

The UK Situation for Nuclear Energy

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Global 2005 Japan



- Current policy
- Costs
- Possible technologies
- Wastes
- Public attitudes
- Recent changes

The Energy White Paper – Creating a Low Carbon Economy

Four pillars of Energy Policy -environment -energy reliability -affordable energy -competitive markets Safety Paramount

No overt support for nuclear Recognition of low carbon

Issues surrounding **waste** and **economics**



Britsh Nuclear Energy Society CO₂ Emissions Avoidance



* Nuclear Energy and the Kyoto Protocol Nuclear Energy Agency, 2002



kg

Nuclear Generates Virtually No Greenhouse Gas Emissions





Affordability - Worldwide Summary of OECD Study



Source: "Projected Costs of Generating Electricity"; OECD; March 2005

Affordability - UK Summary of RAE Study



British Nuclear Energy Society

Source: "The Cost of Generating Electricity"; RAE; March 2004



Reliability of Costs: Nuclear Fuel Costs are a Small Part of Overall Costs



Recent and Forecast Changes in the Electricity Supply Mix



Source: DTI / Ofgem JESS report, November 2004



The Nuclear Closure Programme



■ Sizewell B PWR ■ AGR stations ■ Magnox stations



Current Nuclear Options

Reactor Design	Туре	Country of Origin	Lead Developer	Deployment Status
ABWR	BWR	USJapan	GE, Toshiba,	Operating in Japan. Under
			Hitachi	construction in Japan & Taiwan
CANDU-6	PHWR	Canada	AECL	Operating in Korea, China,
VVER-91/99	PWR	Russia	Atomstroyexport	Under construction in China
AHWR	PHWR	India	Nudear Power Corporation of India	Starting construction
APR-1400	PWR	Korea, US	Kepco	Planned for Shin-Kori
APWR	PWR	Japan	Westinghouse & Mitsubishi	Planned for Tsuruga
EPR	PWR	France,	Framatome ANP	Under construction in Finland
		Germany		Planned in France
AP1000	PWR	US	Westinghouse	Licensed in USA
SVR	BWR	France, Cermany	Framatome-ANP	Offered in Finland
ESBWR	BWR	US	Œ	Under development
ACR	PHWR	Canada	AECL	Under development



An Impression of EPR at Olkiluoto









AP1000 has Fewer Components than Conventional PWRs



Compared with a conventional 1000 MW PWR



AP1000 - Modular Design for Simplified Construction





Building to Time and Cost in South Korea & China





A Timeline for Replacement Nuclear Build





Japanese Reactor Site at Kashiwazaki-Kariwa





Japanese Reactor Site at Mihama





Dramatic Improvements in Nuclear Output

Net Capacity Factors



US 📥 world



New Build Waste Arisings Compared with UK Legacy





Breakdown of Total UK Energy Usage

Energy consumption (Mtoe)





A look to the Future in Terms of Global Warming



As emissions from the industrial and energy sectors fall, so those from other sectors - particularly transport - are rising significantly



Higher temperature reactors are ideally suited to cost-effective hydrogen production - a key step on the road to a hydrogen economy which could deliver **deep** cuts in emissions



Recent UK Attitudes to Nuclear

Q To what extent would you support or oppose the building of new nuclear power stations in Britain to replace those which are being phased out over the next few years? This would ensure the same proportion of nuclear energy is retained.



Source: MORI poll data; Jan 2005





- Positive signs of changing attitudes
- Review to begin next year
- Nuclear to be fully considered
- Choice of international systems
- Long term: HTR's and FR's possible



Tony Blair – 27 September 2005

"Next year too, building on Britain's **Kyoto commitments,** we will publish proposals on energy policy. Global warming is too serious for the world any longer to ignore its danger or split into opposing factions on it. And for **how much longer can countries like ours allow the security of our energy supply be dependent on some of the most unstable parts of the world?**

For both reasons the G8 Agreement must be made to work so we develop together the technology that allows prosperous nations to adapt and emerging ones to grow **sustainably**; and that means an **assessment of all options**, **including civil nuclear power.**"

