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Electricity Policy Research Group

Nuclear New Build in the UK
a personal view

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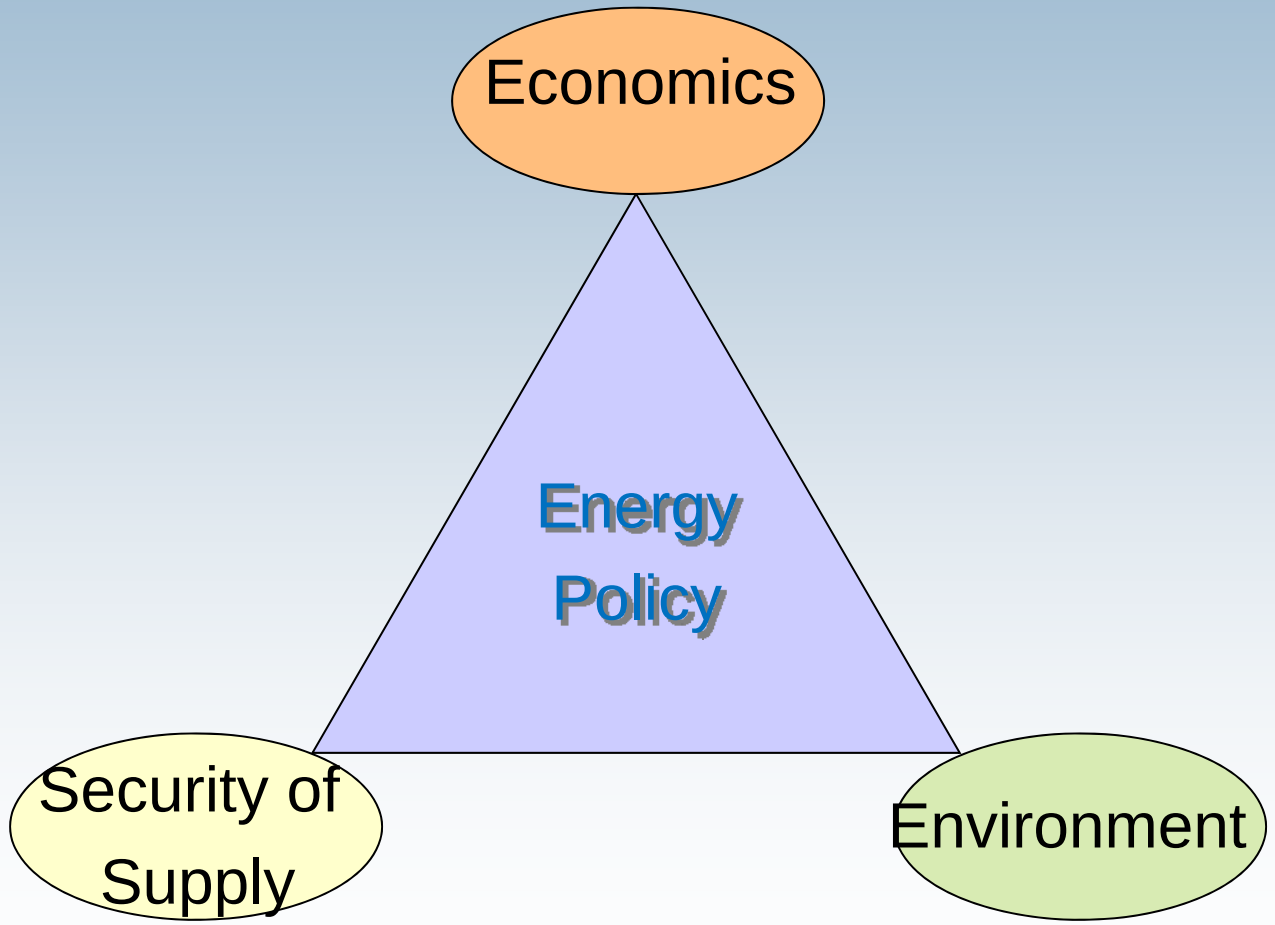
A shared post of Judge Business School and Cambridge University Engineering Department

