The Difficulties of Developing and Financing New Nuclear

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Possible reasons for new nuclear

1. As a long term commercial investment – fully competitive method of electricity generation
2. Carbon free electricity production to enable CO_2 reduction
3. Energy diversity in terms of fuel source, geographic source to ensure security of supply
4. A hedge for electricity final consumers against the risk of high fossil fuel prices

To illustrate the difficulties for a new nuclear station

Compare development and financing of

- a large gas fired CCGT (say 1,000 MW)
- a single nuclear plant

Assume each a standalone plant in a fully competitive market

All existing nuclear stations were built by integrated utilities

Sites

New Gas Fired CCGT

- Sites relatively easily available

New Nuclear Station

- Few suitable sites and already owned by industry players

Planning Permission

New Gas Fired CCGT

- Planning permission quick and relatively easy

New Nuclear Station

- Planning permission very difficult, uncertain, expensive and time consuming

Plant Certification

New Gas Fired CCGT

- Not an issue

New Nuclear Station

- Time consuming, expensive and subject to political interference. Regulatory approval of design required

Plant Vendors

New Gas Fired CCGT

- Wide variety of proven vendors

New Nuclear Station

- Limited number of vendors and designs

Price/Warranty

New Gas Fired CCGT

- Ability to contract fixed price/turnkey
- Vendor warrants performance

New Nuclear Station

- Availability of fixed price and turnkey very uncertain
- Availability of performance guarantees highly uncertain

Sale of Electricity Output

New Gas Fired CCGT

- Gas price likely to determine market price of electricity
- Therefore price in the market related directly to cost of production
- No premium price mechanism needed

New Nuclear Station

- Likely required price for nuclear above market price
- Market price not determined by cost of production of electricity from nuclear power
- Watertight mechanism needed to produce premium price. Needs to survive for many years. Not legislative or regulatory? Contractual? with government

Availability of Fuel

New Gas Fired CCGT

- Gas freely available

New Nuclear Station

- Nuclear fuel available

Insurance

New Gas Fired CCGT

- Plant and third party liability cover available from insurance market

New Nuclear Station

- Plant cover available from insurance market. But third party liability needs government support

Risks in Operation

New Gas Fired CCGT

- Outages expensive
- Type faults unlikely
- Few regulatory issues in operations
- Operation unaffected by events elsewhere

New Nuclear Station

- Outages very expensive
- Type faults possible and serious
- Not only is regulatory approval required for the design, but required to start operations and continue operations. Standards can and do change. No certainty
- Risk that a (unrelated) nuclear incident in another country could lead to closure of the plant

Decommissioning

New Gas Fired CCGT

- Decommissioning very small cost and standards unlikely to change

New Nuclear Station

- Decommissioning a material cost and standards uncertain
- May need up front funding

Spent Fuel and Waste

New Gas Fired CCGT

- Disposing of waste not an issue

New Nuclear Station

- Long term disposal routes HLW and ILW and resulting costs very uncertain
- Government involvement required

Capital Costs

New Gas Fired CCGT

- Capital cost relatively small
- Revenue after 2 years

New Nuclear Station

- Capital cost major proportion of total cost
- Revenue only after at least 5 years
- 30 to 50 years operation required

Viability and Financing

New Gas Fired CCGT

- Because risks well understood financing relatively easy

New Nuclear Station

- Likely to be large residual risks, capital costs high, need for large equity element, and some banks unwilling to lend on nuclear risk
- Not possible on stand alone basis?
- Higher discount rate?

Impossible to develop and finance on as a standalone investment

- But
  - Some of the issues are mitigated if developed and financed by large integrated electricity company with existing nuclear capacity
- Government support still needed

Way Forward for Nuclear

- Much easier if State owned/backed or if within an integrated utility
- In UK, government “support” may be a sufficiently high “strike price” in a CfD
- Small 30MW to 300MW nuclear plants

Other forms of Carbon Free Generation

- Wind, wave, solar and other forms of generation promoted by governments on an ad hoc basis
- Governments do not want to treat new nuclear equally, due to anti-nuclear lobby
- Governments do not ask what is the cheapest way of producing Carbon Free generation

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2. Energy diversity in terms of fuel source, geographic source to ensure security of supply
3. A hedge for electricity final consumers against the risk of high fossil fuel prices
4. As a long term commercial investment – fully competitive method of electricity generation

But

- First three reasons are “public” benefits
- Fourth reason unlikely to be achievable
- Difficult for private sector company to capture public benefits
- Justification for Government support

Conclusions

- New nuclear stations can only be built by large integrated electricity companies with existing nuclear capacity
- Even so, not possible without direct government support
- A fully competitive electricity market is more difficult environment for nuclear
- Would be easier if there was a level playing field between all forms of carbon free generation