

Will there be a nuclear renaissance in the UK?

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Global Background

- Limited current development but significant ambitions – mostly in Asia.
- Currently 439 reactors operating (c 16% of global power) and 35 under construction – 6 in China, 7 in Russia, 6 in India
- These countries also have big expansion plans (China 40 GW by 2020; India 20 to 30 more reactors by 2020; Russia 40 GW by 2025)

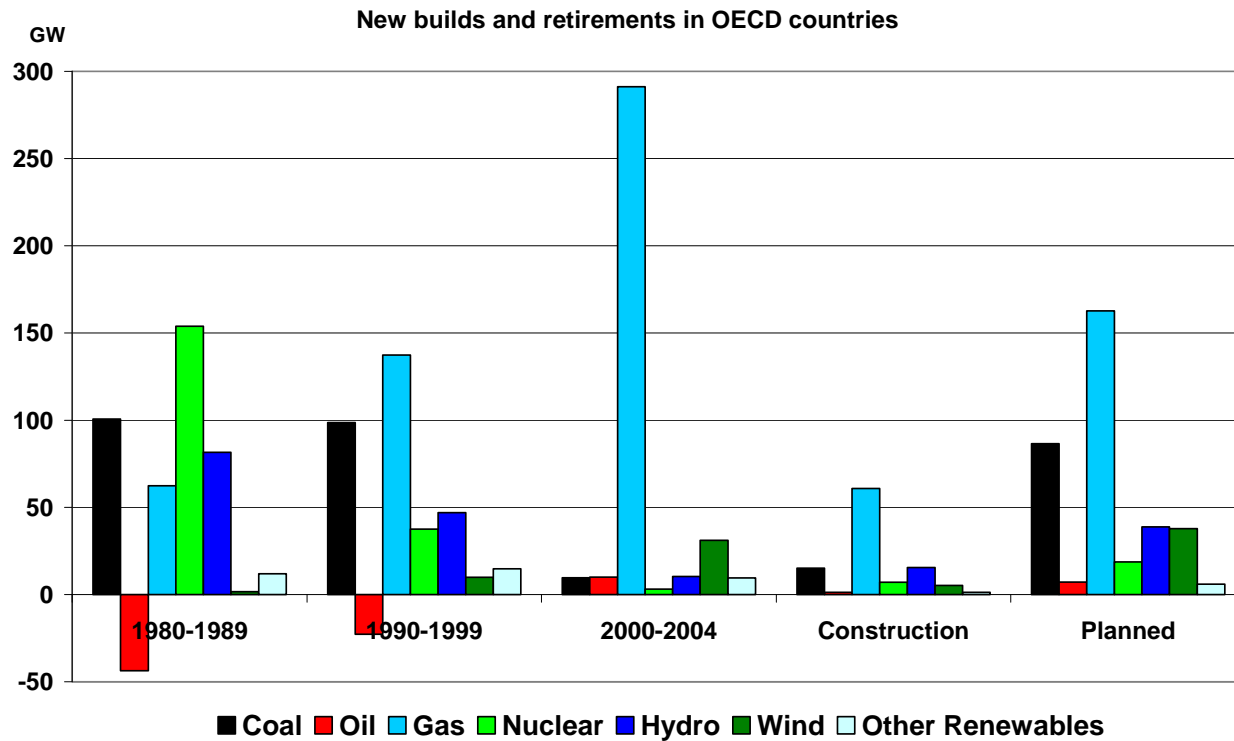
OECD – cautious approach

- Contains majority of current plants (153 in Europe; 100 in US; 55 in Japan) but cautious about future,
- Japan, Korea committed and active.
- N. America is re-engaging. Canada has firm plans; US has strong incentives and many proposals - but no new order since 1975.
- Australia/NZ against (but Australia is big uranium supplier)

Europe (EU)

- Largest fleet and dependence on nuclear (c30%) but most reluctance about future, despite climate change leadership.
- Finland, France, and Central/Eastern Europe – current construction and future plans. But modest compared with 1980s (7 reactors projected over 10 years compared with over 70 reactors built in these countries in 1980s).
- UK green light but rest of Europe uncertain or opposed - perhaps more positive than in 2000 (when nuclear was one of the “undesirables”). Still expanding by uprating.

OECD Plans



Why (some) renewed interest?

