

The economics of new nuclear build – do the benefits outweigh the risks?

Nuclear Free Local Authorities
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Council

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Construction costs

- 10 years ago industry forecast cost \$1000/kW – so cost of 1600MW plant like EPR \$1.6bn
- 2004: Olkiluoto ~\$3000/kW
- 2007/08: US utility estimate \$5000/kW
- 2008/09: Areva/Westinghouse bid for Ontario, S Africa, UAE >\$6000/kW

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Costs

- 2008 White Paper & NPS assume £1250/kW or \$2000/kW
- In 2008, E.ON said cost 70% higher than government
- Estimates before construction always under-estimate
- Why does government think industry will build UK reactors at 40% of price charged elsewhere?

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So...

- Nuclear construction cost assumptions are gross under-estimates
- More realistic assumptions on construction cost and cost of borrowing would triple the expected kWh cost

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And EPR construction experience?

- July 2010, Areva announced losses of €367m on the Olkiluoto contract, originally priced at €3bn, but now estimated at €5.7bn.
- EPR Flamanville: EDF confirmed the project was running two years late and increased its estimate of the cost overrun from 20% to more than 50%.

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Over-runs



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US pull-out

- Withdrawal by US EdF partner Constellation Energy from their project to build a French-designed EPR reactor at Calvert Cliffs, Maryland.
- Constellation forced to withdraw because of *'high cost of financial support from the US government'*.

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Waste and decommissioning very expensive: £70bn - £100bn so far...

- So Government proposal for 'fixed unit price' at which Government takes ownership of waste - potentially a subsidy
- But we haven't met the 'Flowers criterion' from 1976 – no new build until a clear route for final solution waste exists

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Geological 'disposal'

- Nowhere in the world has intermediate or high-level radioactive waste been safely disposed.
- GDF R&D required by CoWRM have not been undertaken.

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High burn-up fuel

- Much hotter – more radioactive
- 3 x existing waste burden
- Performs very poorly when subject to abnormal conditions.
- Liable to release a much higher content of its fission product inventory than its Generation II counterpart.

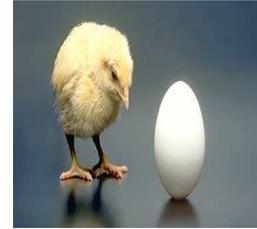
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Immediate release fraction

- Over the six days of open containment 30-60% of the Chernobyl reactor core fission products were released to the atmosphere.
- AREVA EdF EPR 'worst case' estimates - including terrorist attack – insist that no more than 0.2% of the core content would be released over six days.

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Chicken



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Sea rise, storm surge, flooding



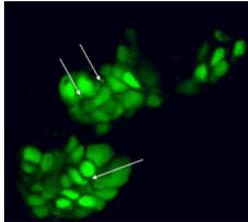
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German Childhood Cancer Registry, KiKK Study, 2008

- Risk of tumour or leukaemia in children under 5 years of age significantly increases the closer they live to a nuclear power plant

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Bystander effect



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Chernobyl



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proliferation

	<p>Name: Plutonium Symbol: Pu Atomic Number: 94 Atomic Weight: 244.06090 Family: Rare Earth Elements CAS RN: 7440-07-5 Description: A silvery white radioactive metal. State (25°C): Solid Oxidation states: -3, +4, +5, +6 Molar Volume: 12.32 cm³/mole Valence: Electrons: 5f6s2</p>	<p>Boiling Point: 3200 1BoK, 3235 1oC, 5865 1oF Melting Point: 912 05oK, 639 5oC, 1183 1oF Electronegativity Level: 2 R: 19, 32, 24, 6, 2 Stable¹⁰⁰: None Heat of Vaporization: 343.3 kJ/mol Heat of Fusion: 2.94 kJ/mol Density: 19.84 g/cm³ @ 3000K Specific Heat: 0.13 J/gK Atomic Radius: 131 pm ionic Radius: 0.867 Å Electronegativity: 1.28 (Pauling), 1.22 (Allred Rochow)</p>
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If things go wrong, who pays?

- Taxpayers are always the last recourse if things go wrong
- British Energy was privatised but rescued at a cost to future taxpayers of more than £10bn when it went bankrupt
- Electricity consumers contributed for 25 years for decommissioning. In 2003, found to be no money.

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'It's the poor what get the blame'

- Future taxpayers now face a bill of £80bn and rising
- Taxpayers always pay to clear up after accidents

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What could happen

- E.ON/RWE/EDF lobby - no new build without levy/fixed carbon price and loan guarantees
- Energy Market White paper Dec 2010
- Maybe 2-4 of reactors could be built at very high cost by 2025
- Government support for energy efficiency & renewables weak up to 2025

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