



COMMISSION OF THE EUROPEAN COMMUNITIES

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**COMMISSION STAFF WORKING DOCUMENT**

**Annex to the**

**COMMUNICATION FROM THE COMMISSION  
TO THE COUNCIL AND THE EUROPEAN PARLIAMENT**

**Nuclear Illustrative Programme**

**Presented under Article 40 of the Euratom Treaty for the opinion  
of the European Economic and Social Committee**

**Annex 1  
for the Draft Nuclear Illustrative Programme**

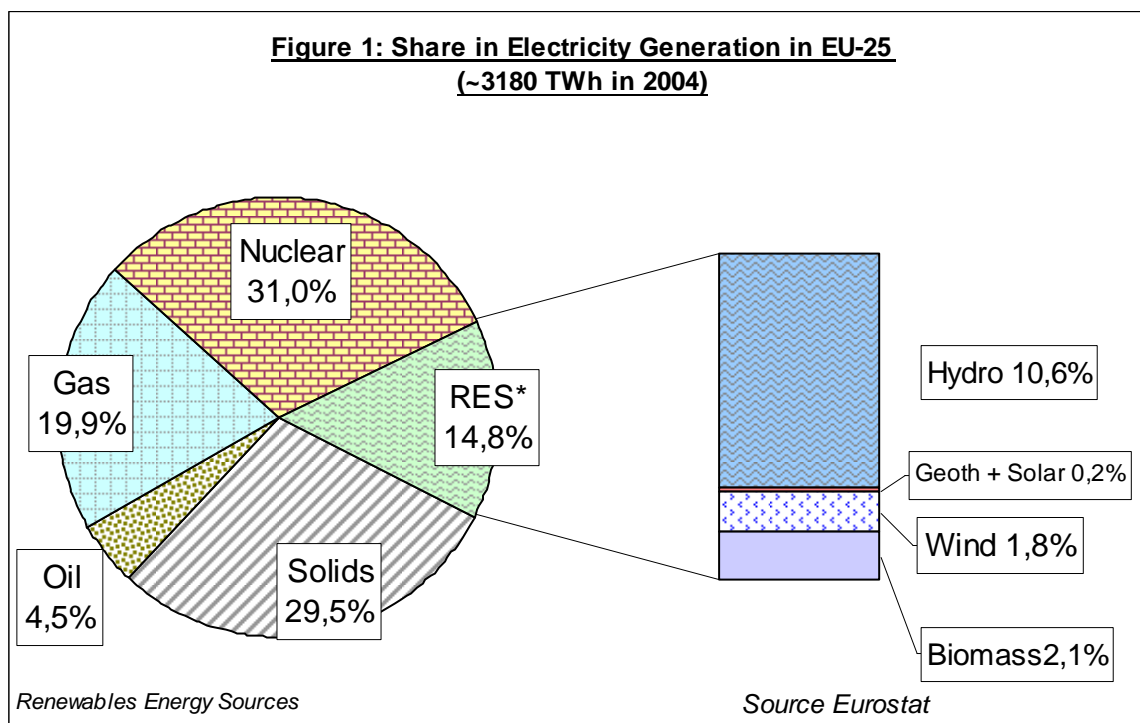
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{SEC(2007) 12}

