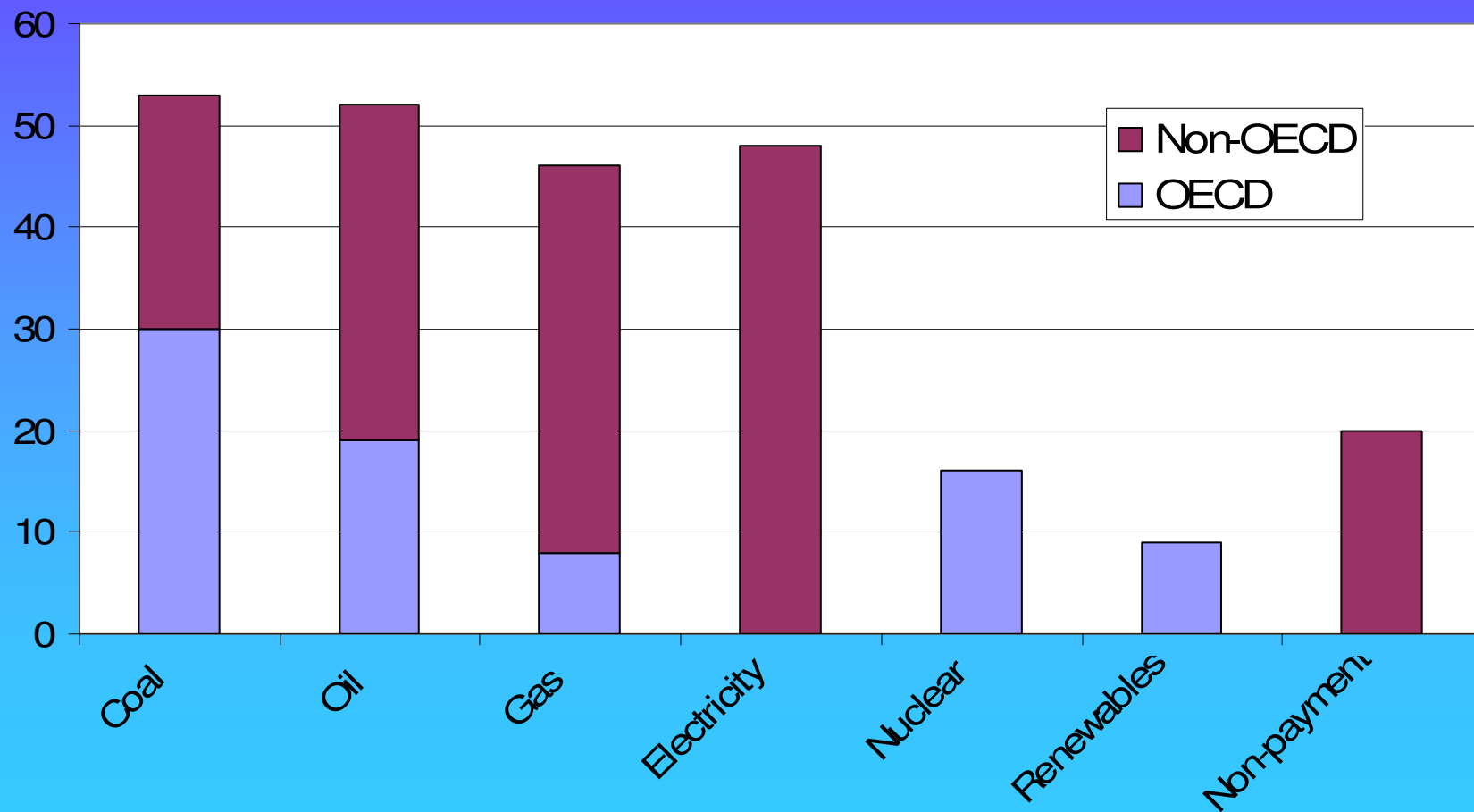
Targeting of Public Funds

- Analysis undertaken by Amory Lovins suggests:
 - Every \$0.10 spent on a new nuclear kWh could have resulted in:
 - 1.2-1.7kWh of Windpower
 - 0.9-1.7 kWh of gas fired
 - 2.2-6.5 kWh of co-generation
 - Several to 10+kWh of energy efficiency.
- There is an opportunity cost of different support schemes.