27 October 2011

Structure of my remarks:

- UK Policy For New Build 2008-2011
- Problems Before Fukushima
- Problems From Fukushima
- A comment on the Fukushima incident itself


Economics
Energy Policy
Security of Supply
Environment

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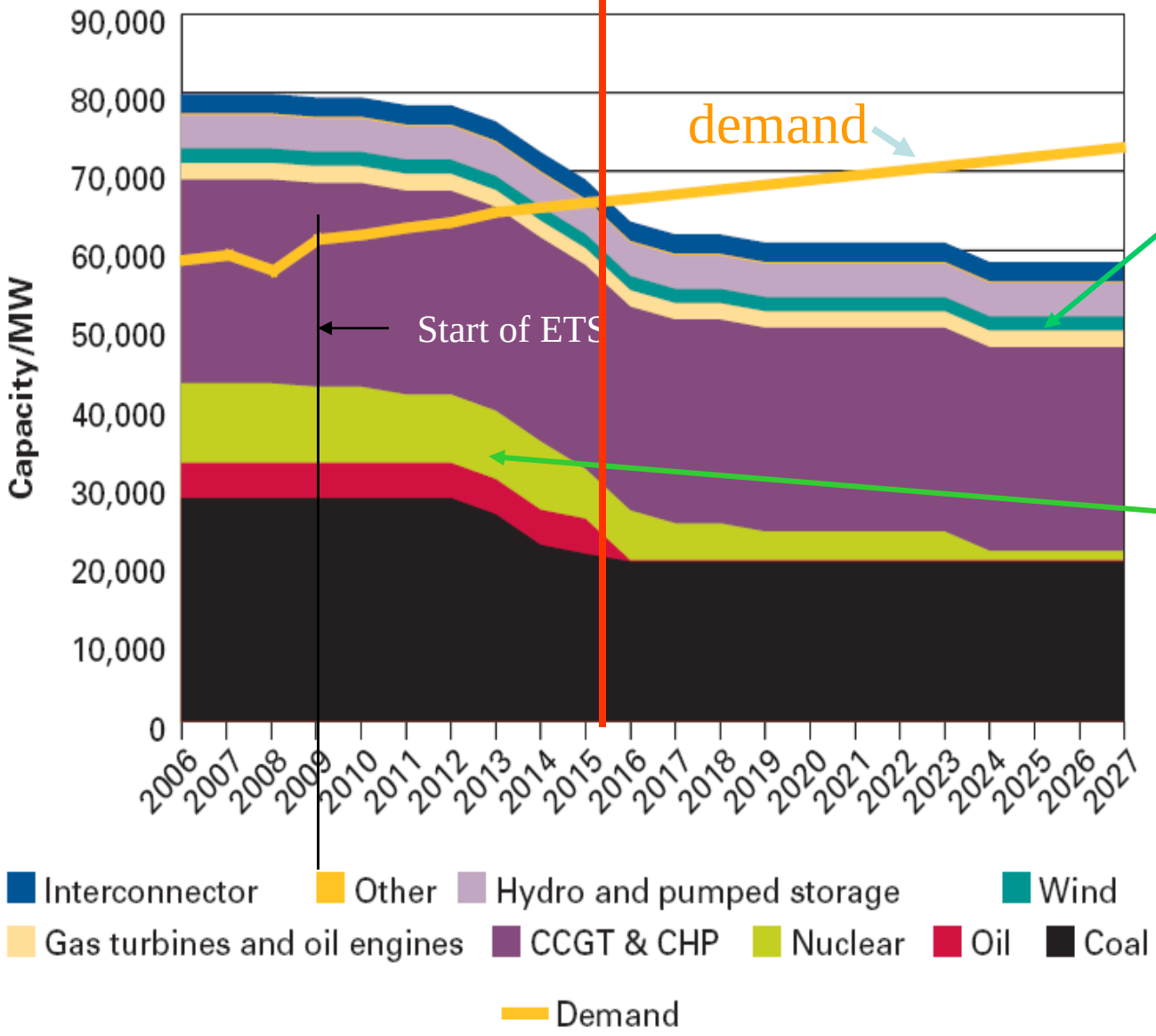
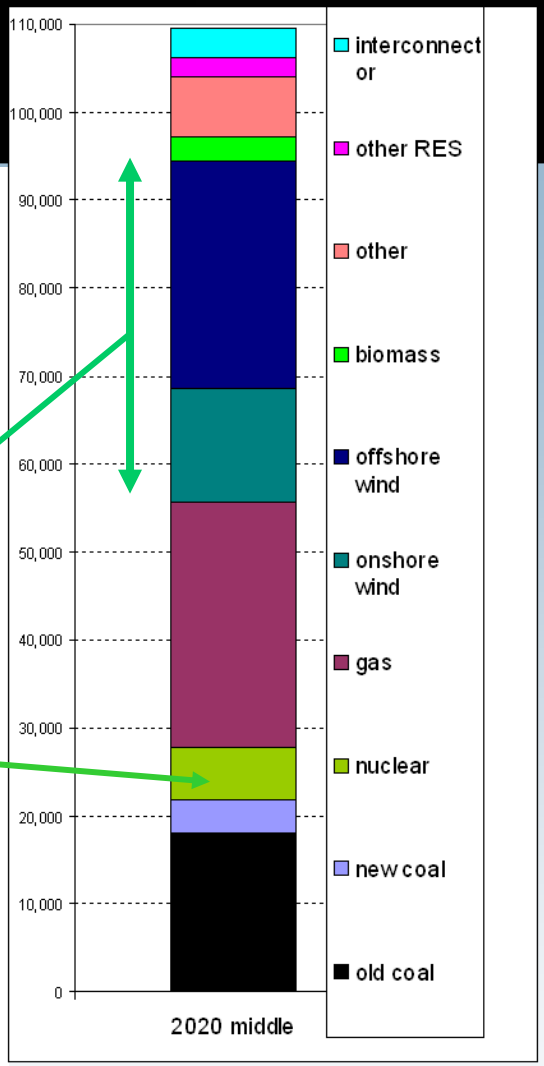
New capacity needed 2015