# COMMISSION STAFF WORKING DOCUMENT

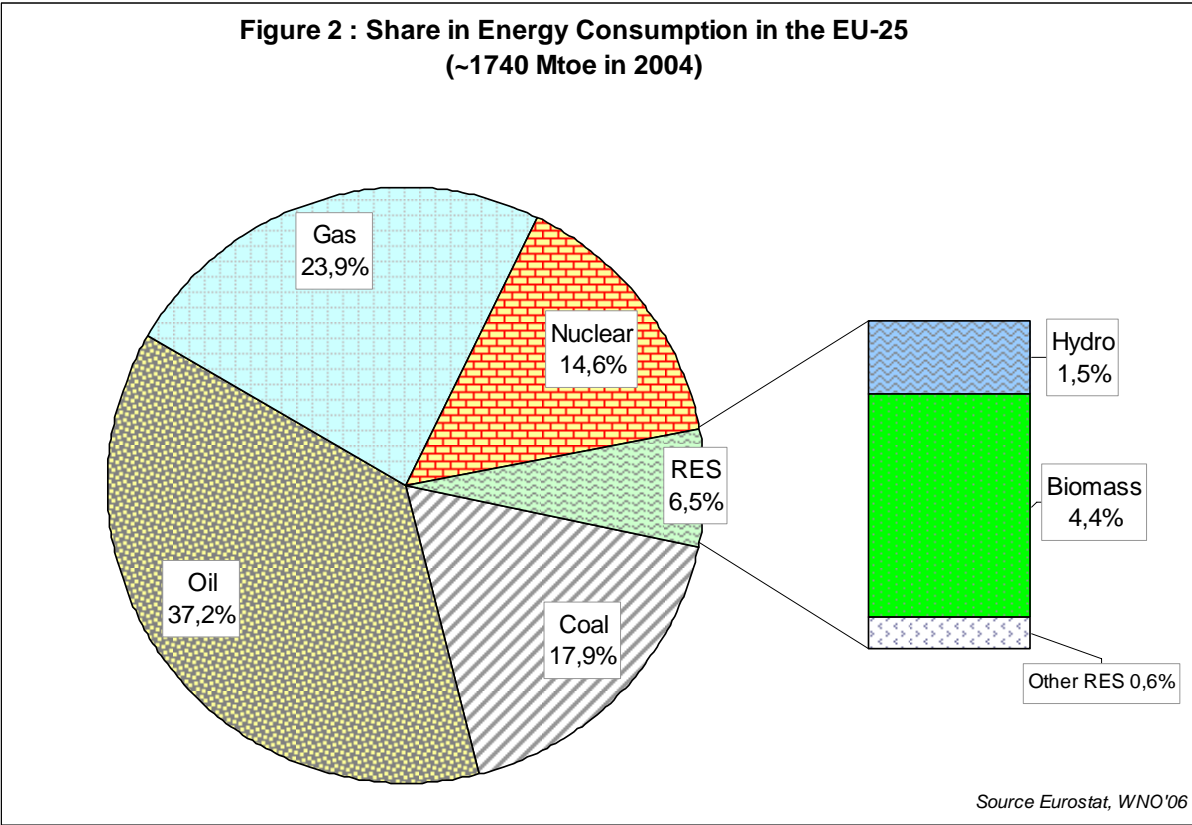
## Annex 1

### for the Draft Nuclear Illustrative Programme

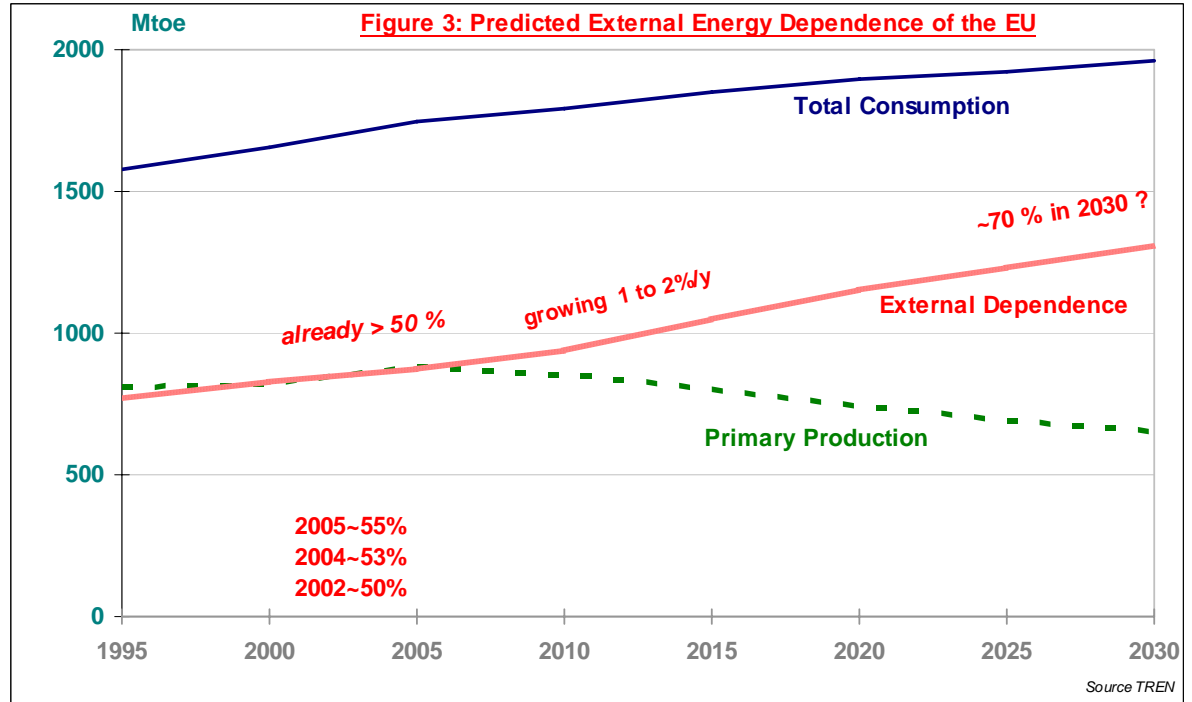
DRAFT PRESENTED UNDER ART. 40, EURATOM TREATY FOR OPINION OF THE  
EUROPEAN ECONOMIC AND SOCIAL COMMITTEE



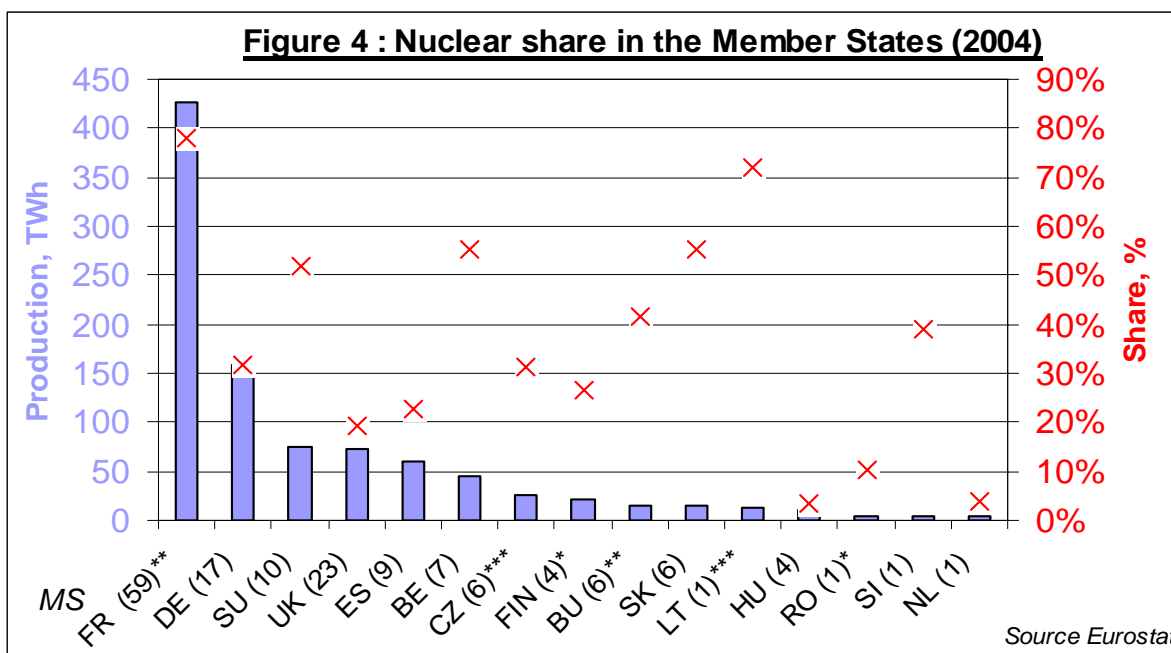
**Fig 1: Relative share for generation of electricity by various sources**



