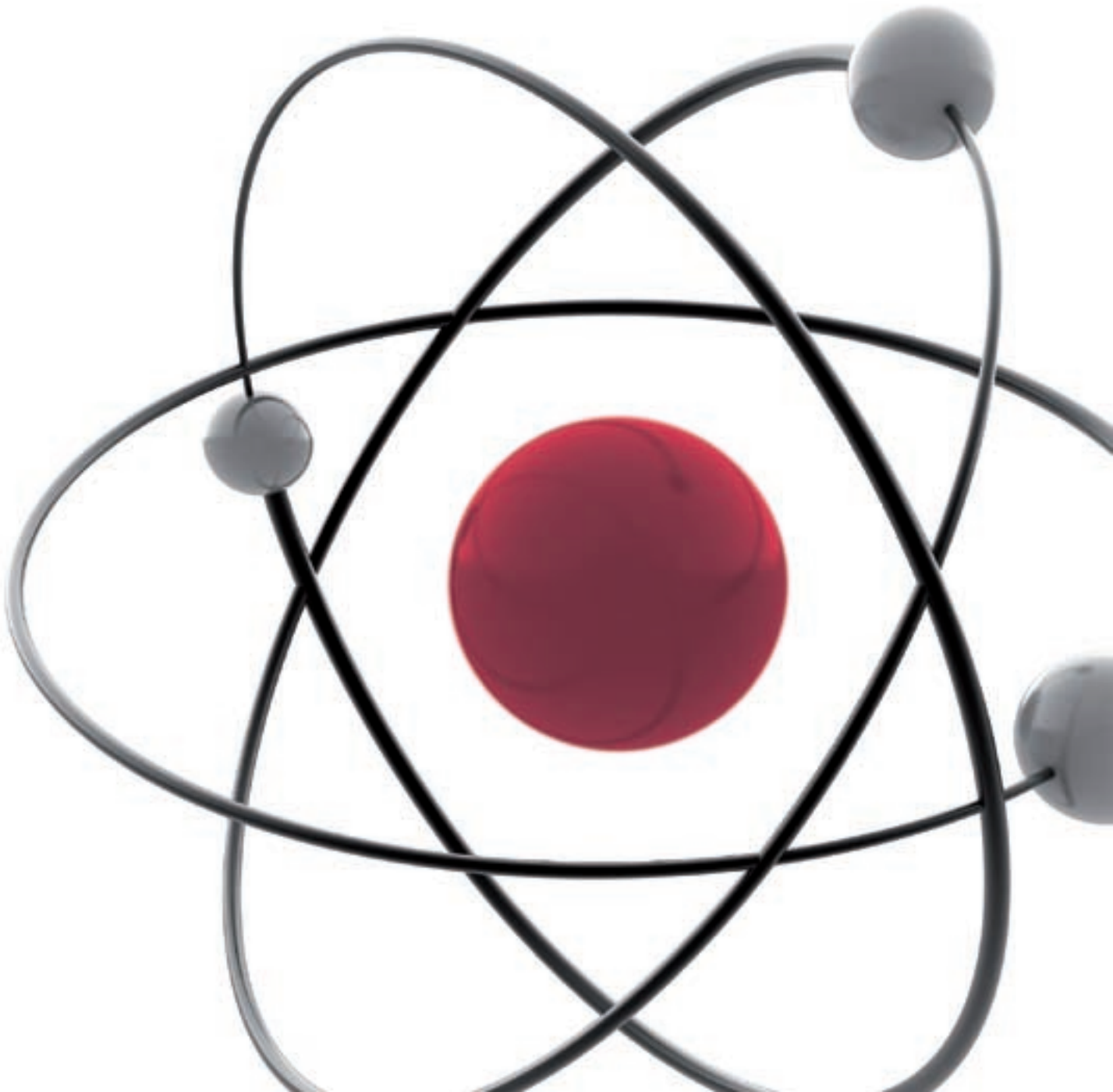




THE BULLETIN
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THE RENAISSANCE
OF NUCLEAR
Construction opportunities
in the nuclear industry



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Back in the 1980s there was a fashionable bumper sticker and badge, which bore the catchy slogan: Nuclear Energy, No Thanks.

Today however, fashionable opinion has changed with no less a luminary that James Lovelock, creator of the Gaia theory of ecology, proclaiming that nuclear power offers the most certain and environmentally safe option to meet our future energy needs.