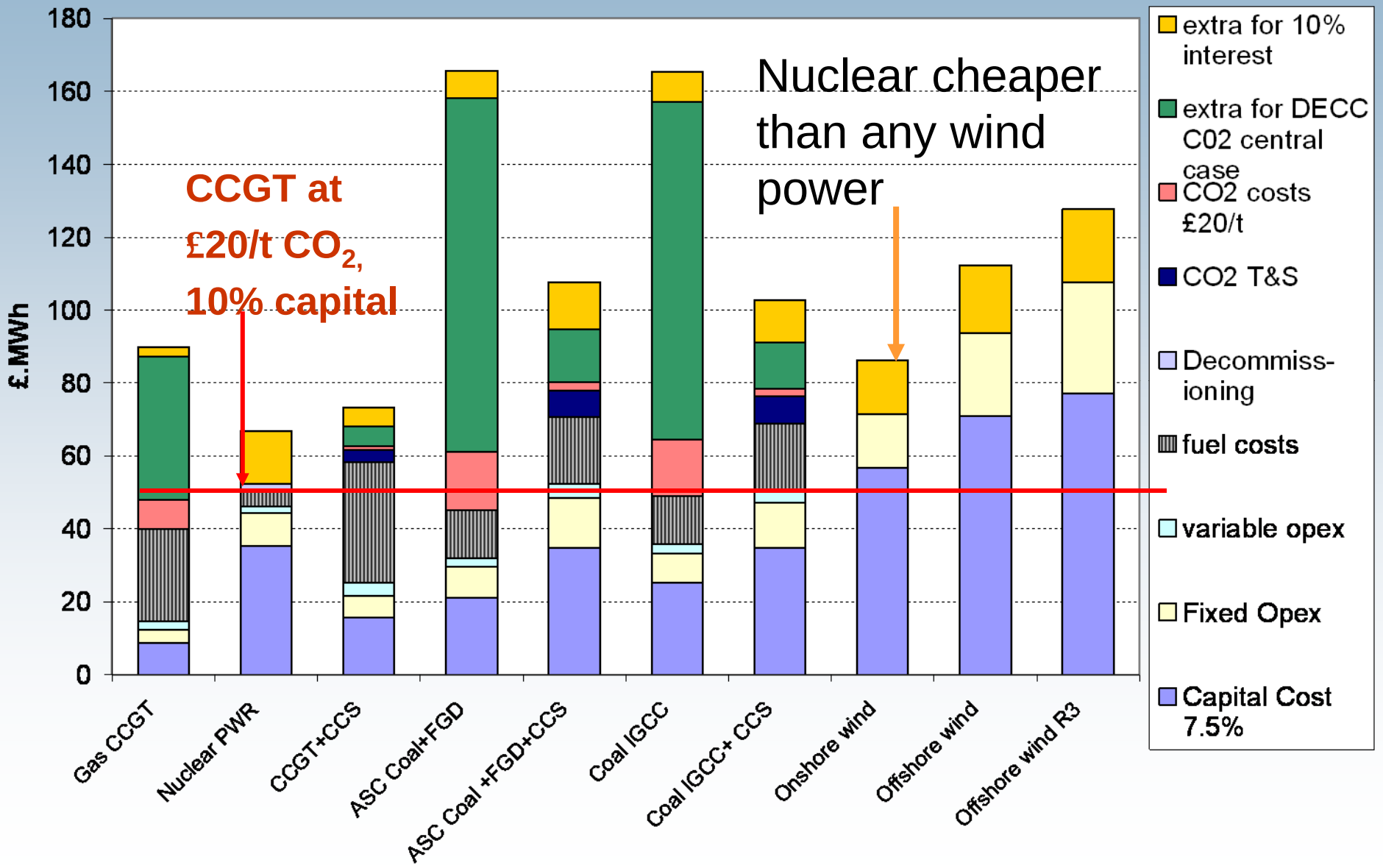




SKM (2008) mid-scenario projection

Source: Digest of UK Energy Statistics/DECC

With thanks to D. Newbery EPRG



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

Nuclear White Paper 2008

Labour Government Formally Supports Nuclear New Build

2008 White Paper – main measures

1. Generic Design Assessment

2. Justification and Strategic Siting Assessment

3. Statement of National Need – *National Policy Statements*

Consequence: future local approval processes (including public inquiries) will not be allowed to question:

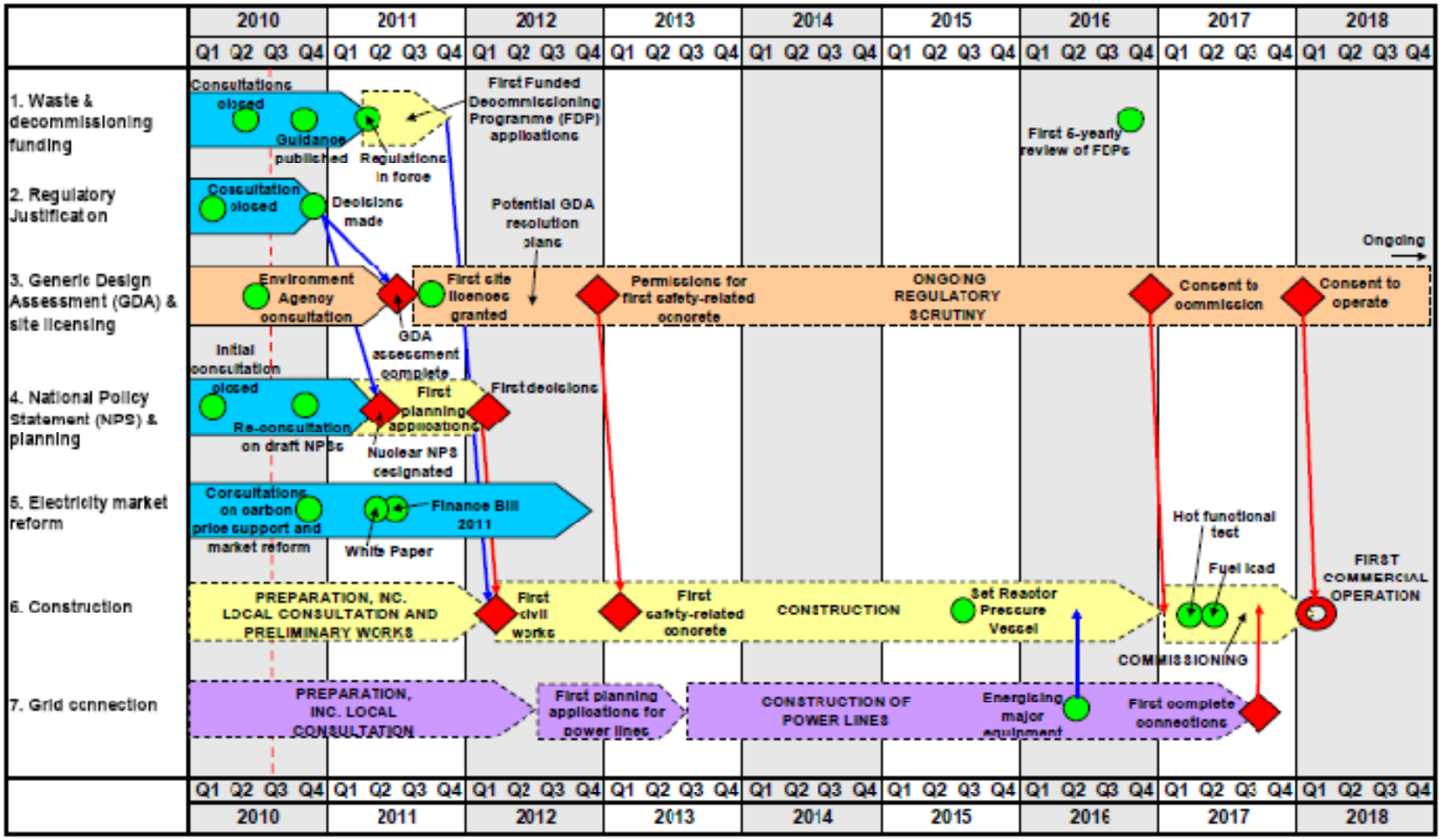
- Design safety
- National need for nuclear power, or
- Whether this is the best place to build

Local planning approval has been a difficult issue for UK infrastructure build

2010 Conservative/Liberal Democrat Coalition Government Agreement:

"We have agreed a process that will allow Liberal Democrats to maintain their opposition to nuclear power while permitting the government to bring forward the national planning statement for ratification by parliament so that new nuclear construction becomes possible." (Emphasis added)

UK Timeline, Pre-Fukushima



KEY:

- Government
- Regulators
- Operators
- National Grid
- Milestone
- Critical path
- Generic activity
- Project-specific activity

