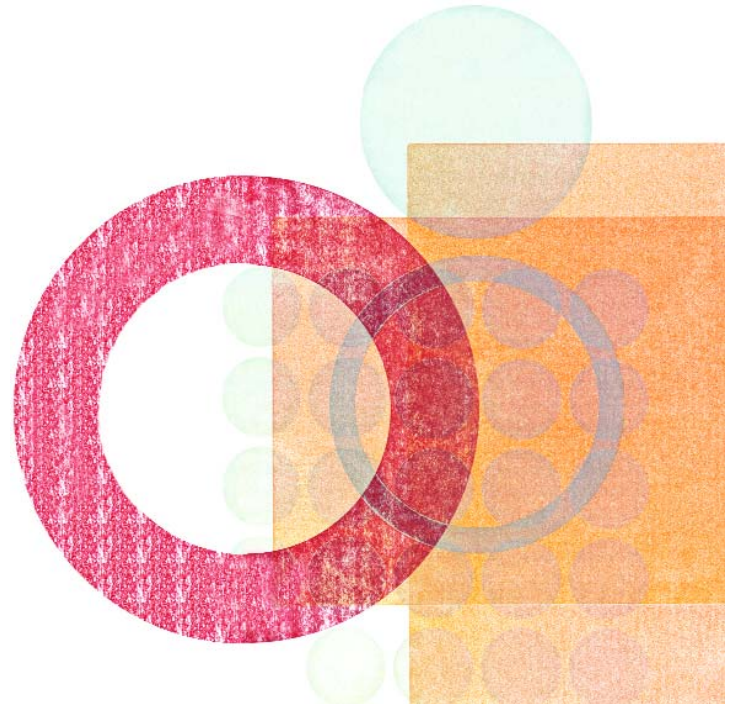


New Build Nuclear: Role in the Energy Mix and Economic Viability

Global Energy Advisors

Ayşe Sabuncu



Company Overview

Ventyx is the leading provider of integrated software, business information databases, advisory products and consulting services to the energy supply chain worldwide.

Ventyx software solutions are the standard of the industry for Market Analysis, Resource Planning & Optimisation, Energy Trading and Risk Management and Generation Performance using a common data framework.

Ventyx Advisors leverages Software and Intelligence and its own expertise to provide advisory services and advanced quantitative analysis of energy markets, assets, fuels and risk.



Ventyx Intelligence delivers energy markets databases (European Velocity Suite). They deliver data for the Software unit models, and Advisors advisory services.

- With approximately 1,200 employees in more than 20 locations worldwide, Ventyx personnel solve complex technical challenges with innovative solutions and deep industry-specific domain expertise.

- We have 900+ clients, and 50+ partners worldwide.

- We offer a broad range of solutions to address our customer's most critical needs, including:

- Energy Operations
- Energy Market Operations
- Energy Trading & Risk Management
- Asset Management
- Mobile Workforce Management
- Customer Care
- Regional Market Analysis
- Asset Evaluation



Global Energy Decisions



Global Energy Decisions

Changes in the nuclear policy, why?

- An important part of the current European energy policy

“Nuclear power is low-carbon, affordable, dependable, safe and capable of increasing diversity”

Source: BERR

Putting Nuclear in Context

- Nuclear provides a potential lifeline in ambitious GHG emission reduction programmes
 - Maintain the reserve margins (security of supply)
 - Maintain a balanced resource mix
 - mitigates major reliance on gas
 - fuel sourced from more “stable” regions than fossil
- Commonly held view - a low cost, low emission alternative
 - no need for reserve support from fossil fuels (under wind)
 - low marginal cost keeps wholesale prices down
 - experience with the technology exists (as opposed to CCS)
- Even the public are warming up to it (a bit)*
 - In 14 EU countries, >50% of the public believe that “nuclear power as a proportion of all energy sources should be maintained or increased” and that “nuclear power stabilises or lowers energy prices”
 - In 8 EU countries, >50% of respondents believe that nuclear power can help to limit global warming
- **BUT significant issues remain:**
 - Waste and decommissioning management and costs
 - Capital cost/construction period uncertainty