**Fig 2: Relative share of sources used to accommodate energy consumption.**



**Fig 3: Comparison of forecast for energy consumption and production (EU-25).**



**Fig 4: Number of NPPs in the EU nuclear Member States along with their contribution to the nuclear share for electricity generation and production figures.**

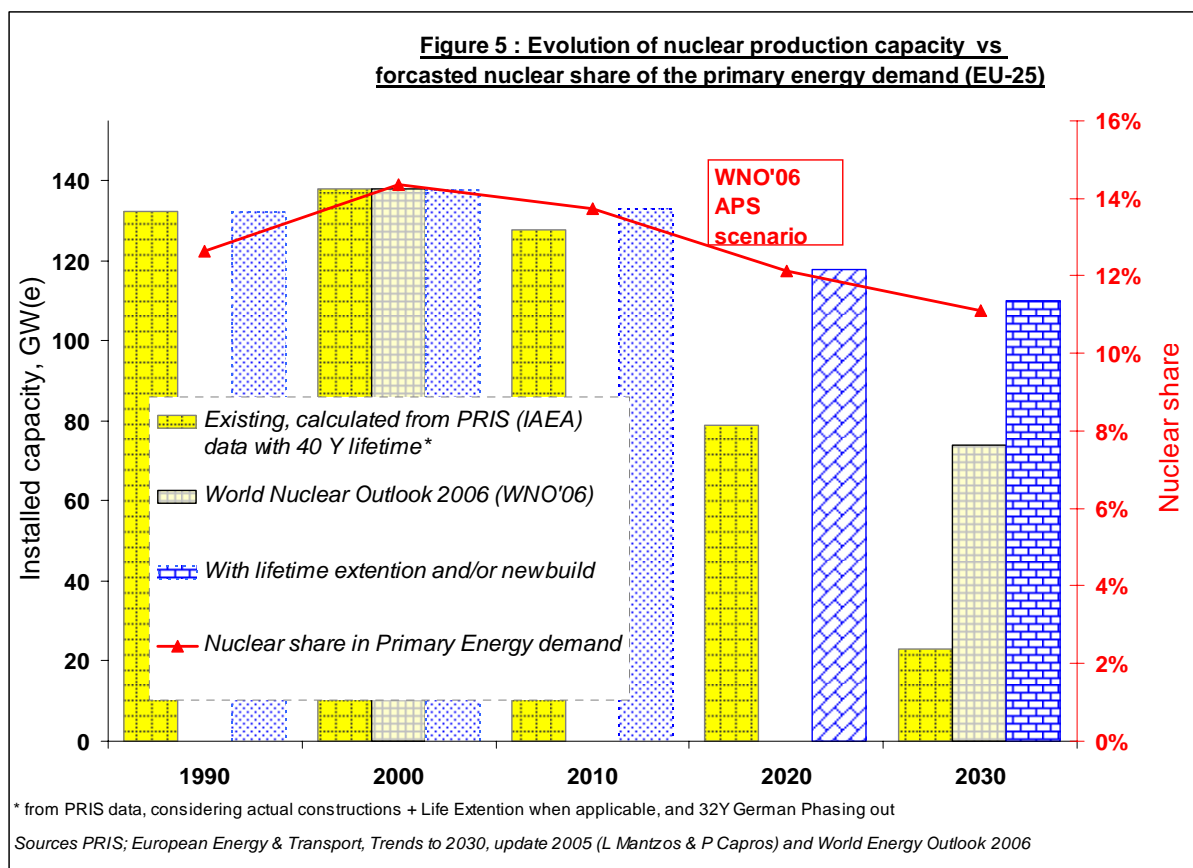
**Table 1: List of Reactors, Electricity Generation and U Requirements in the EU-27 (15 August 2006)**