- Rising demand for electricity (in Asia)
- Higher energy prices
- Renewed security concerns
- Environmental arguments (?)
- Improved technology
- Better safety record since Chernobyl

But the old problems remain – and there are new ones

- Public opposition in many countries
- Decommissioning; waste management; safety; proliferation
- Terrorism
- Market liberalisation – attitudes to capital cost and risk

Western European Line-Up

Firmly against*: Ireland, Austria

Against, but : Belgium, Germany, Italy,
Netherlands, Spain, Sweden, Switzerland

For, but...: UK

Definitely for: Finland, France

*Also not a realistic prospect in Denmark, Greece, Luxembourg , Norway, Portugal etc

Why UK? Why now? - not political leadership

- 1998 and 2003 White Papers ducked issue
- 2006 White Paper botched
- Tories: nuclear is “last resort”
- Other parties opposed

Not public opinion

	Favourable	Unfavourable	Undecided
Public	28	25	47
MPs	43	44	13
MPs' perception of public opinion	2	84	14

UK has painted itself into a corner – decisions are needed now

- Nuclear mostly due to close by around 2020; own brand nuclear technology will accelerate closure
- Most coal due to close by then too – 80% over 30 years old; LCPD
- Huge increase in fuel imports over period heightens (perceived and real) security problem
- Self-imposed carbon constraints strongest in world

Europe: decisions less urgent

- Average age of nuclear plants: 20-25 years. Lifetime could be 40-60 years.
- Average age of coal plants: 30 to 35 years
- Dash for gas in some countries; growth of renewables in all; coal in a few (Germany - 20 plants planned)
- Slow demand growth
- Decisions on nuclear can be delayed – though not for ever

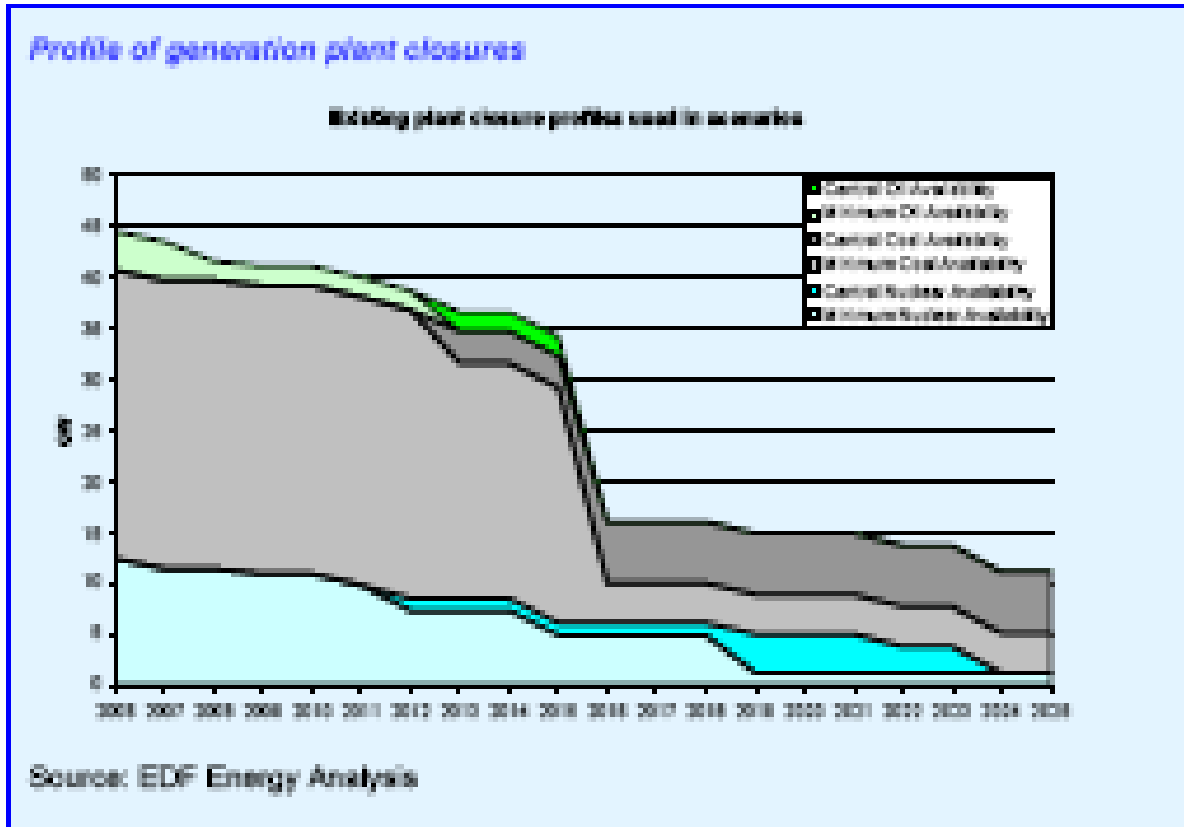
UK could be test case

- Facing hard decisions on nuclear replacement first
- Pioneer liberaliser
- Public opinion fluid
- Could help answer the questions: can you persuade the public? Is nuclear compatible with liberalisation? Does the environmental argument work?