Subsidies

- The total revenues of the energy sector is approximately \$2 trillion per year.
- However, Governments continue to subsidise the sector.
- In 1998 global energy subsidies were approximately \$240 billion, of which 75% of fuel subsidies went to fossil fuels and 6% went to renewables and energy efficiency.

Energy Subsidies/Year (\$ billion)



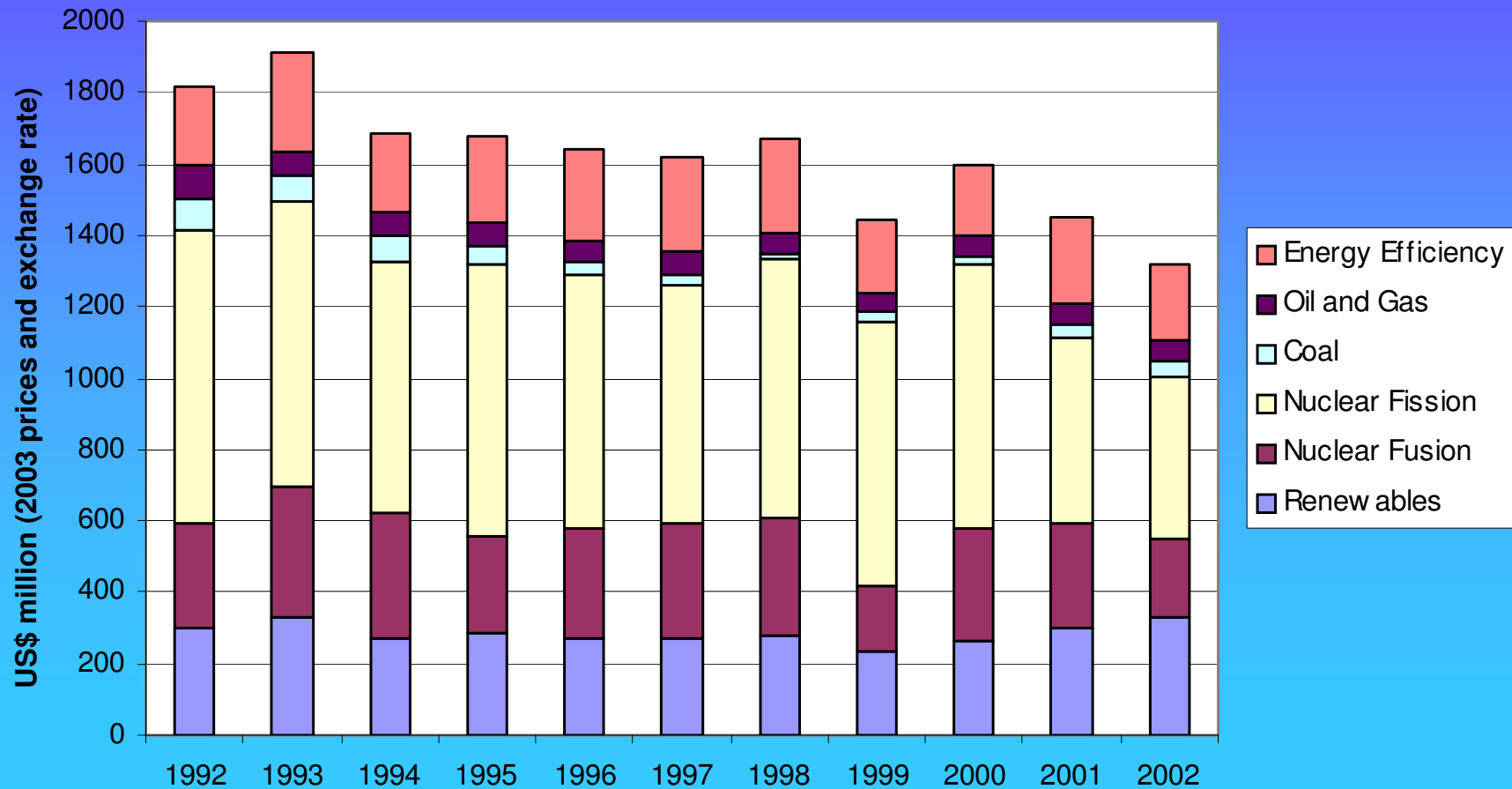
Specific Subsidies/Support for Nuclear

- Research and Development
- Financing
- External Environmental Costs

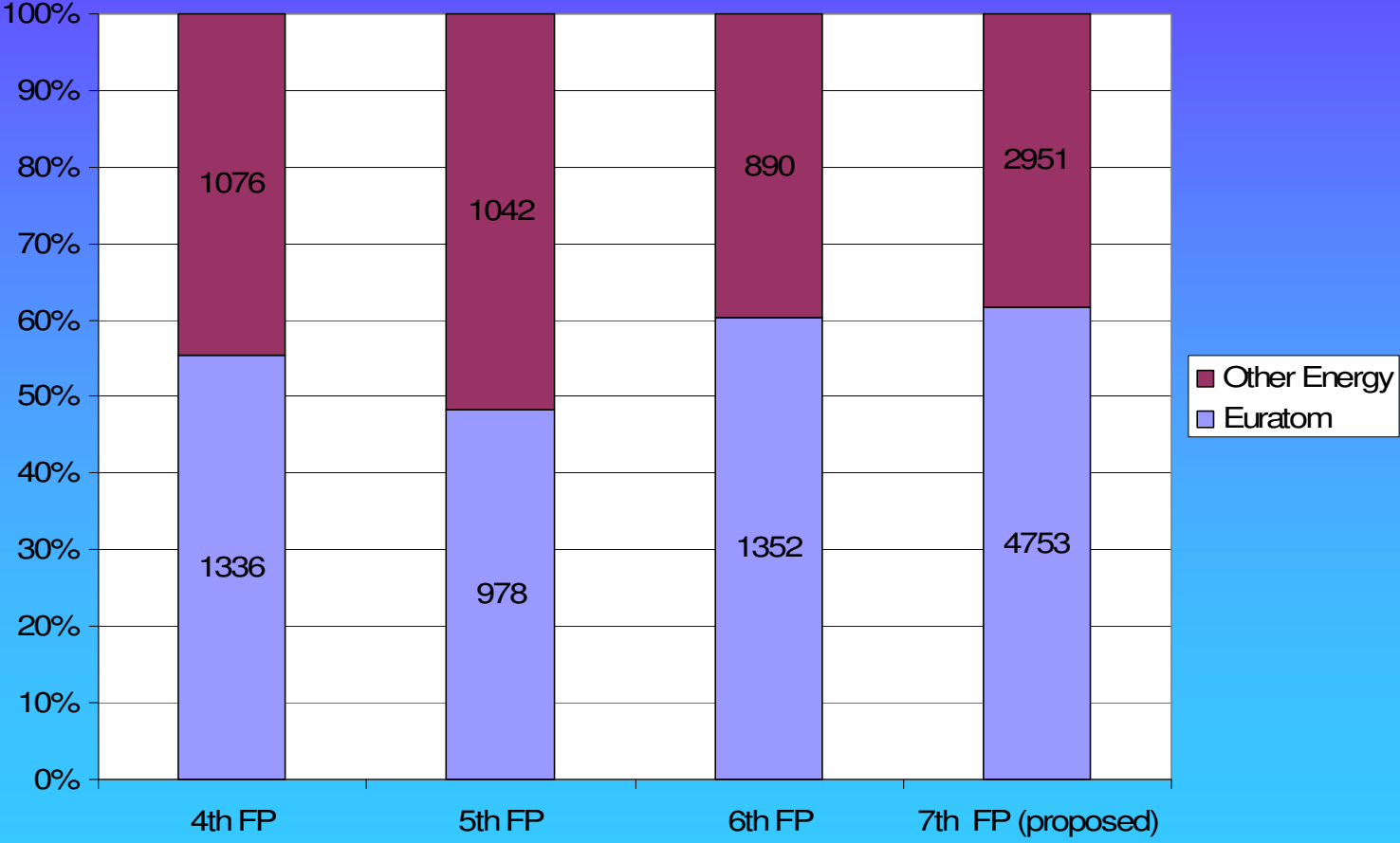
Research and Development

- Limited Government research and development funding must be allocated towards:
 - infant technologies
 - those in which the private sector is unable to fund the work
 - Expected to reach commercialisation soon, and
 - Widespread applicability
- Between 1974-2002, nuclear (fission and fusion) received \$169 billion in Government R and D grants from countries in the International Energy Agency, compared to \$24 billion for renewables.
- In 2002, Japan allocated more funding for nuclear fission (\$2.8 billion) than all the countries of the IEA combined allocated for energy conservation and renewable energy (\$2.4 billion).
- In their first 15 years of commercial operation, nuclear and wind technology produced a comparable amount of electricity in the United States, but the subsidy to nuclear was 40 times greater than that given to wind (\$39.4 billion to \$900 billion).
- The European Commission has estimated that between 1974 and 1998 Member States granted approximately \$55 billion