Sources WNA-PRIS	Power Reactors					Electricity Produced in 2005		2006 Uranium Requirement Tonnes U
Country	Operational in Aug 2006 Nr	Installed Capacity MWe	Shut Down Nr	Under Const. Nr / MWe	Planned + Proposed Nr / MWe	Total, TWh	Nuclear, TWh ( <i>share</i> )	
<b>BE</b>	7	5728	1	-	0	81.5	45.3 (56%)	1075
<b>CZ</b>	6	3472	-	-	2 / 1900	76.2	23.3 (31%)	540
<b>FI</b>	4	2676	-	1 / 1600	0	67.9	21.8 (27%)	473
<b>FR</b>	59	63473	11	-	2* / 3230	549.2	426.8 (78%)	10146
<b>DE</b>	17	20303	19	-	0	499.0	154.6 (32%)	3458
<b>HU</b>	4	1755	-	-	0	35.1	11.2 (34%)	251
<b>LT</b>	1	1185	1	-	1 / 1000	14.8	13.9 (72%)	134
<b>IT</b>	0	-	4	-	-	-	-	-
<b>NL</b>	1	452	1	-	0	96.4	3.6 (3.8%)	112
<b>SK</b>	6	2472	1	-	2 / 840	29.1	16.3 (56%)	356
<b>SI</b>	1	676	-	-	0	13.2	5.6 (42%)	144
<b>SP</b>	8*	7442	2*	-	0	279.6	54.7 (20%)	1505
<b>SE</b>	10	8975	3	-	0	154.7	69.5 (45%)	1435
<b>UK</b>	23	11852	22	-	0	378.4	75.2 (20%)	2158
<b>EU-25</b>	<b>147</b>	<b>130461</b>	<b>65</b>	<b>1 / 1600</b>	<b>7 / 5760</b>	<b>2261.9</b>	<b>921.8</b>	<b>21787</b>
<b>BG</b>	4	2722	2	-	2 / 1900	39.3	17.3 (44%)	253
<b>RO</b>	1	655	-	1 / 655	3 / 1995	59.6	5.1 (8.6%)	176
<b>EU-27</b>	<b>152</b>	<b>133838</b>	<b>67</b>	<b>2 / 2255</b>	<b>12 / 9565</b>	<b>2360.8</b>	<b>944.2</b>	<b>22216</b>
<i><b>Changes* since 04/06</b></i>	<i><b>-1</b></i>	<i><b>=</b></i>	<i><b>+1</b></i>	<i><b>=</b></i>	<i><b>+1 / +1600</b></i>	<i><b>-</b></i>	<i><b>-</b></i>	<i><b>=</b></i>
USA	103	98054	24	1 / 1065	23*/26716	4037.4	780.4 (19%)	19715
Japan	55	47700	4	1 / 899	12 / 14782	957.0	280.7 (29%)	8169
Russia	31	21743	5	5*/ 4550	10*/11225	869.8	137.3 (16%)	3439
Canada	18	12595	7	2*/ 1540	2* / 2000	593.6	86.8 (15%)	1635
Ukraine	15	13168	4		2 / 1900	171.8	83.3 (49%)	1988
China	10*	7587	-	5 / 4170	63* / 48800	2475	50.3 (2%)	1294
India	16*	3577	-	7 / 3088	24 / 13160	555	15.7 (2.8%)	1334
South Korea	20	16840	-	-	8	311.8	139.3 (45%)	3037
Switzerland	5	3220	-	-	0	68.9	22.1 (32%)	575
<b>World</b>	<b>442</b>	<b>368496</b>	<b>107</b>	<b>28</b>	<b>204</b>	<b>16400</b>	<b>2626 (16%)</b>	<b>65478</b>
<i><b>Changes* since 04/06</b></i>	<i><b>+1</b></i>	<i><b>-</b></i>	<i><b>n/a</b></i>	<i><b>+1</b></i>	<i><b>+53/+45000</b></i>	<i><b>-</b></i>	<i><b>-</b></i>	<i><b>-</b></i>