Similarly the UK Government's Energy review paper published in 2007 accepted (in principle) the case for a new programme of nuclear stations as part of the UK's potential energy generating mix aimed at reducing carbon emissions and reducing the UK's reliance on imported energy.

The increasingly unstable geo-political situation in the middle east and shocks caused by the Kremlin's decision to shut





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down the gas pipelines to Europe twice earlier this year has focused attention on the pressing need to guarantee that the UK does not face an energy crisis in future.

In fact, the logic behind today’s drive for nuclear is very similar to that which informed the commissioning of the world’s first commercial nuclear power reactor which began operating in the UK in the 1950’s. The 1956 Suez crisis emphasised concerns about the threat of coal and oil shortages to British industry and led to a trebling of the

nuclear building programme.

Tony Blair was quoted before he stood down saying that nuclear power was back on the agenda with a vengeance. The CBI has also pointed out that nuclear “is the only low-carbon technology proven to deliver a consistent supply of electricity on a large scale”.

The UK nuclear market

The UK currently has 23 reactors generating one fifth of its electricity. Most of these reactors will close by 2020. Industry sources forecast that four new reactors will need to be built in the UK by 2016, representing the first stage of a programme that could ultimately see up to 12 new reactors eventually come on-stream.

It is expected that the new-build programme will start around 2010 (assuming government approval). At the same time the nuclear market will also see continued decommissioning of the older reactor stations. The total forecast spend in the UK nuclear market in the next decade is an estimated £30-40 billion. This comprises decommissioning of existing facilities, building new reactors, related projects and upgrades.



This drive to nuclear creates clear opportunities for a range of players with the expertise to support both the construction and decommissioning programmes. The newbuild sector alone could be worth some £2 billion plus per year once design and construction activity starts.

As well as newbuild the sector will also see major work in the decommissioning of existing facilities – the so-called nuclear legacy – as well as major projects and upgrades through the Aldermaston Weapons Establishment (AWE).

The contractor value proposition

When selecting the preferred contractors, the nuclear industry will look for firms that can add value through innovation and productivity enhancement. Strategic teaming arrangements will be necessary to offer full service

solutions to clients comprising various skill-sets. Advisory teams must offer a full complement of strategic, commercial and contractual services.

In the newbuild sector the transfer of oil and gas project skills, cost management techniques and contracting models could offer a strategic choice for the approved building contractors and client companies. Nuclear new build is happening in other countries at present so importing these skills would also offer some advantages as

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the UK has not built a new nuclear plant for many decades.

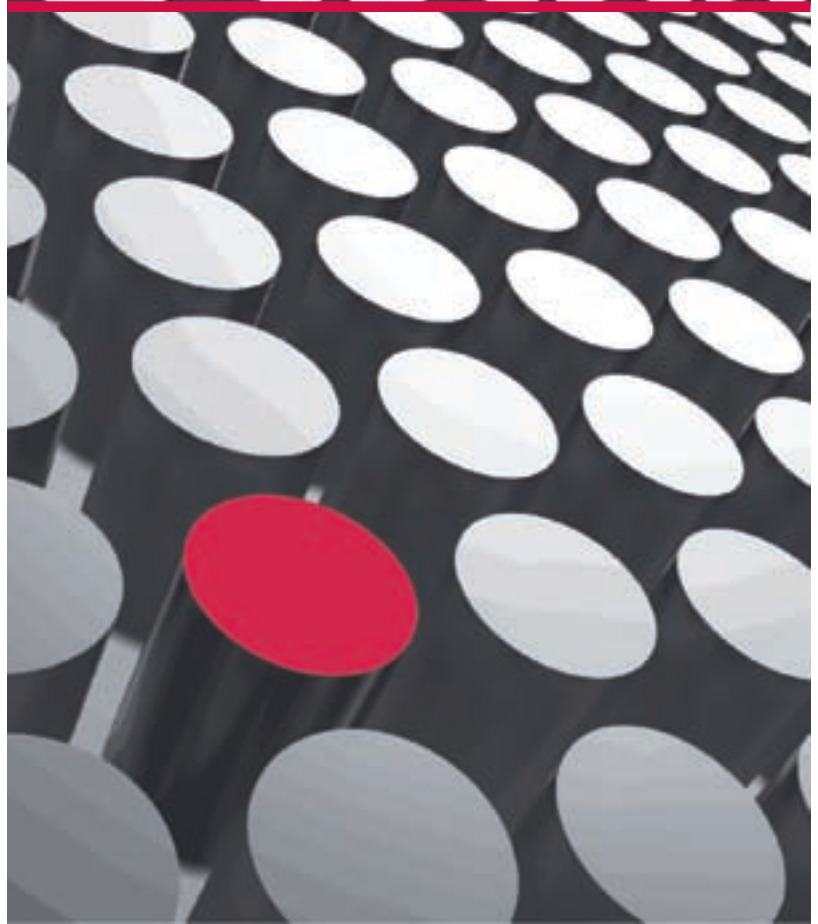
Given the substantial investment needed and the risk profile of a new build project, companies with experience in partnering, alliance and target/incentive based contracts should be well positioned. The key is to convince clients of the merits of transferable skills as the correct framework for projects valued at up to £2.5 billion for each new plant.