IEA-Europe Research and Development Funding



Comparison of EU Research and Development Funding

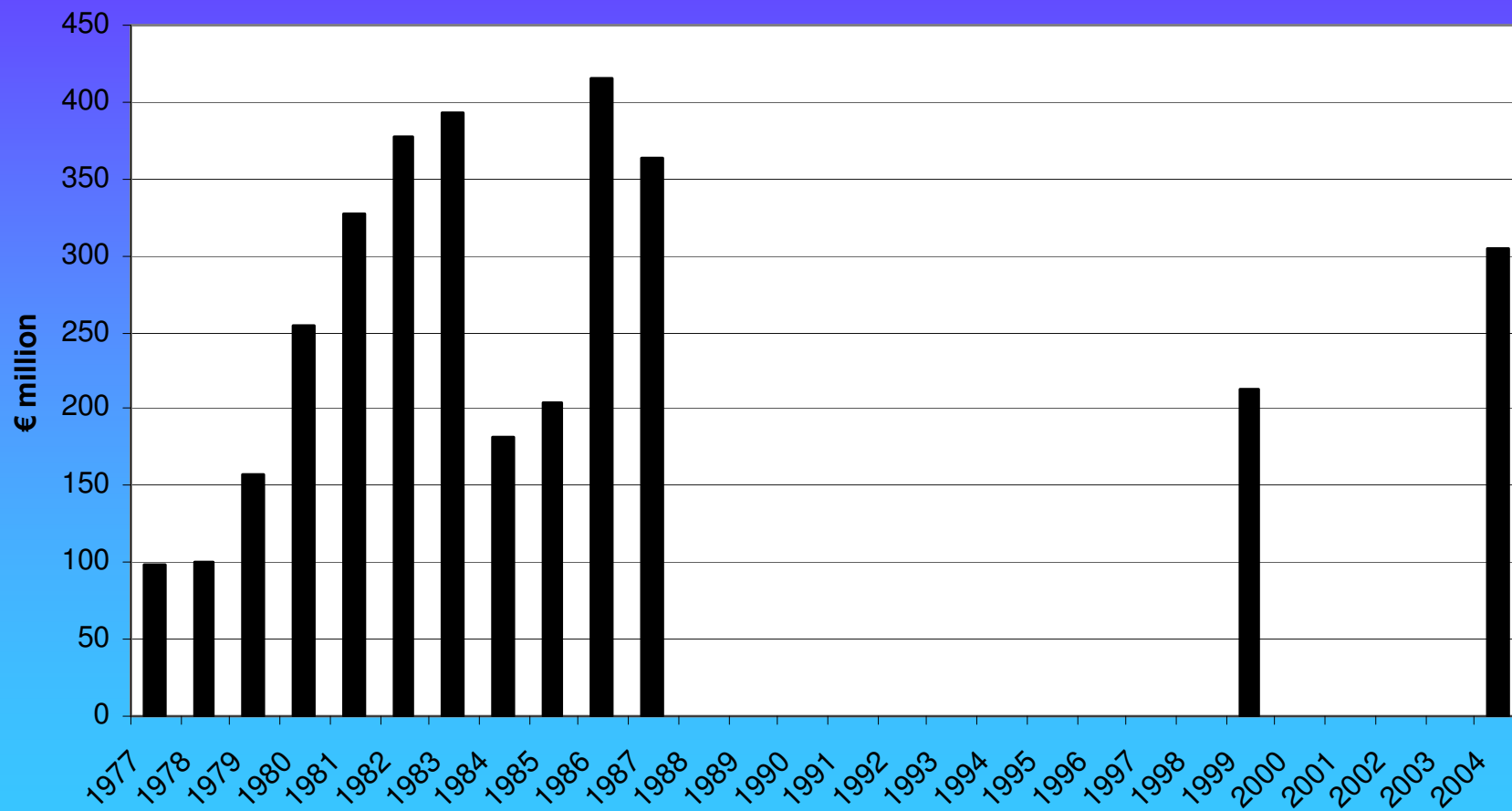




Financing

- Nuclear power has large construction costs and times. This increases the financial risks.
- Therefore an important cost element in the price of nuclear electricity is the interest rate obtained.
- Government or International Financial Institution assistance is used to decrease the interest rate obtained.