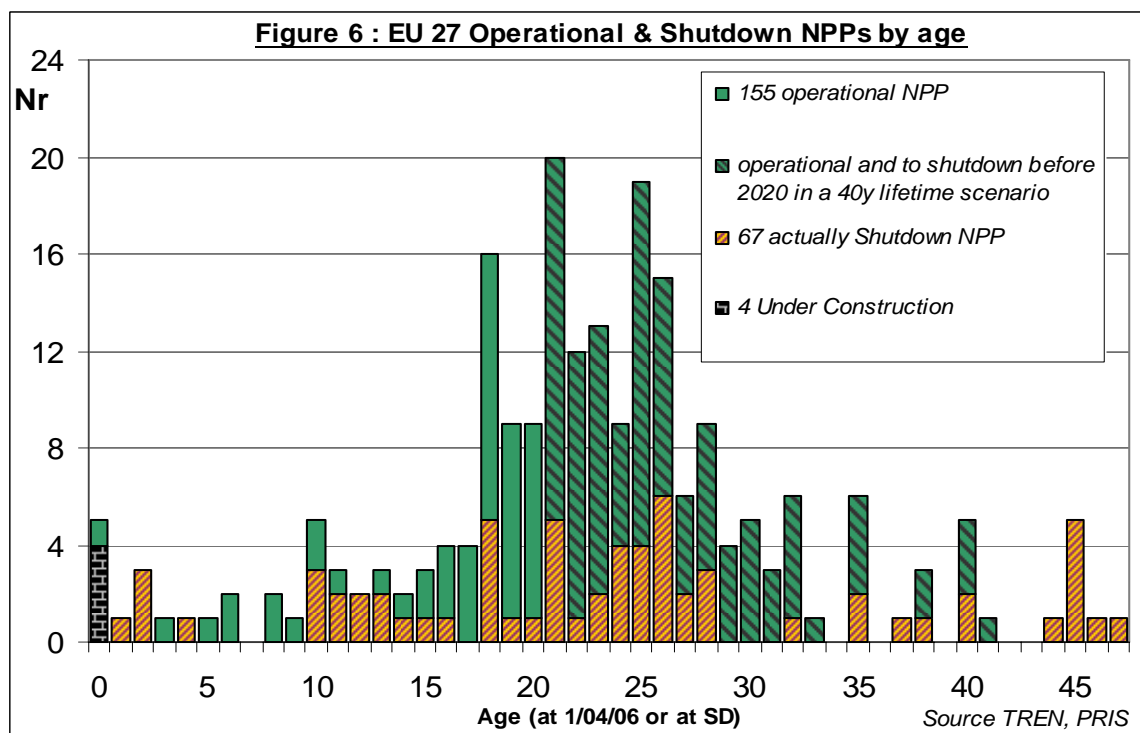
*Source: WNA, PRIS*

*\* Note changes between March and August 2006:*

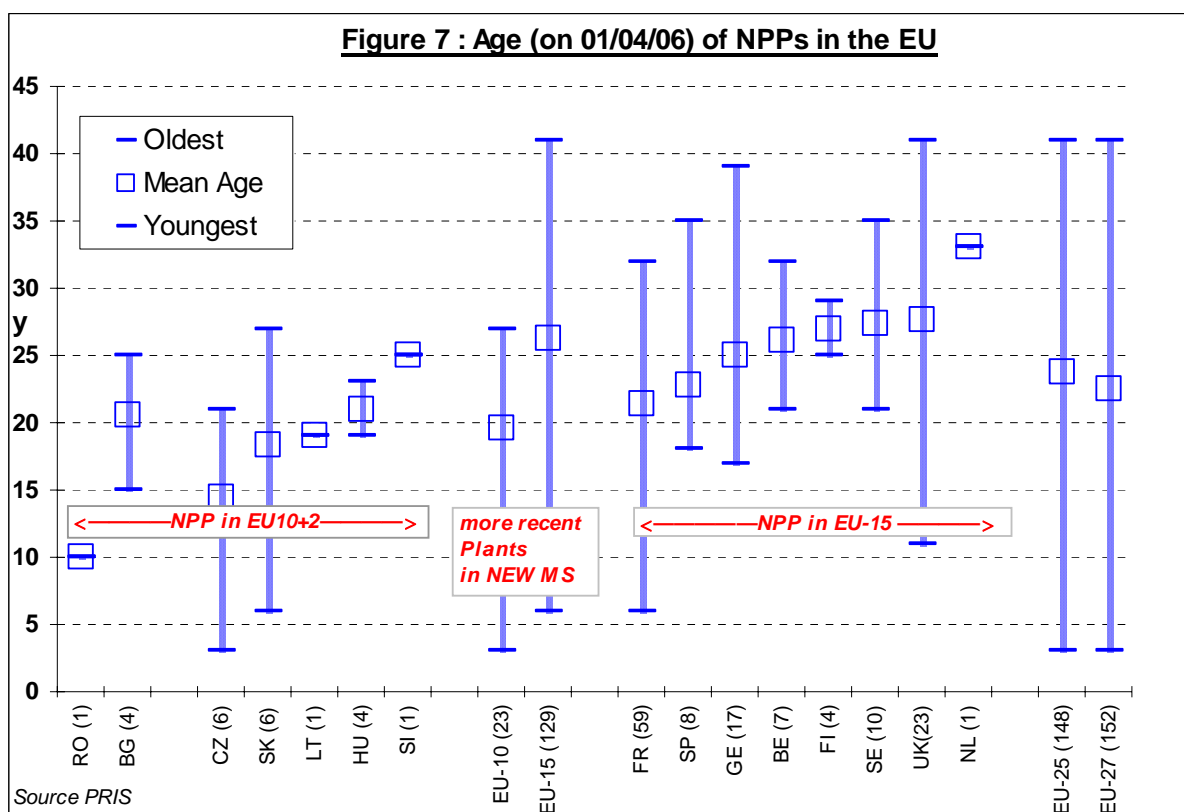
- EU: 1 shutdown in Spain; 1 second EPR proposed in FR
- USA: 10 new proposed/planned
- Russia : 1 newly operational; 1 started construction
- Canada: 2 started constructions; 2 additional proposed/planned
- China: 1 newly operational; 1 started construction; 38 additional proposed/planned
- India: 1 newly operational;



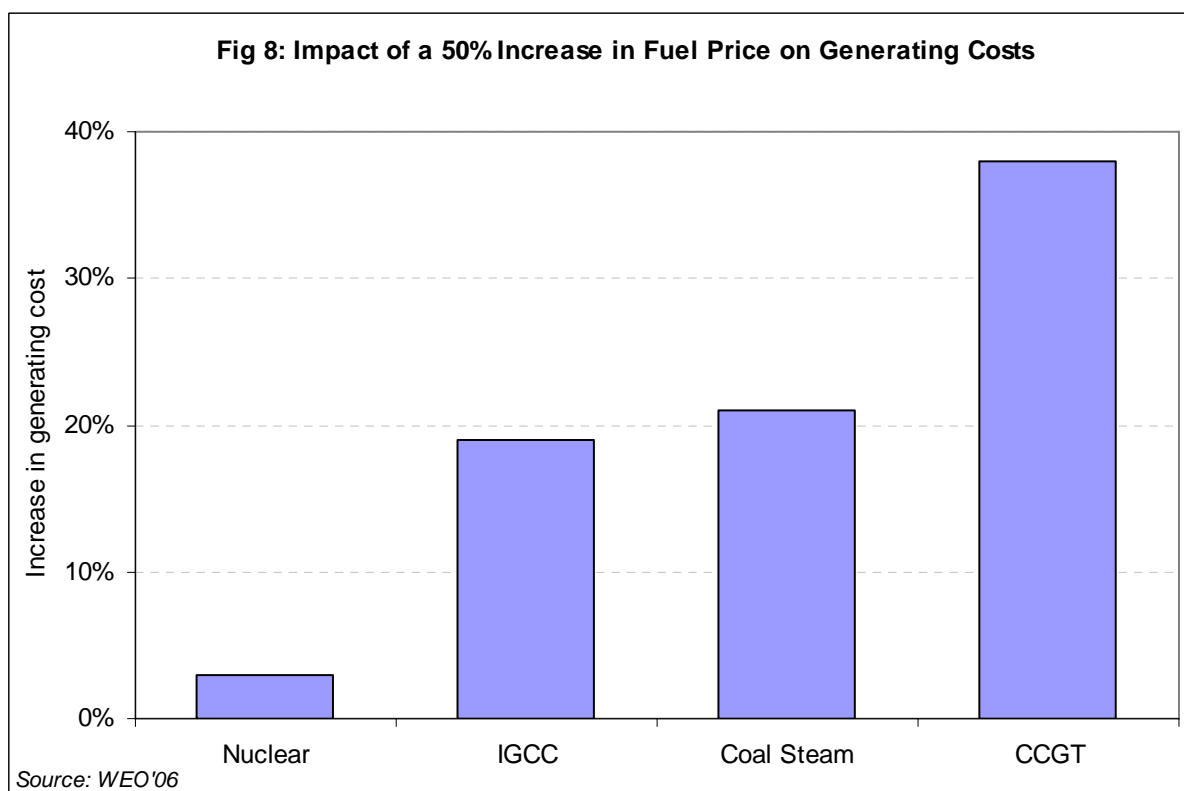
**Fig. 5: Projection of the expected nuclear capacity to provide the nuclear share of electricity generation in the EU assuming planned closedown of reactors and potential lifetime extension or/and new build.**