In this sector therefore there will be high demand for contractors who can demonstrate the appropriate mix of experience in risk management, governance, cost and project control and conflict resolution.

The oil industry has shown that it has the right skill-set to manage, identify and mitigate project risks. Apart from capital costs the lifecycle costs are very important. Given that there has been no nuclear build in the UK for years, data for lifecycle cost models is minimal. Most facilities are in decline so available intelligence on costs relates to old and obsolescent sites.

Although deep ground storage of nuclear waste materials still appears to be the preferred option the industry is still compelled to build new storage facilities in the short term to cover the needs of the next 15-20 years. The spent plutonium store at the Sellafield nuclear reactor in Cumbria is currently being built to store spent plutonium at an estimated cost of some £200 million. There are significant lifetime cost implications in this and other such projects. When Dounreay and Sellafield were built nobody thought about how they would decommission and dismantle these facilities.

Currie & Brown's experience in the nuclear and oil & gas industry along with building 'life-cycle' cost models for a number of clients in other sectors



could prove useful in this emerging nuclear market in areas of budget preparation, funding approval, risk management and project control.

Key construction issues

There are a number of potential designs for the UK new build stations, however it is considered that there are three potential front-runners. The Westinghouse modular design (the AP1000), the French design (Areva) and the Canadian (Candu) designs.

The Westinghouse modular design has already been approved by the US government. It is claimed that this type of design would reduce the construction risks by allowing for much of the fabrication to take place off-site. This contrasts with the alternative "stick-build" approach, where all construction takes place on-site. While there may be little difference in the overall project costs or schedule there is a material difference in the costs of field assembly

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work. Reducing the work at site by using prefabricated modules which are pre-tested and validated, makes it far easier to trace faults, and reduces construction related risks/clashes. This approach also reduces the size of the required construction team, a welcome factor when available resources are constrained.

Recent experience of oil refinery construction is informative here. With oil prices at historically high levels many projects were schedule-driven and not cost-driven. The key risk with schedule-driven projects is that construction gets ahead of design causing delays and rework and out of sequence working.

Beyond this the industry must determine the commercial strategy for these new nuclear projects, should they be risk-reward oriented, target based, turnkey or alliance & partnering type models.

Risk factors

Shortage of skilled labour in the market is a decisive factor as competition for labour and lack of capacity will have an impact on contractors. A recent major survey of the UK construction sector by PKF found



that two-thirds of contractors saw the shortage of skilled labour as a major barrier to growth. A separate report from the Nuclear Industries Association said that the UK sector could supply 80% of the workforce needed for new nuclear build. That forecast was based on the assumption that 10 reactors would be built at five sites over the next two decades.

Beyond the UK there is a global new build programme. It is estimated that as many as 80 to 100 new build nuclear stations might be needed to ensure global energy supply needs are met over the next few decades. This will have significant impact on resource availability. Similarly there is the potential for the supply industry to find it difficult to meet the potential demand, major reactor forging would be an example of this.

If the UK is to achieve any 'potential' for new generating capacity coming on-stream around 2016 the government must streamline the planning process (assuming around five years for design, build, commissioning and start-up). It is essential that the government is proactive in ensuring that planning processes meet their deadline. Otherwise it will create a major risk for the client community who must decide whether to invest in the UK ahead of these planning procedures being agreed or to wait until confirmation, if they choose the latter this could further delay new build plant schedules.

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UK industry structure

The British nuclear industry has been transformed since the first generation of reactors were built.

In April 2005 the government set-up the Nuclear Decommissioning Authority (NDA) to take ownership of the majority of civil nuclear sites in the UK, and control their current or future decommissioning. These sites include the oldest Magnox reactors, whose decommissioning is currently being carried out by British Nuclear Group.