Euratom Loans



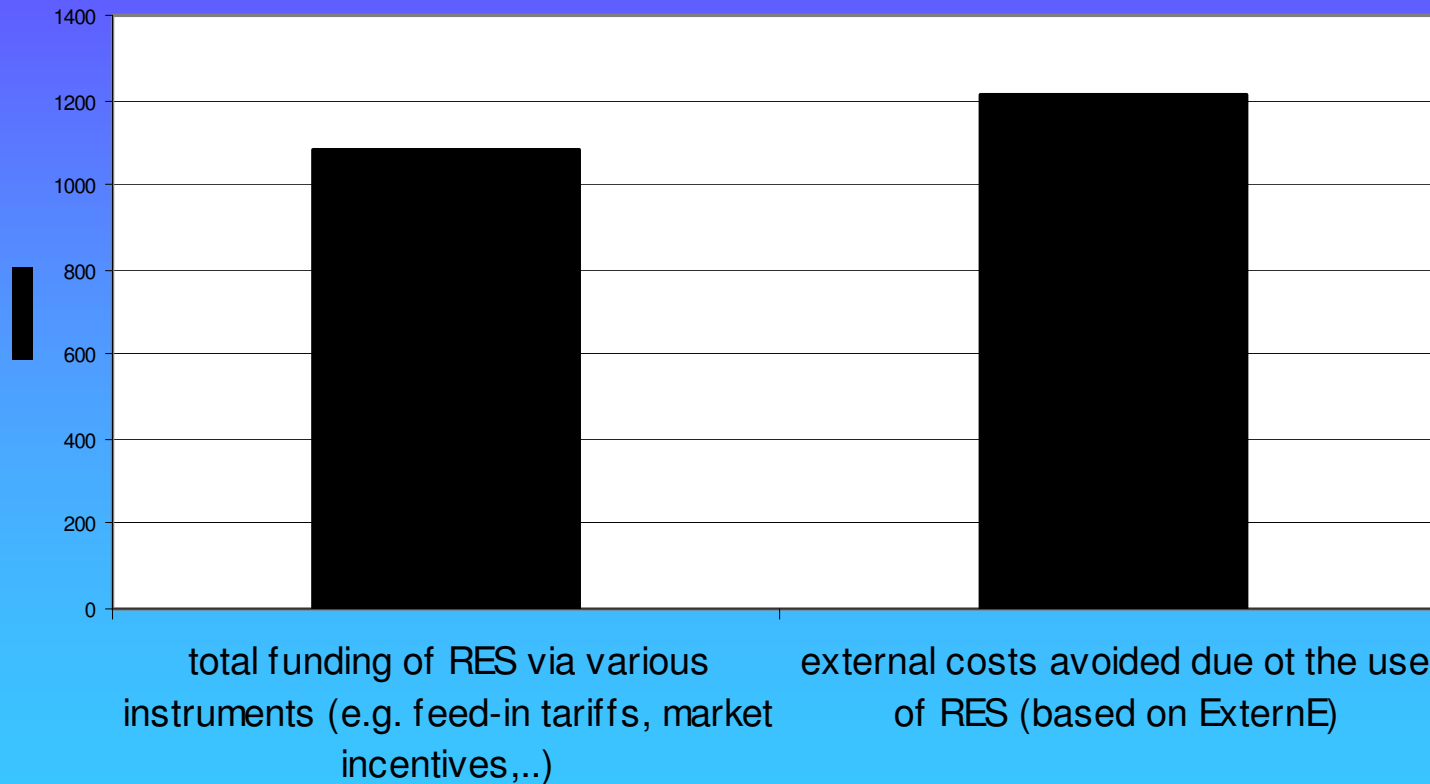
Export Credit Agencies

Exporting Country	Recipient Country	Project
Canada	China Romania	Quinshan III Cernavoda I and II
France	China Finland	Ling Ao 1 and 2 Olkiluoto
Germany	China	Lianyungang
Italy	Romania	Cernavoda II
Japan	China Mexico	Quinshan II and III Laguna Verdi
Russia	China India Iran	Lianyungang Kudankulam Busher
UK	China	Quinshan II Ling Ao
US	Bulgaria China Czech Republic	Kozloduy 5 and 6 Quinshan II and III Temelin 1 and 2

External Costs

- The full environmental impacts of energy sources are not all included into the final cost of energy.
- The energy sector is a major contributor to climate change, the cost of which may well be up to \$300 billion per year.
- A joint EU-US study which assessed the economic cost of the environmental impact of different energy options concluded that *'cost of producing electricity from coal or oil would double the cost of electricity from gas would increase by 30% if external costs such as damage to the environment and health were taken into account.'*

Externalities Vs Renewables Support Schemes



Nuclear External Costs

- Nuclear external costs are often excluded, “Reliable values of accident, high level wastes impacts, nuclear proliferation and impacts of terrorism have not been developed in ExternE. These omissions may well be significant and therefore should be clearly noted in any assessment” – ExternE.
- If Electricité de France, were required to fully insure their power plants with private insurance but using the current internationally agreed limit on liabilities of approximately €420 million, it would increase EdF’s insurance premiums from 0.0017c€/kWh, to 0.019 c€/kWh, thus adding around 8% to the cost of generation. However, if there was no ceiling in place and a operator had to cover the full cost of an worst cost scenario accident it would increase the insurance premiums to 5 c€/kWh, thus increasing the cost of generation by around 300%