UK White Paper – January 2008

- Fourth or fifth bite at cherry
- Nuclear in public interest – security, diversity and environmental impacts
- Government should take “active steps” to open the way for construction
- But it’s for energy companies to put forward proposals (same as last three times)

Security - the cliff edge



By around 2020

- 25 to 30GW of coal and nuclear plant due to retire
- 20+ GW of renewables (mainly wind) needed to meet 20% target – but worth only 5GW firm capacity
- Higher renewables target would create more uncertainty
- Market, left to itself, would probably build gas
- UK faces loss of diversity and reliability – and maybe plant shortage

UK – climate change

- CO₂ emissions up since late 1990s – though down since 1990
- Favourable trends of past may have run their course – dash to gas in homes and power; nuclear expansion; de-industrialisation; reduction in non CO₂ gases.
- Self-imposed constraints: to meet Climate Bill targets very aggressive measures will be needed
- Electricity will have to be the main focus

The importance of electricity

- Electricity trend outweighs developments in other sectors.
- Electricity is main component of decrease in CO₂ in UK since 1990 and forecast 2020 reductions.
- Renewables target is highly ambitious and unlikely to be met.
- If nuclear were replaced by fossil plant, emissions impact would be 20-50 mt CO₂.

Nuclear economics: government's view

- Nuclear yields economic benefits for UK
- Nuclear is a relatively cheap form of carbon reduction
- Nuclear is competitive on many price scenarios
- Nuclear should therefore be attractive to investors
- But based on levelised cost

Nuclear economics – investors' view

- Nuclear isn't necessarily cheap (gas and coal are cheaper on the government's central price scenario)
- Nuclear is only competitive with an assured carbon price (price of at least €25+)
- Nuclear is high capital cost and high risk
- Nuclear does not get the same support as renewables

The impact of liberalisation

In a liberalised market, investment appraisal changes from

- levelised cost; to
- risk-weighted NPV; to
- game theory benefit

Investment is about risk - the risk of investing vs the risk of not investing (leads to herd behaviour and cyclicalities)

Nuclear risks

- Market; plus
- Political
- Environmental
- Specific – decommissioning, waste etc
- Construction/operation

Market and construction risks

- Construction costs and capacity issues – have we overcome appraisal optimism? (US says costs have doubled or quadrupled; EOn says cost is twice UK government estimate)
- Price volatility
- Specific costs and liabilities
- Growth of renewables
- Timescales

Political risk

- Government support may change – Germany, Sweden, Italy, Spain, Netherlands etc
- No consensus and no enthusiasm in UK
- Commitment still equivocal – markets or UK need? Scotland? Future administrations?
- External events
- Legal challenges

Environmental risk

- Carbon price uncertainty
- Difficult to get long term commitment because of international context
- Kyoto process still not nuclear friendly
- Climate Change Bill doesn't really help – problem of long timescales
- Planning process and legal challenge

Government action

- Identified “viable” solutions on waste
- No need for reprocessing
- New planning system (strategic siting assessment plus use of existing sites)
- Speeding approvals process via “generic” design approval
- Strengthen ETS

Remaining risks

- Renewables targets
- Many environmental risks remain (eg carbon price; legal challenge)
- Political risks also remain – eg no consensus in Europe or across UK
- Market and operational risks not dealt with
- Events

Current industry position

- Definite interest, many proposals
- Strategic arguments
- Other options risky (apart from renewables)
- No-one wants to miss the boat (or let sites be grabbed by rivals acquiring British Energy)
- But: “We need to work with government to make it a reality” (ie the pieces are not yet all in place)

Conclusions

- A nuclear renaissance is possible
- But the conditions are not yet in place
- It is doubtful if it can be done without compromises on liberalisation – I expect this to happen, but messily
- UK may set a lead for much of Europe