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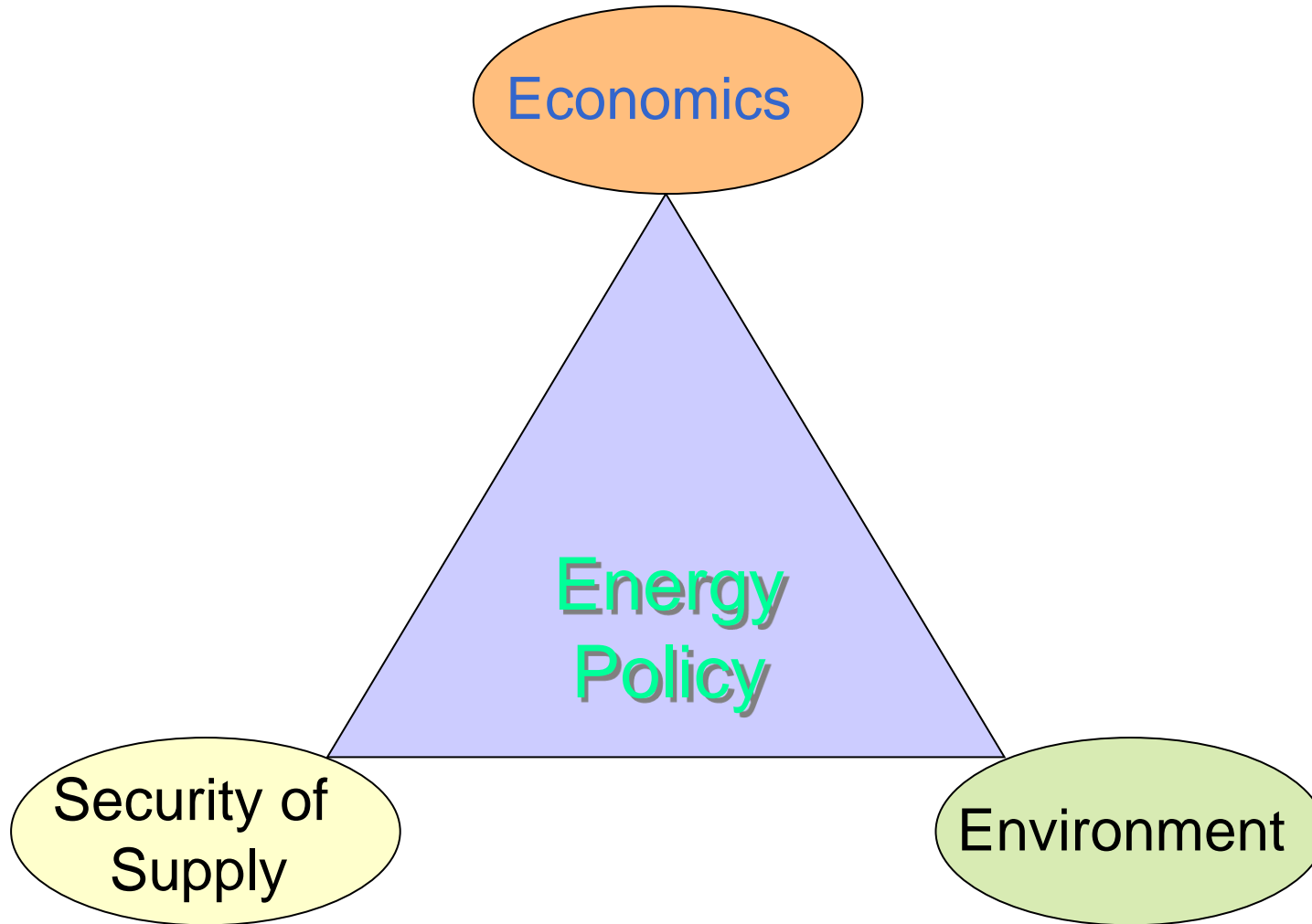
Energy Research Day
6 March 2013

*Nuclear Power and Next Steps in European
Electricity Policy*

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The Energy Policy Triangle





EU Energy Policy

EU 20:20:20 by 2020



Binding EU targets affecting electricity:

- 20% of total energy consumed to be supplied from renewables by 2020
- 20% reduction in greenhouse gas emissions by 2020.
- In addition there is a non-binding target to reduce primary energy use by 20%

See: <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/80> and http://ec.europa.eu/energy/energy_policy/

National overall share and targets for the share of energy from renewable sources in gross final consumption of energy in 2020

	Share of energy from renewable sources in gross final consumption of energy, 2005	Target for share of energy from renewable sources in gross final consumption of energy, 2020
Belgium	2,2 %	13 %
Bulgaria	9,4 %	16 %
The Czech Republic	6,1 %	13 %
Denmark	17,0 %	30 %
Germany	5,8 %	18 %
Estonia	18,0 %	25 %
Ireland	3,1 %	16 %
Greece	6,9 %	18 %
Spain	8,7 %	20 %
France	10,3 %	23 %
Italy	5,2 %	17%
Cyprus	2,9 %	13%
Latvia	32,6 %	40 %
Lithuania	15,0 %	23 %
Luxembourg	0,9 %	11%
Hungary	4,3 %	13 %
Malta	0,0 %	10 %
The Netherlands	2,4 %	14 %
Austria	23,3 %	34 %
Poland	7,2 %	15 %
Portugal	20,5 %	31 %
Romania	17,8 %	24 %
Slovenia	16,0 %	25 %
The Slovak Republic	6,7 %	14 %
Finland	28,5 %	38 %
Sweden	39,8 %	49 %
United Kingdom	1,3 %	15 %

EU 20:20:20

‘Burden Sharing’

UK: 15% of total energy from renewables in 2020?

UK →

EU 2050 Energy Roadmap (15/12/2011)



http://ec.europa.eu/energy/energy2020/roadmap/index_en.htm

Most interesting (arguably) are the six scenarios:

1. Reference (business as usual)
2. High Energy Efficiency
3. Diversified Supply
4. High Renewable Energy Systems
5. Delayed CCS (this is the highest nuclear scenario)
6. Low Nuclear

It is expected that the Roadmap will be followed by a political process yielding policy to supplant EU 2020 20:20:20



Energy and the Lisbon Treaty

- **Energy receives a whole section in the Treaty [Title XX]**
- **The Treaty supports a European Energy Market with better interconnections**
- **The Treaty provides ‘shared competence’ between the EU and the Member States on matters of Energy Policy [Article 2.c.ii]**



One EU voice on energy policy?

- **Climate change is a global threat.**
- **The whole European Union faces growing fossil fuel import dependency**

Surely there is a case for EU exclusive competence in energy policy, including the generation mix?

See: European Energy Forum, *Green Paper on a European Strategy for Sustainable, Competitive and Secure, Energy*, 8 March 2006, ID:COM(2006)105

Energy an EU ‘Shared Competence’



- The EU operates a principle of ‘subsidiarity’
- In some areas via the treaties the Member States have passed exclusive competence in some policy areas to the EU
- Energy is a ‘Shared Competence’
- The national ‘energy mix’ remains a matter for individual member states

“Such measures [better interconnected markets etc.] shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply, without prejudice to Article 175(2)(c)” [Lisbon Treaty, Article 176A]



Britain in Europe

2007: Nuclear Back on the UK Agenda



26. Even with our expectations that the share of renewables will grow, it is likely that fossil fuel generation will meet some of this need. However, beyond that date there are still significant amounts of new capacity needed; for example, in 2023 one third or 3GW of our nuclear capacity will still be operational, based on published lifetimes. Given the likely increase in fossil fuel generation before this date, it is important that much of this capacity is replaced with low carbon technologies. New nuclear power stations could make an important contribution, as outlined in the consultation document, to meeting our needs for low carbon electricity generation and energy security in this period and beyond to 2050. Because of the lead times, without clarity now we will foreclose the opportunity for nuclear power.

UK Climate Change Act 2008



- 80% GHG emissions reduction by 2050 (-34% by 2020)
- Creation of a high-level 'Climate Change Committee'
- Five Year Carbon budgeting
- The Climate Change Committee's first report recommended the complete decarbonisation of electricity by 2030



UK Nuclear New Build Faced Difficulties Before Fukushima.