**Fig 6: Distribution of operational and planned shutdown for NPPs in the enlarged EU as well as potential new build.**

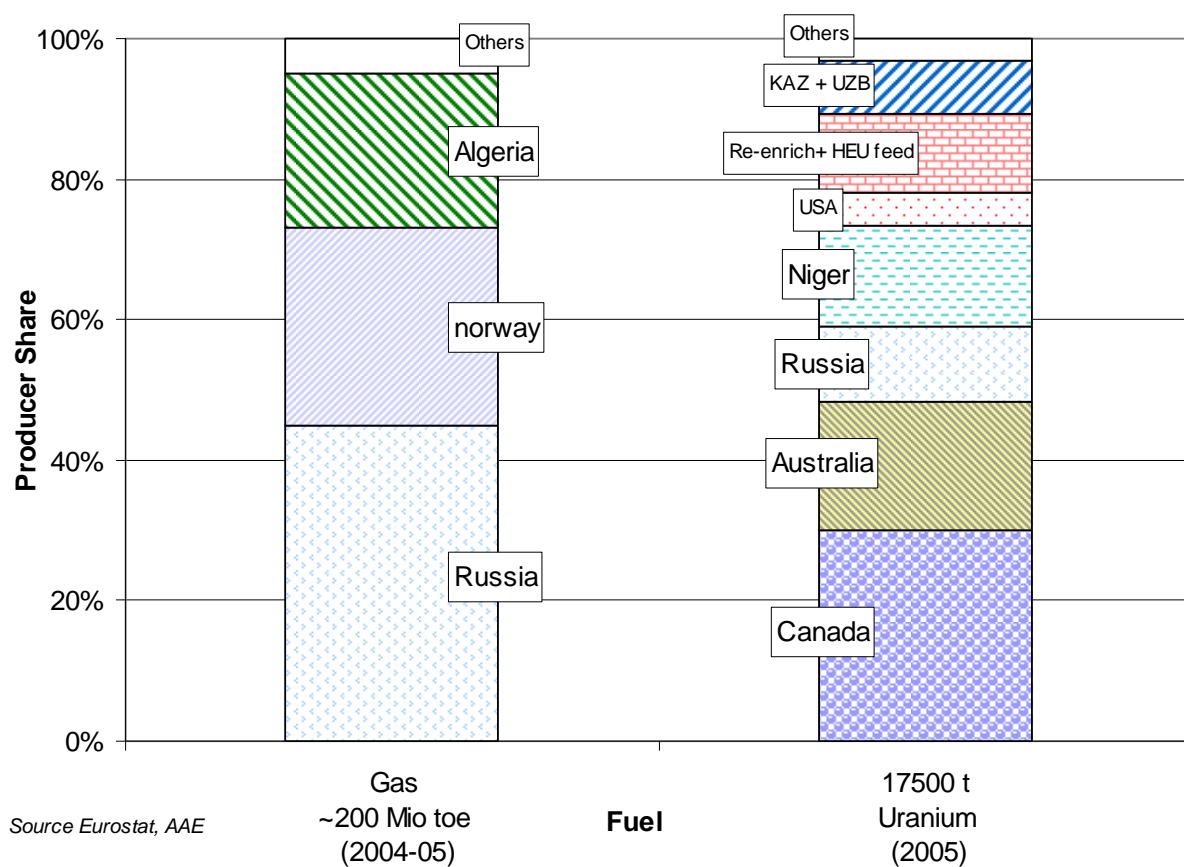


**Fig 7: Distribution of age of NPPs in the EU**



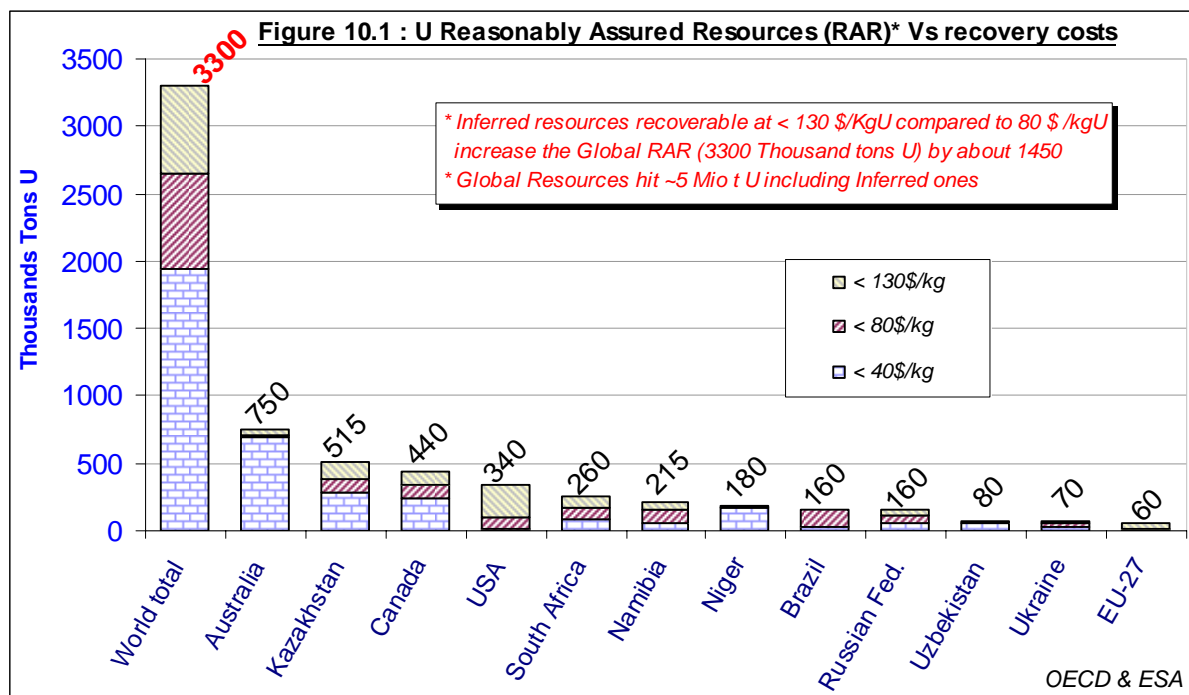
**Figure 8: A 50% increase in uranium, coal and gas prices compared (with the base assumption) would increase generating costs by 3% for nuclear, 20% with coal and about 38% with gas (CCGT)**