* Source: Datamonitor research quoted in www.energy-business-review.com, “Nuclear power could be returning to favour” 15 November 2007

Global Energy's Reference Case Forecast

An independent point of view and standardised approach:

- A fundamental market view based on market supply and demand

- 25-year, long-term view of zonal market prices:

Peak, Off-peak, EFA Block and Hourly

- “All-in” Energy Market Price Forecast:

Energy only (variable cost)

Scarcity Premium (market condition based)

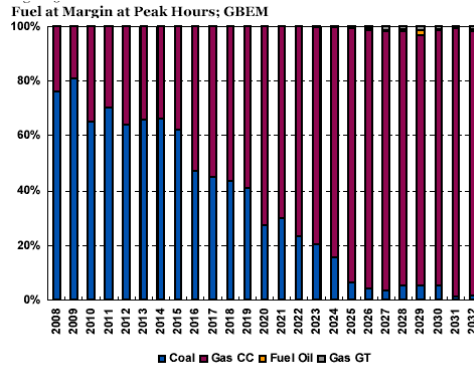
new Capacity market forecast (All-Island market only)

- Expected Price Forecast

Only source of volatility is unexpected unit forced outages

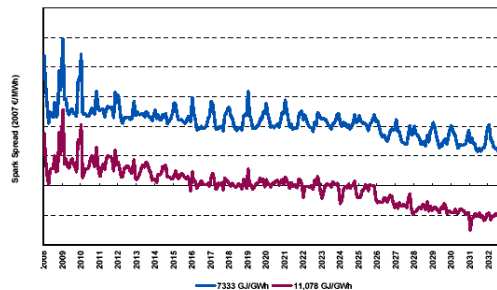
- Fuel and emission price forecasts are provided