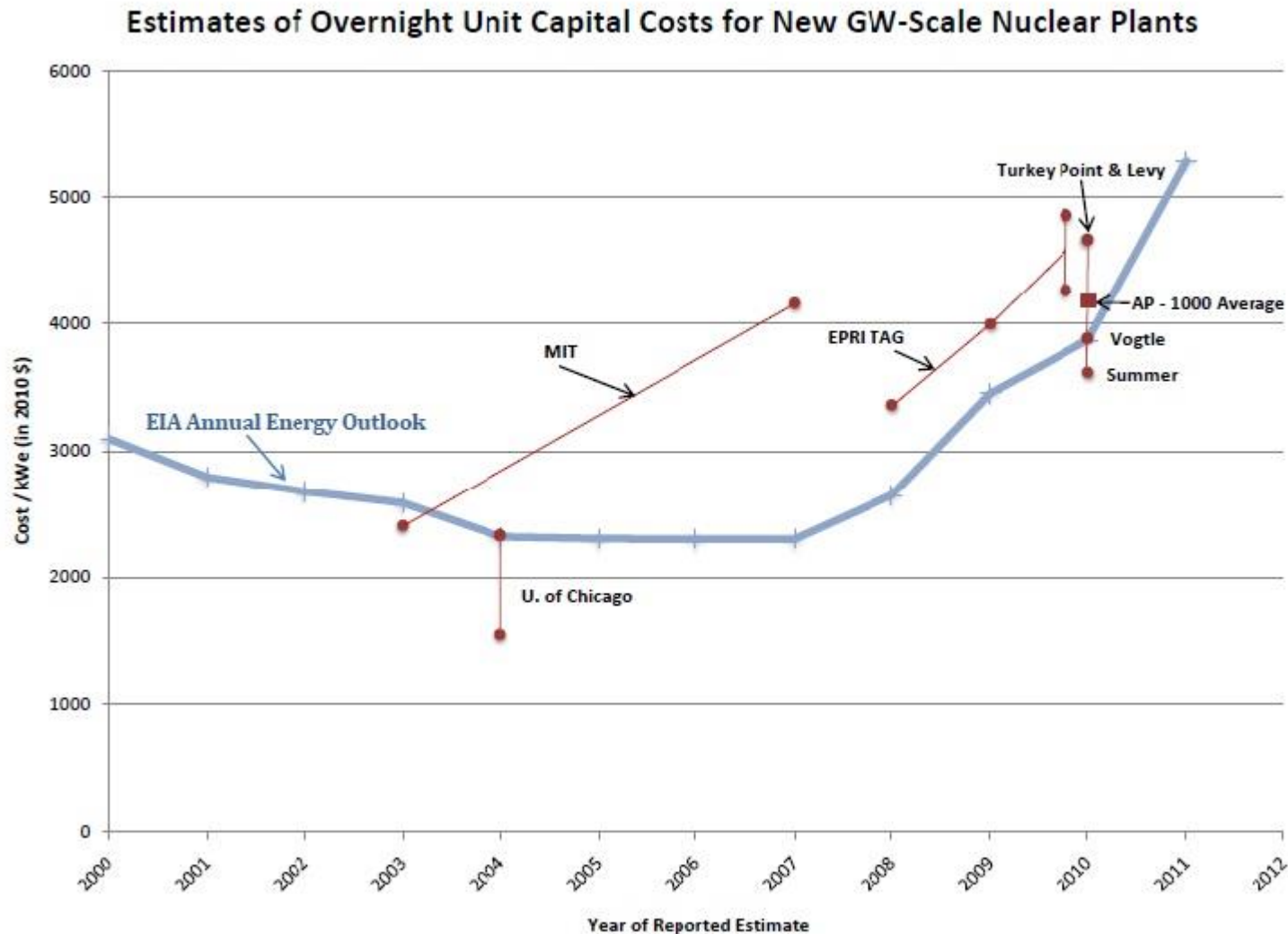
The issues related to financing nuclear new build in the liberalised electricity market

Key concerns were rising costs, the structure of those costs and the allocation of economic risks.