**Figure 9 : Geopolitical distribution of imported resources in the EU**

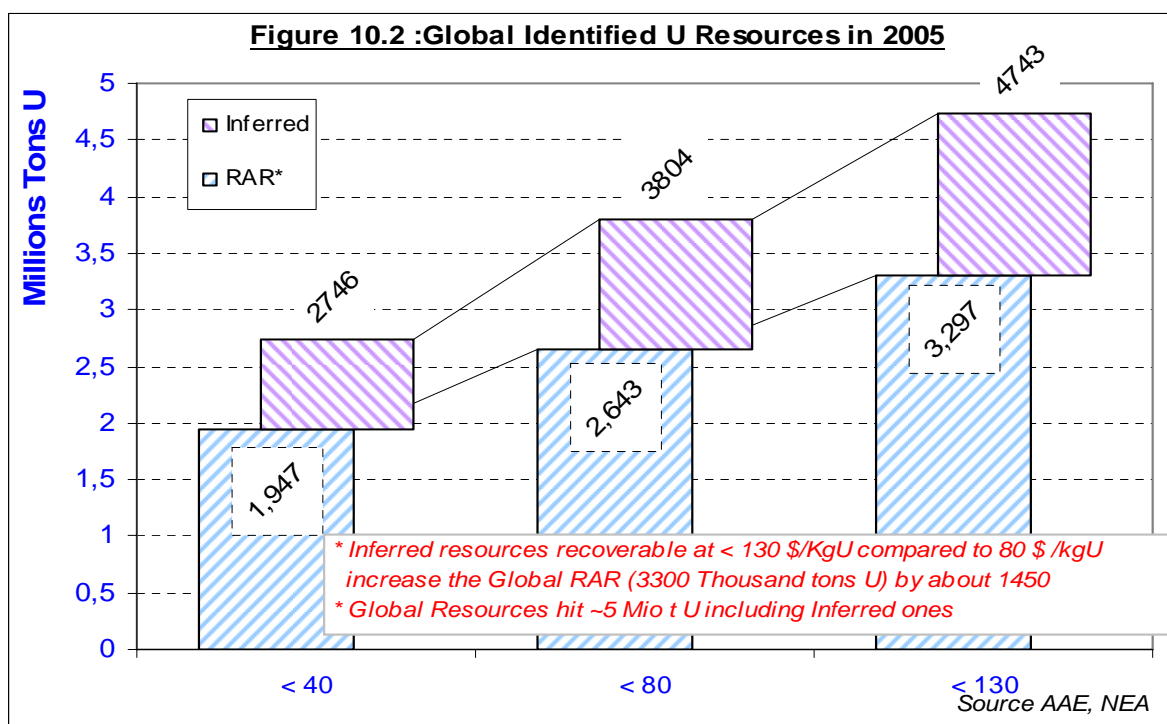


**Fig. 9: Comparison of the Geopolitical distribution of imports of uranium and gas into the EU.**



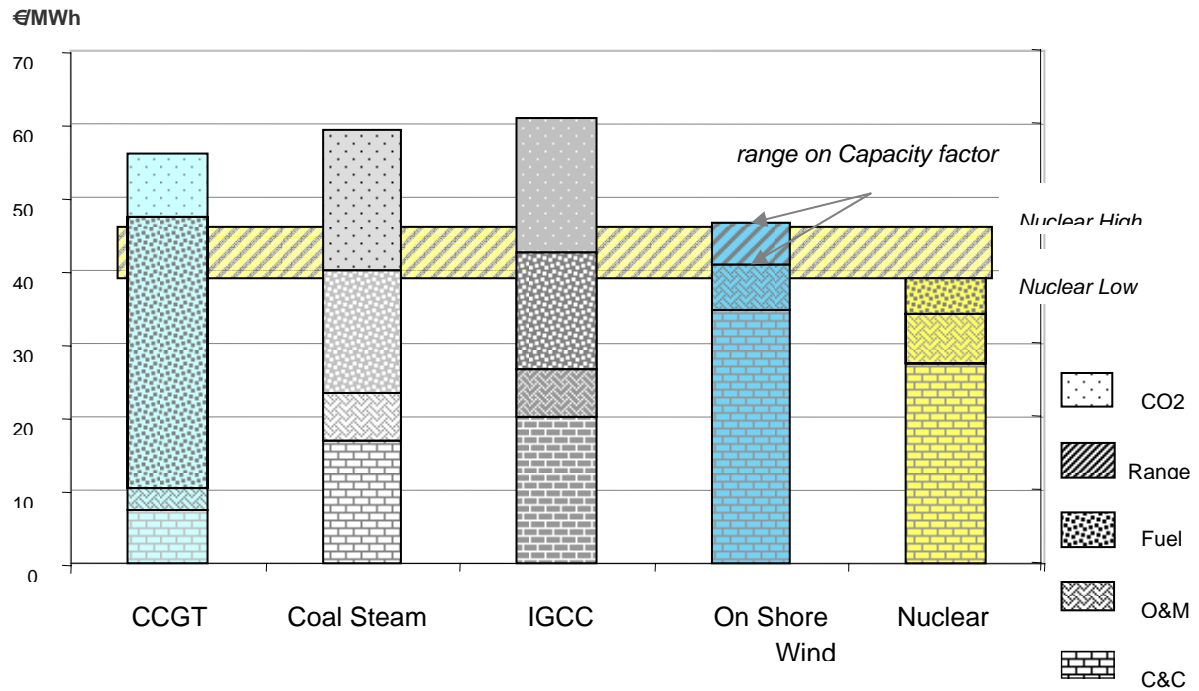


**Fig. 10.1: Geopolitical distribution of uranium sources.**

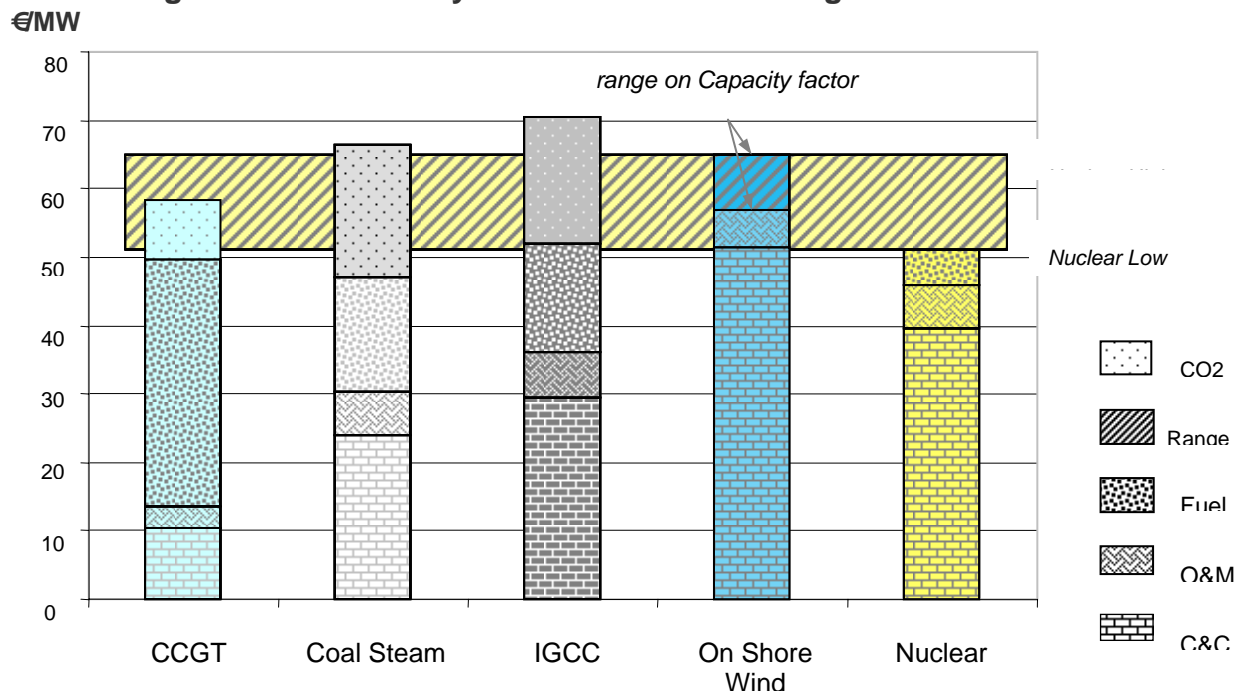


**Fig. 10.2: Uranium sources available by price range.**

**Figure 11a: Electricity Generation Costs in Low Discount rate Case**



**Figure 11b: Electricity Generation Costs in High Discount rate Case**



**Figure 11 : range of levelised costs of generating electricity, with 5% and 10% discount rates and C costs at 30\$/tCO<sub>2</sub> (1€= 1.25 \$)**

Source World Energy Outlook 2006

CCGT: Gas Fired Combined Cycle Turbine; IGCC: Integrated Gasification Combined Cycle Plant

## List of Abbreviations

AGR	Advanced Gas Cooled Reactor
ALARA	As Low As Reasonably Achievable
BSS	Basic Safety Standards
BWR	Boiling Water Reactor
CANDU	CANada Deuterium Uranium
CEA	Commissariat a l'Energie Atomique
CIS	Community of Independent States
CO <sub>2</sub>	Carbon Dioxide
CCGT	Combined Cycle Gas Turbines
FP	Framework Programme
GCR	Gas Cooled Reactor
GEN IV	Generation IV Reactors are a set of theoretical nuclear reactor designs currently being researched.
GFR	Gas Fast Reactor
GHG	Green House Gases
EPR	European Pressurised Reactors
ERA	European research Area
HEU	Highly Enriched Uranium
HLW	High Level Waste
IEA	International Energy Agency
IAEA	International Atomic Energy Agency
ITER	International Thermonuclear Experimental reactor
LEU	Low Enriched Uranium
LILW	Low Intermediate Level Waste
Magnox	Type of British designed nuclear reactor
MOX	Mixed Oxide Fuel
NEA	Nuclear Energy Agency
NPP	Nuclear Power Plant
OECD	Organisation for Economic Cooperation and Development
P&T	Partitioning and Transmutation
PWR	Pressurised Water Reactors
TACIS	Technical Aid to the Commonwealth of Independent States
VVER or WWER	The Russian abbreviation VVER stands for water-cooled, water-moderated energy reactor. Russian version of PWR reactor.
VHTR	Very High Temperature Reactor
VLLW	Very Low Level Waste
WEO	World Energy Outlook
WNA	World Nuclear Association

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