INDICATIVE TIMELINE FOR FIRST NEW NUCLEAR POWER STATIONS

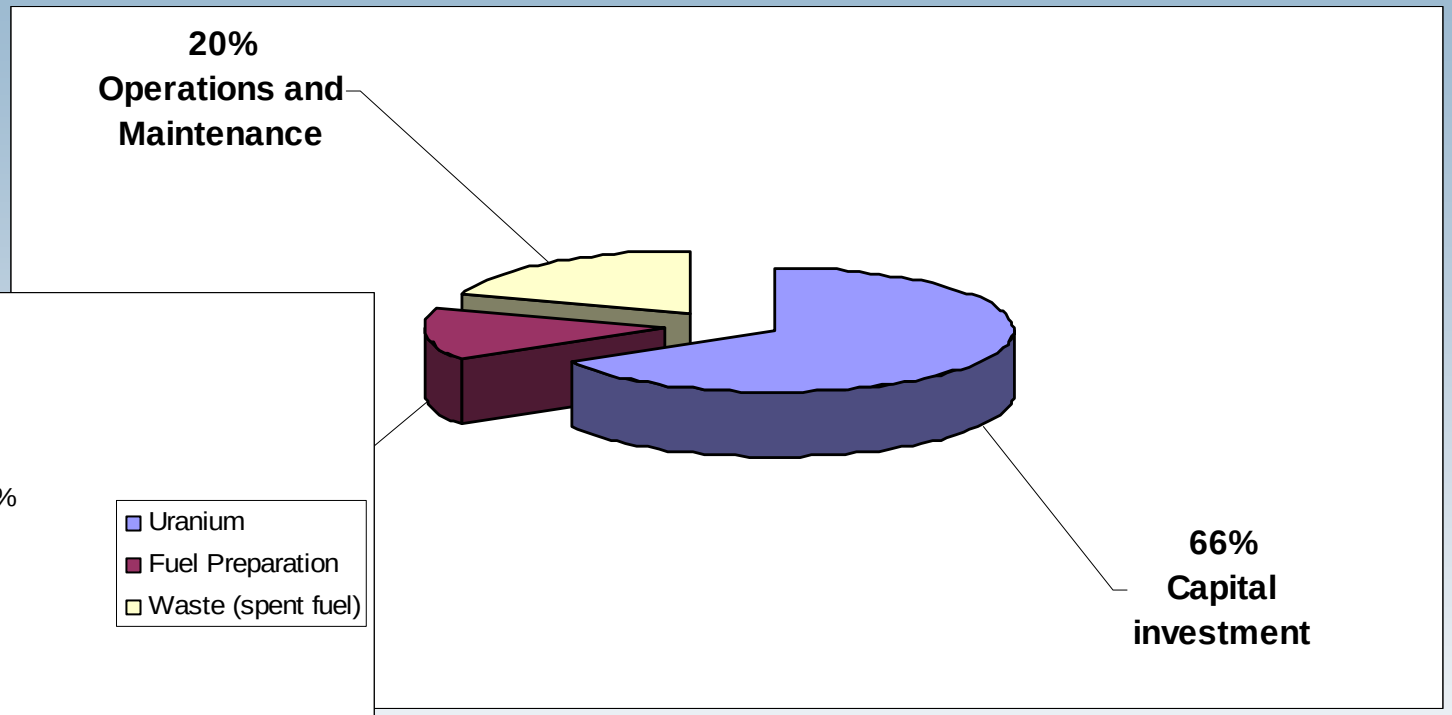
NOTES:

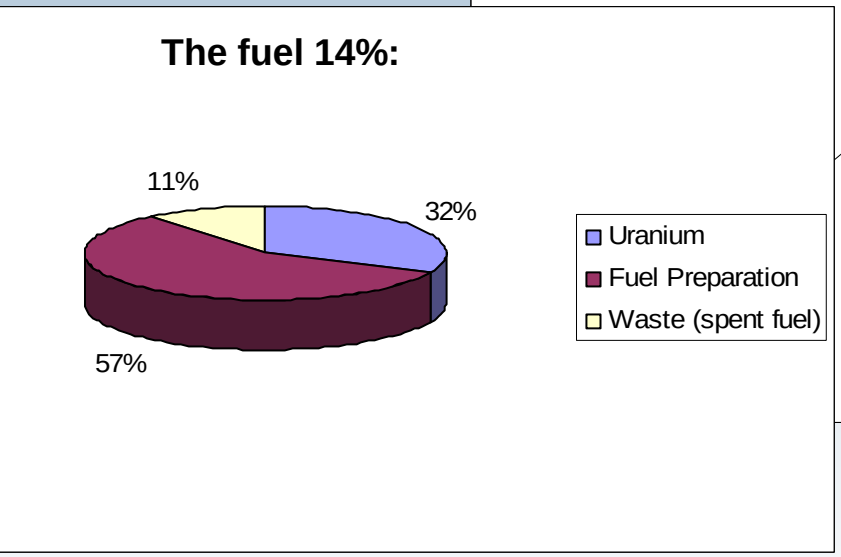
- All timings given in this plan are indicative only and subject to change. This document was current as of AUGUST 2010.
- This plan shows an indicative pathway to commercial operation of the first new nuclear power station by 2018. In line with announcements from prospective operators, other new nuclear power stations are expected to become operational after 2018.
- Assumptions in this plan about future timings/milestones in no way prejudice the outcome of current or future Government processes, regulatory approvals or planning decisions.
- 'First safety-related concrete' refers to structural concrete within the nuclear island.

Source: DECC UK

2. Difficult realities before Fukushima

Capital Costs Dominate





Note: main chart components of lifetime levelised cost (10% real post-tax discount rate assumed) Ref: DTI Energy Review – cm6887 (July 2006).

Raw uranium costs are only a minor part (about 5%) of the total costs. Ref: Nuclear Power in the OECD, IEA (2001)

Economic Risks Matter to Investors

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

Impact of EU Policy - EU 20:20:20 by 2020

Binding EU targets affecting electricity:

- **20% of total energy consumed to be supplied from renewables by 2020 – (UK commitment is 15%. Implying 30%+ of electricity from renewables)**
- **20% reduction in greenhouse gas emissions by 2020 (UK commitment is 16%)**
- **In addition there is a non-binding target to reduce primary energy use by 20%**

TENSION

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

Before Fukushima High Costs and Major Economic Risks Were Threatening Nuclear New Build in the UK

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 are arguably the most radical proposals in UK energy policy for more than 20 years. They are now at the heart of the 2011 Electricity Market Reform White Paper. Are these measures sufficient to make nuclear new build viable?

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UK Carbon Price Floor

(in Budget of 3/11)