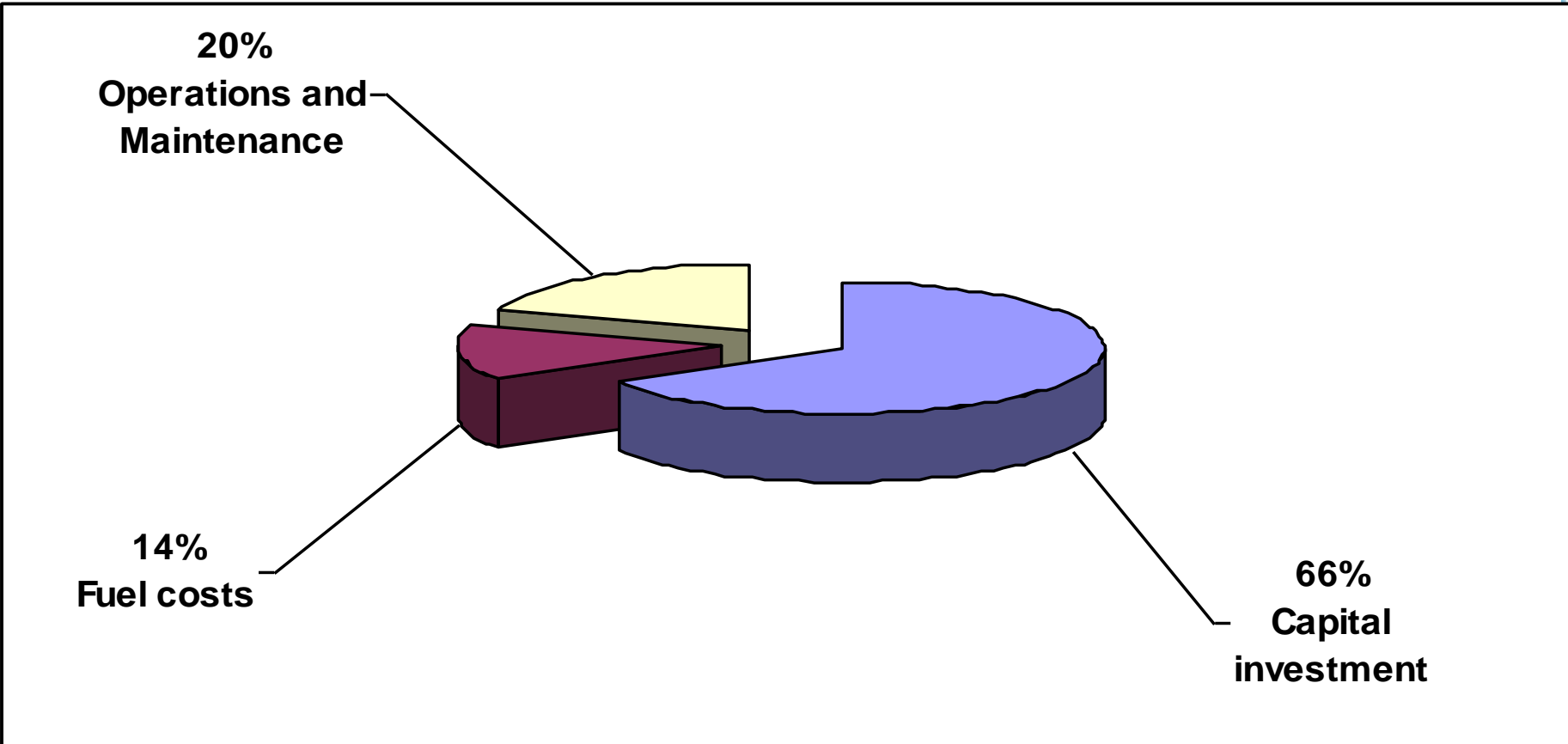
Rising Costs



R Rosner et al. *Analysis of GW-scale overnight capital costs*, Energy Policy Institute of Chicago, Technical Paper, Nov 2011.