New Subsidies

- Fears about climate change and security of supply have lead to renewed interest in nuclear.
- The industry is promoting itself, with higher oil and gas prices, as competitive.
- However, current experience suggests new subsidies will be needed.

US Support Program

- Production Tax Credits: 1.8 cent tax credit for each kWh from new reactors for 8 years for six reactors: cost to US treasury \$5.7 billion.
- Loan Guarantees for first 6-8 reactors. Congressional Research Service estimate taxpayer liability would be \$14-16 billion.
- a support framework against regulatory or judicial delays, worth up to \$500 million for the first two reactors and \$250 million for the next four.
- Further research and development funding worth \$850 million.
- Assistance with historic decommissioning costs (up to \$1.3 billion).
- It is thought that the total cost of this nuclear support programme is around \$12 billion (£7 billion).

New Energy Policy For Europe

- Published by European Commission, 8th March 2006.
- Calls for Strategic EU Energy Review, which could.
 - Aim for a minimum level of the overall EU energy mix originating from secure and **low-carbon energy sources**.
 - Such a benchmark would reflect the potential risks of import dependency, identify an overall aspiration for the long term development of low carbon energy sources and **permit the identification of the essentially internal measures necessary to achieve these goals**.

Conclusion

- The traditional industries have received and continue to receive vast direct and indirect subsidies
 - Research and Development
 - Tax breaks
 - Lack of accountability of environmental costs
- Renewables current are receiving funding, but this at best covers the external environmental costs.
- A new nuclear build programme will require additional Government financial support or guarantees.
- If allocated these funds or resources will not be available for other technologies.