The NDA are responsible for 20 former UKAEA and BNFL sites and an integrated waste strategy. For 2007/8 the annual budget is estimated at £2.79 billion.

British Nuclear Group, owned by British Nuclear Fuels Ltd, is being positioned for sale.

A completely separate private company - British Energy - owns and operates a further eight UK nuclear power stations.

Key players

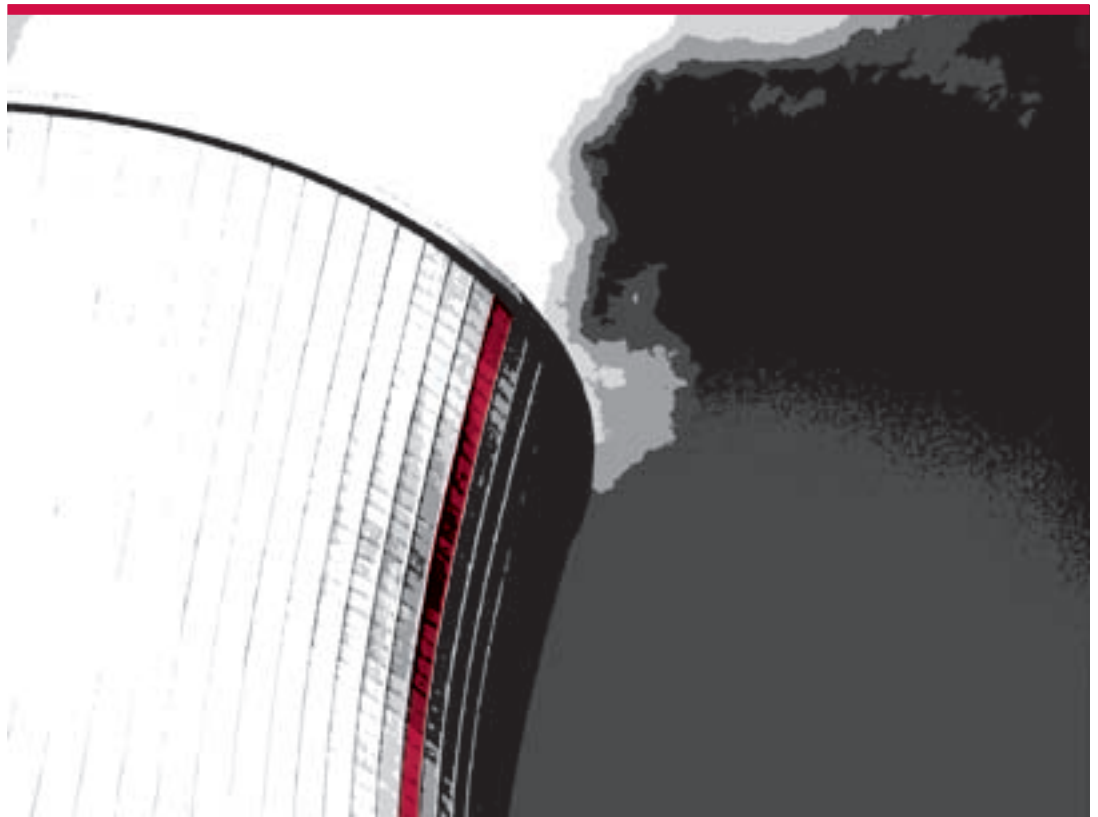
If new plants are to be built it will be by the private sector. The government has ruled out any subsidies so the players therefore will have to be energy giants with huge balance sheets and preferably huge British customer bases.

New nuclear build is likely to be dominated by firms such as EDF of France, E.ON and RWE of Germany.

In reactor design the leading players are likely to be Westinghouse (formally

owned by BNG but being sold to Toshiba of Japan). Areva of France and Candu the Canadian nuclear design house.

Other players and major contracting companies will be teaming up in order to provide comprehensive design and build services. They include, but would not be limited to, companies such as Bechtel, Amec, Fluor, Jacobs, CH2MH, Costain and Mitsui Babcock. Many of these firms have US nuclear experience as well as being involved in new build in other parts of the world.



If you would like to find out more about the issues discussed in this paper or learn more about how Currie & Brown's expertise can add value to your organisation please contact Nicola Giblin, head of marketing and communications.

nicola.giblin@curriebrown.com