Nuclear New Build Lifetime Costs



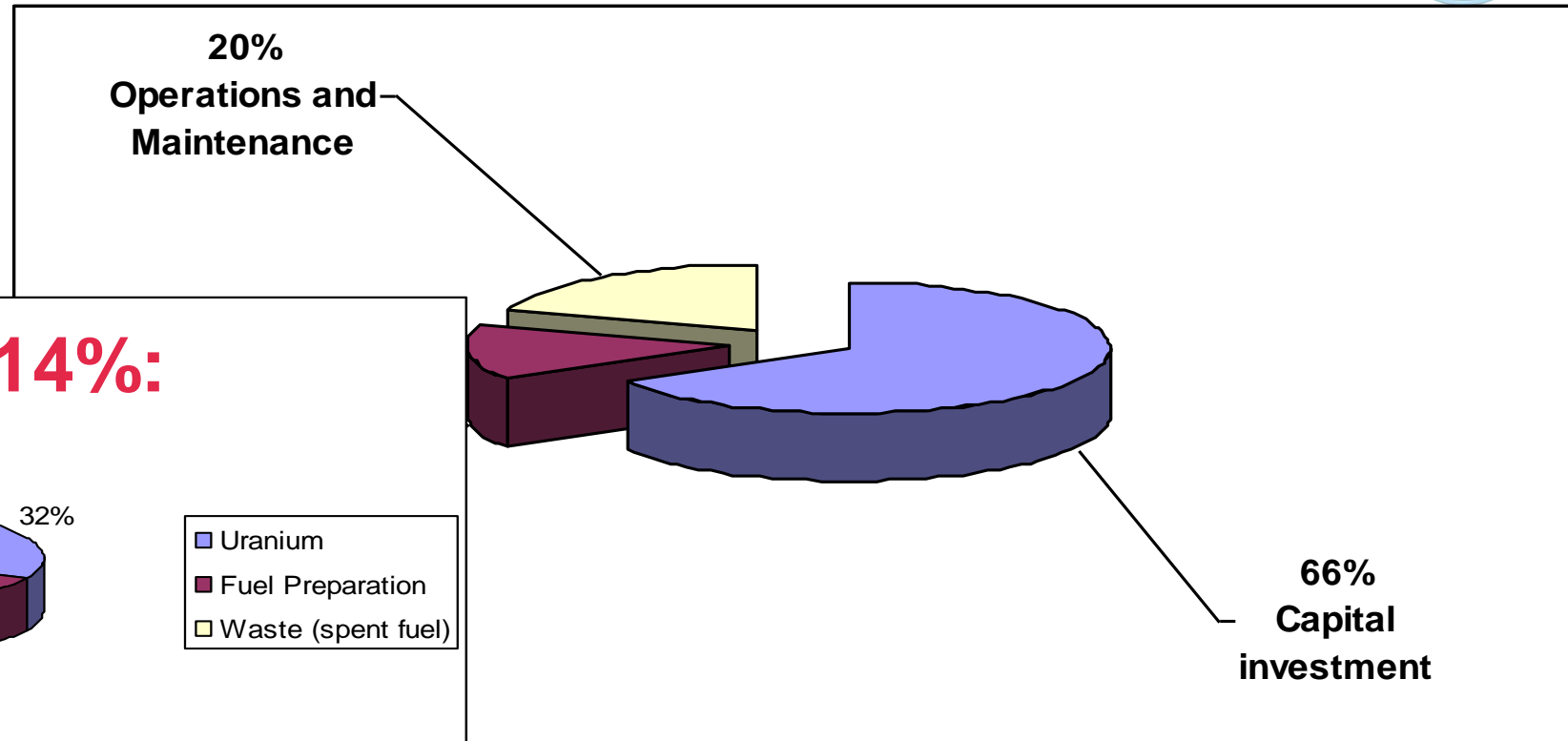
Breakdown of lifetime costs of a nuclear power plant.

Capital investment is the most significant factor in the economics of nuclear power.

Source: DTI *Energy Review – A Report*, chart A1, page 175, cm6887, (July 2006). Available at: <http://www.berr.gov.uk/files/file39525.pdf>

Discount Rate assumption 10% real post tax

Uranium a minor cost



Note: typically decommissioning costs are less than 1% of ongoing operating costs (10% discount rate assumed). Ref: *Nuclear Power in the OECD*, IEA (2001)

Raw uranium costs are only a minor part (about 5%) of the total costs, this is in contrast to fossil fuel power generation where equivalent fuel costs are approximately 70%.