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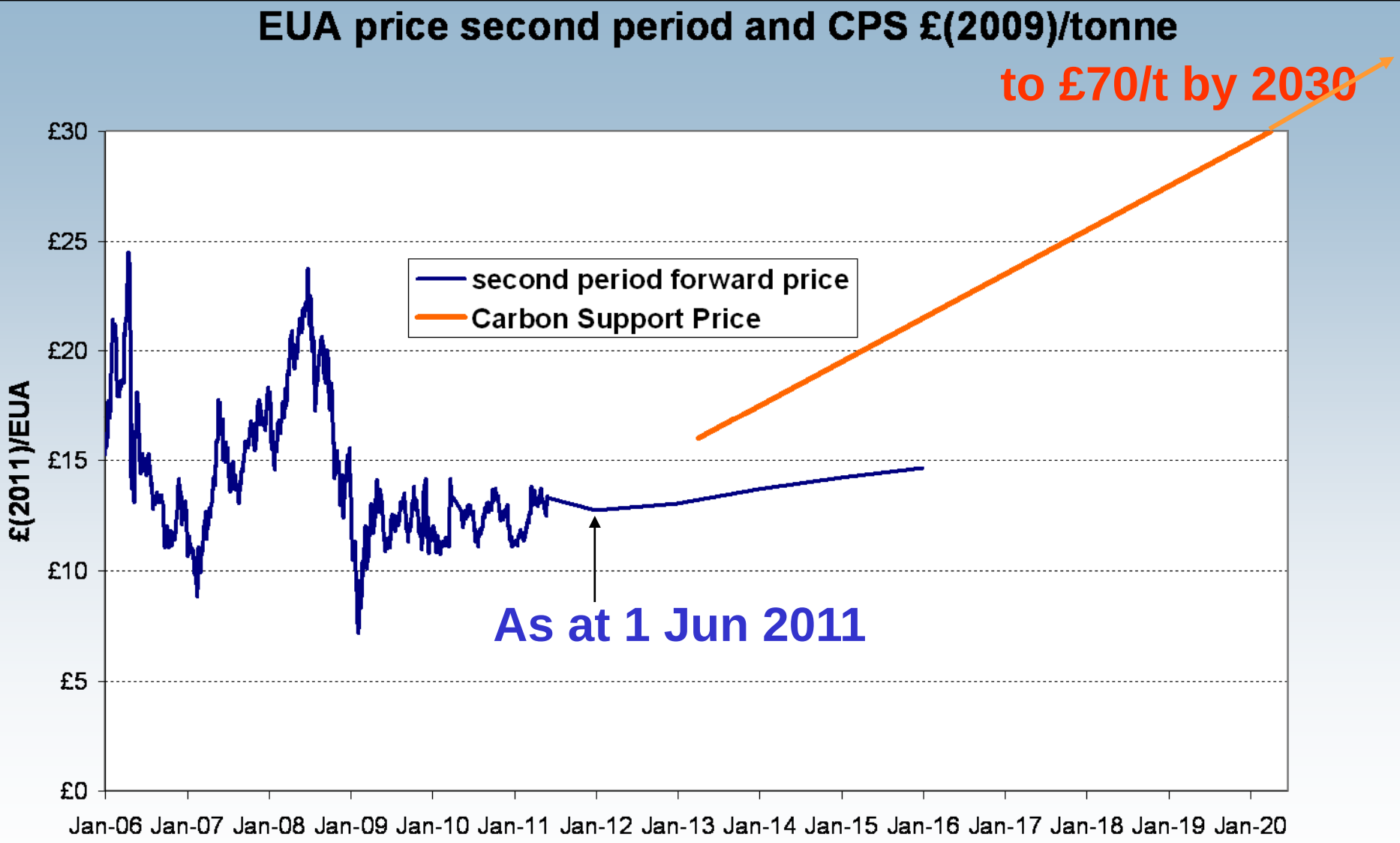

Source: EEX and DECC Consultation. Chart prepared D Newbery EPRG

‘No Subsidy’ for Nuclear Power

A long-standing UK Government axiom ‘clarified’

“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

Policy becomes No <u>Special</u> Subsidy for Nuclear Power

UK Consequences of Fukushima

Government

- UK Government resolve in favour of nuclear new build appears to be undiminished
- Both Government and opposition continue to support nuclear new build
- The original 2010 timeline has clearly been pushed back by Fukushima and the Weightman Review, but project proponents suggest that any delay will be minor.

Energy Companies

- Initiative lies with the energy company consortia – here are the main risks to UK new build
- Members of these international consortia are affected by politics and the business environment in their home markets. German decisions are particularly relevant
- 26 October 2011 Financial Times Reports that Project Horizon consortium is seeking a €5 Billion investment from a reactor technology vendor in return for a 25% project stake.

A Closing remark on Fukushima

Concerning the Fukushima incident itself.

I see two schools of thought:

1. TMI and Chernobyl were unforced errors of the nuclear industry. Fukushima, however, was a side consequence of a truly horrendous natural disaster which killed many thousands of people. Hence Fukushima is much less troubling than those earlier accidents.
2. Alternatively, Fukushima reveals the worst kind of design basis error. An industry which makes such basic errors in its assumptions simply cannot be trusted.

Thank You