- Entire market view refreshed every six months to reflect changing conditions



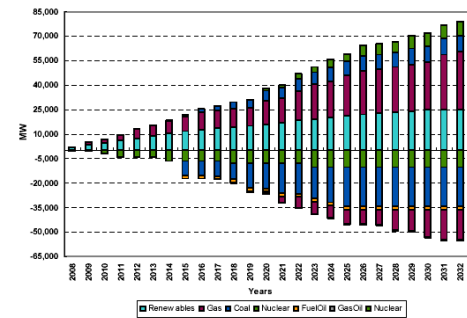
SOURCE: Global Energy

AIEM Clean Spark Spreads



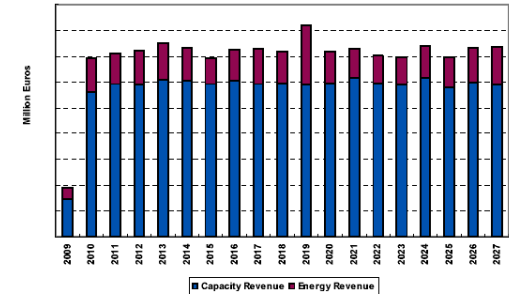
SOURCE: Global Energy

Cumulative Retirements and New Build Capacity Forecasted for GBEM



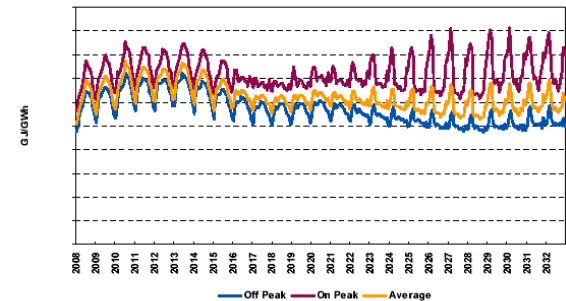
SOURCE: Global Energy

Sample CCGT Energy and Capacity Revenue



SOURCE: Global Energy

Market Heat Rates in the GBEM

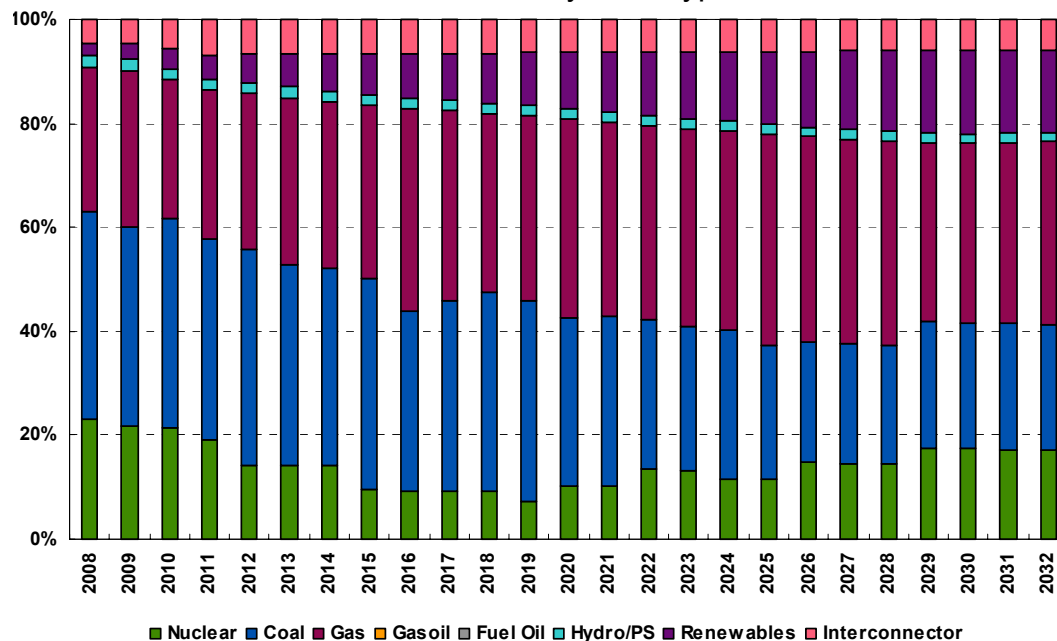


SOURCE: Global Energy

Global Energy Decisions

Reference Case Future Generation Mix - A Balanced View Forward

Great Britain Generation Forecast by Fuel Type



Source: Global Energy

A conservative (?) scenario:

- Retirement of 8.5 GW by 2020 and 11.2 GW by 2032
- 2020 onwards 5 new nuclear plants – 8.25 GW

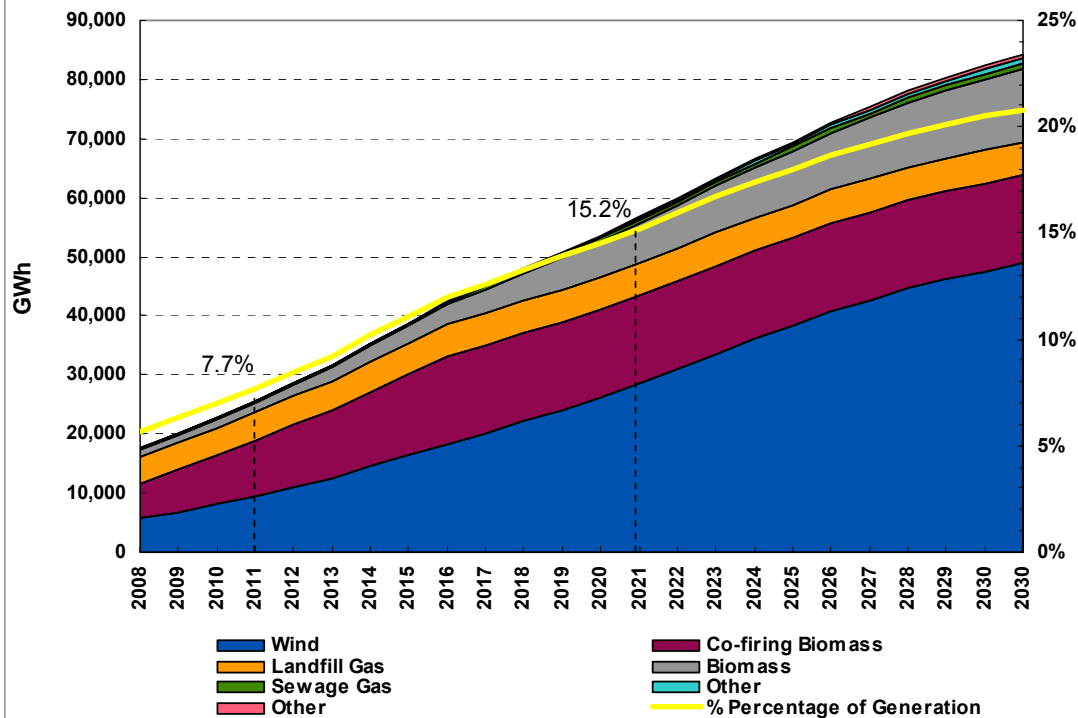
Nuclear – an important piece of “overall” energy landscape.