Costs ... and Risks



The fundamental economic risks of nuclear power are:

- **High costs of capital (high discount rates and rates of return)**
- **Overrun of construction phase (lost time is lost money)**
- Future electricity prices (as for any power technology)
- **Changes of safety or environmental regulation during planning and construction**
- **Political risk and public acceptance problems**
- Risk of a low carbon price
- Poor plant reliability in operational phase (low load factor)

Blue font denotes risks occurring before first operations

Economic 'Non-Risks'



For nuclear power the following factors are relatively minor:

- **Decommissioning costs** (40-60 years in the future)
- **Fuel costs** (raw U_3O_8 is only a few % of total costs)
- **Geopolitical risks** (fuel is easily stored and is regarded as “domestic” for energy security)

'No Subsidy' for Nuclear Power



A long-standing UK Government axiom
'clarified' *by the coalition:*

“To be clear, this means that there will be no levy, direct payment or market support for electricity supplied or capacity provided by a private sector new nuclear operator, unless similar support is also made available more widely to other types of generation.”

Rt Hon. Chris Huhne MP, Secretary of State for Energy and Climate Change,
October 2010

***So now, No Special Subsidy for Nuclear Power
Note provisions of the current Energy Bill***

UK Electricity Market Reform 2011

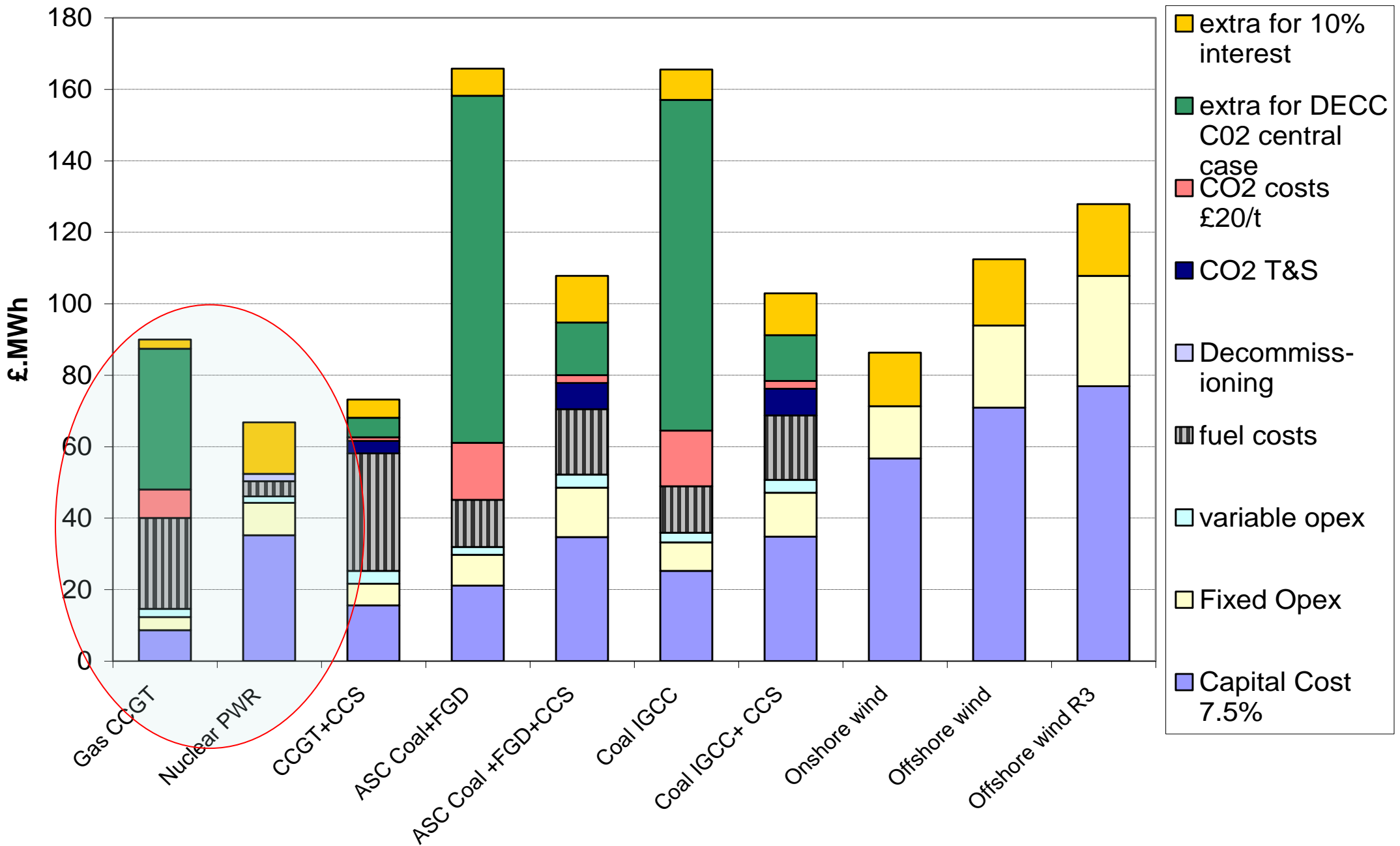


In December 2010 the UK Government issued a consultation paper proposing four important market changes:

1. Establish a stable and significant floor to the carbon price
2. New 'Contract for Difference' Feed in Tariffs for low carbon electricity generation investments
3. Capacity Payments - moving away from energy only markets
4. Emissions Performance Standard which would block new unabated coal generators

These were arguably the most radical proposals in UK energy policy for more than 20 years. They led to the 2012 Energy Bill – more on that later.

Projected levelised generation costs 2017 NOAK



With thanks to D Newbery EPRG, Data from DECC EMR 2011

UK Energy Bill 2012



At the end of last year DECC published the long awaited Energy Bill:

- **Contract for Difference Feed In Tariff** – government is not the counterparty – it is merely the ‘arbiter’. The money flows to and from ‘suppliers’. No ‘strike prices’ yet.
- No rising carbon price floor, IPPR think tanks says: “*The Energy Bill misses an opportunity to improve Britain’s unilateral Carbon Price Floor*”
(<http://www.publications.parliament.uk/pa/cm201213/cmselect/cmenergy/275/275vw23.htm>)
- **Capacity market - as planned**
- **The Bill contains an Emissions Performance Standard, see:**
<http://www.pinsentmasons.com/en/media/publications/energy-bill-update---the-emissions-performance-standard/>