The % share of nuclear energy reduces from its current 23% share to low 7% by the end of 2019, eventually rising to 17% by the end of study after new build nuclear plants come online.

Possibility to extend lives of existing plants.

Reference Case Renewables Forecast

UK Renewables Generation



Source: Global Energy

The targets 10% by 2010 20% 2020 are difficult to achieve.

Increasing contribution of renewables in energy consumption is another policy piece towards meeting the green challenge.

According to the latest EU policy, UK should provide 15% of total energy from renewables.

The allocation to different sectors is not clear but it is expected that the electricity sector's share will be greater than the old 20%.

CO₂ Emissions

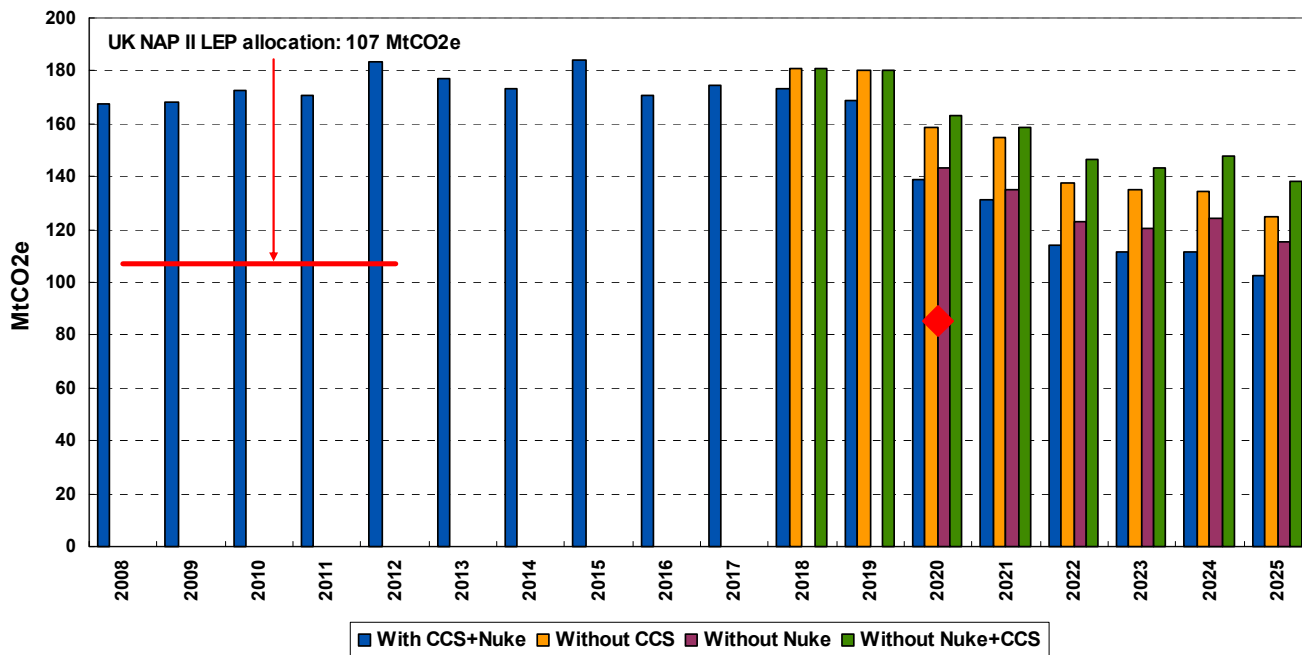
Is 26-32% CO₂ reduction target attainable?

Looking at CO₂ from LEPs:

With 8.2 GW new nuclear and 4 GW new coal with CCS, a reduction to 80-90 MtCO₂ is possible.

CCS – over optimistic? Without CCS LEPs barely reduce their emissions to 100 MtCO₂ NAP allocation.

UK Emissions from Large Energy Producers



Source: Global Energy

Nuclear is necessary but not sufficient in reducing CO₂ emissions.

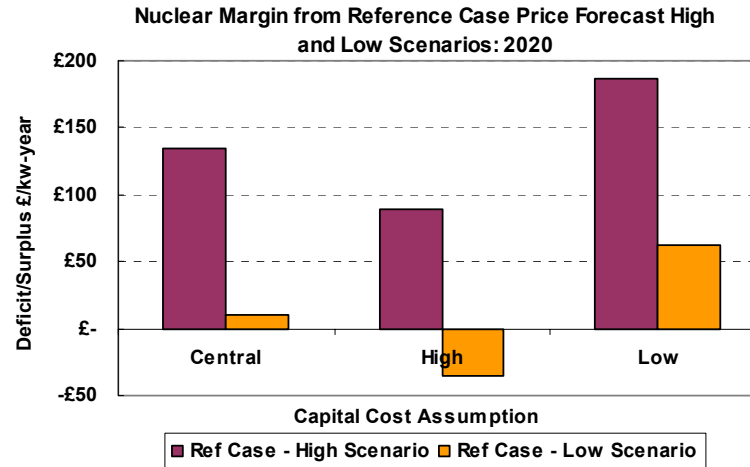
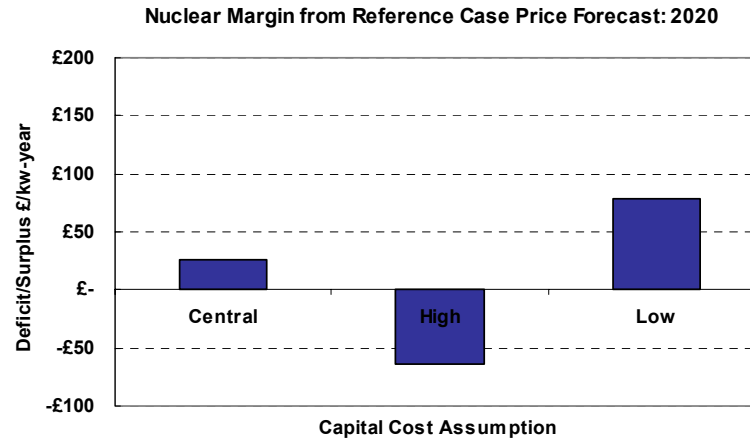
Will Nuclear need subsidy and how much?

The nuclear margins vary significantly depending on the on the levels of the main key drivers: capital cost and discount rate assumptions, as well as emission, fuel cost and energy efficiency.

BERR capital cost estimates of £850, £1,250 to £1,650 kW.

Nuclear might need more than what it can get from the energy market.

£8.7/MWh (£107.7 million p.a.) of subsidy is required under high capital cost & ref case scenario.



Source: BERR Nuclear Cost Estimates;
Global Energy Reference Case Market
Price Forecasts