11 March 2011

Fukushima Nuclear Accident

Prompted by a magnitude

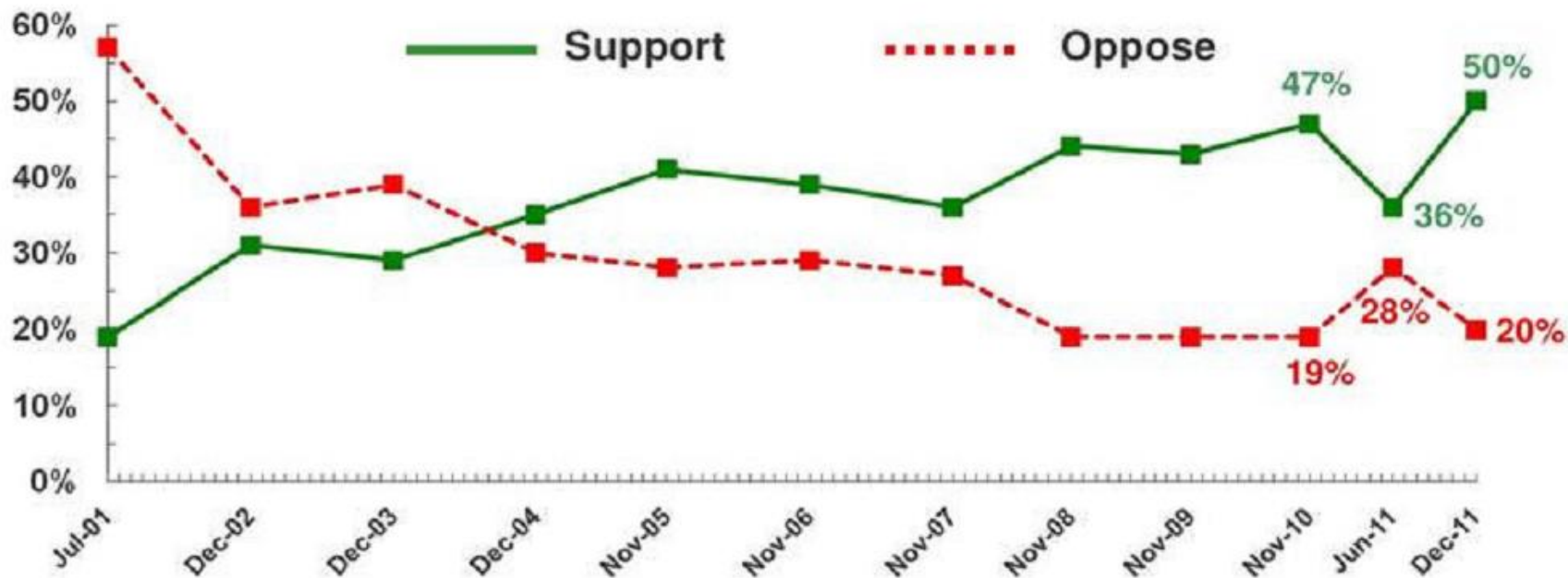
9.0 earthquake and 14m Tsunami

UK Public & New Build



Support for replacement newbuild reaches a new high point of 50%

Q To what extent would you support or oppose the building of new nuclear power stations in Britain TO REPLACE those that are being phased out over the next few years? This would ensure the same proportion of nuclear energy is retained ie 18%.



Ipsos MORI Base: All respondents c1,000-2,000

* Wording in 2001 was "To what extent would you support or oppose the building of new nuclear power stations in Britain?"





Nuclear Power and EU Policy

57 Years of Nuclear Policy in the EU



In April 1956, following the 1954 failure of the European Defence Community, an international committee, under the Presidency of P.H. Spaak, the Belgian Minister for Foreign Affairs proposed:

- the creation of a general common market;
- the creation of an atomic energy community.

These became the "Treaties of Rome" signed in March 1957

The first Treaty established the European Economic Community (EEC) and the second the European Atomic Energy Community, better known as "Euratom". These two Treaties entered into force on 1 January 1958. The EEC Treaty has been modified numerous times whereas the Euratom Treaty remains unaltered.

http://europa.eu/legislation_summaries/institutional_affairs/treaties/treaties_euratom_en.htm

Euratom ossified?



- **Despite much good work in the EU to achieve appropriate Qualified Majority Voting in the Council of Ministers*; on matters relating to Euratom – Member State unanimity is still required.**
- **The European Parliament has no line item control of the Euratom budget and little scope for scrutiny of its work. Hence Euratom has a severe democratic deficit.**

I have called publicly for Euratom reform:

William Nuttall, Research Europe, *Opinion*, 1 October 2009

- * The Lisbon Treaty introduced double QMV in the Council based on 55% of EU Member States and 65% of EU population – except for Euratom policy areas



Nuclear Consensus?

However, the absence of amendments to the Euratom Treaty is not a sign of a European consensus on nuclear power.

The EEC treaty has moved towards its aim of “ever closer union”, while in the area of nuclear power there has been little European convergence.

The constitutional framework of Euratom is an historical legacy. In my opinion it is unfortunate. There is little reason today that nuclear issues should be constitutionally special within the EU.

Member State Policies Following Fukushima



Some turning away from nuclear

- Germany
- Belgium
- Switzerland
- Italy
- France?

Elsewhere resolve appears to be holding

- Finland
- UK
- Czech Republic
- Bulgaria?
- Romania?



An alternative to Euratom reform would be the idea of a '*Nuclear Schengen*' as proposed by Nicole Ahner and colleagues from the European University Institute in Florence.

[EUI Working paper RSCAS 2010/43]



Thank you