Levelised Nuclear Costs

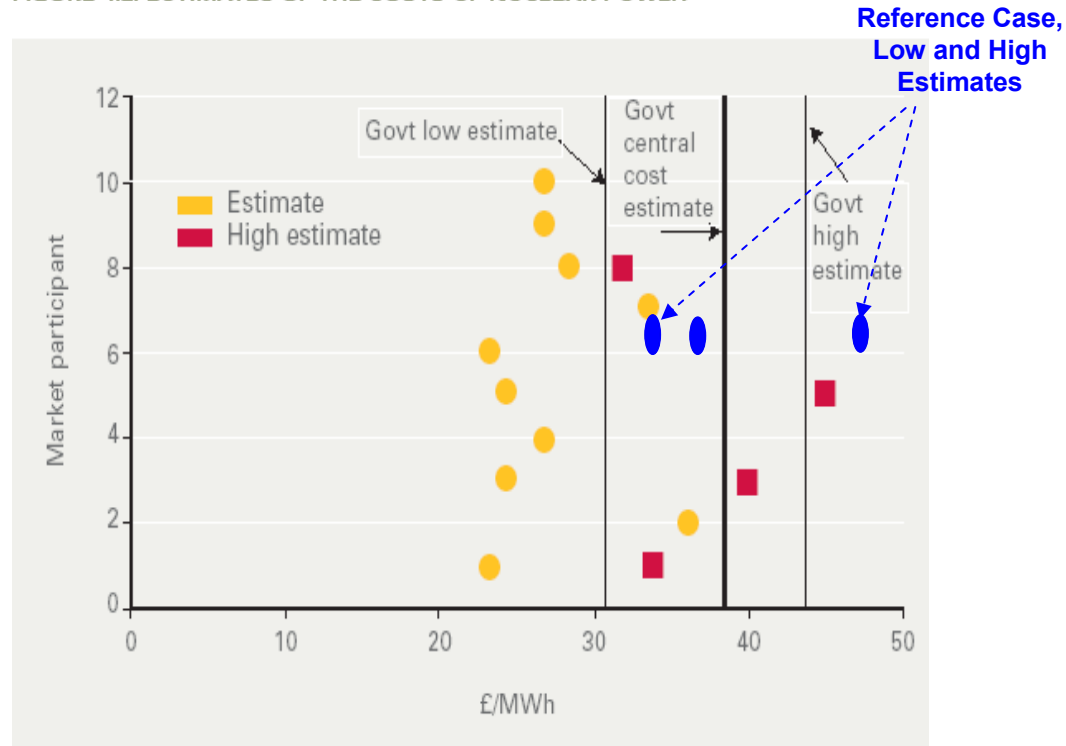
Global Energy levelised revenue (£/MWh) estimates

Other key drivers:

- Discount rate
- Construction period
- Load Factor

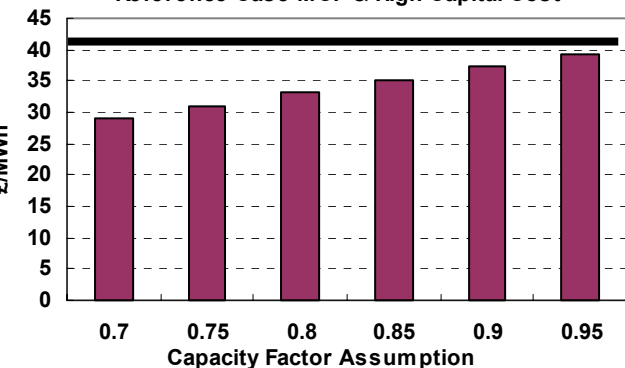
The new build nuclear plant levelised costs are under the reference case average MCP even at 95% load factor.

FIGURE 4.2. ESTIMATES OF THE COSTS OF NUCLEAR POWER



Source: Data from Cost Benefit Analysis

Reference Case MCP & High Capital Cost



Ventyx Events

COMPLIMENTARY WEBCASTS:

- **Advisory** 26 February: Northwest Europe Database Update and Modelling Discussion
27 March: Modelling Renewables in Northwest Europe
20 May: Changes to the Landscape in Southeast Europe - Resource Mix and Ownership
- **Water** 15 April: Latest business best practices to address some of the complex and demanding issues associated with today's business environment
- **Nuclear** 12 February: Key Considerations of Building New Nuclear Plants
11 March: Extending the Life of a Nuclear Plant
29 April: Improving Nuclear Plant Operations

EVENTS:

- **Advisory Workshop:** 24 April - Canary Wharf, Four Seasons, London
- **Water Conference:** 15 May – Heathrow, Sheraton, London
- **Nuclear Conference:** June – Paris

ADVISORY STUDIES:

- **UK & All Island Reference Case**

A detailed long term analysis of these two energy markets. The results include the market clearing prices forecasted for the next 25 years as well as emission and generation volume forecasts.

Details, registration and archive of all events available at:
www.globalenergy.com
Or
www.centradesign.net

Contact:
Shereen Langer
+44 (0) 20 8834 8703
slanger@globalenergy.com