

# UK ENERGY – THE KEY ISSUES

Nigel Hawkins  
Investment Analyst

# Background



- Profound Security of Supply Concerns
- Gas Supply Uncertainties
- Exposure to High Gas Prices
- Carbon Emissions Impact Coal-Fired Plant
- Setbacks for Nuclear Investment
- Fukushima, Olkiluoto and Flamanville
- Renewables' Limitations Exposed
- Subsidy Cuts inc. Solar
- Five Key Points

# 1. Mixed Energy Policy



- General Agreement on Mixed Energy
- With ...or Without Nuclear?
- Rare Case for a Single Fuel Policy
- Re-run of 1960's Wrong Horse – Oil
- Key Factor is Minimising Risk
- Reliability of Fuel Supply and Input Costs

## 2. Major Energy Risks

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- Gas – Input Costs (Up to 70%)
- Gas – Interference to Transport Links
- Coal – Emissions and Constraints
- Coal – CCS Technology is Immature
- Nuclear – Long Time-Lag, Rising Costs
- Nuclear – Chernobyl, Fukushima etc
- Nuclear – Waste
- Renewables – Low Efficiency (<30%?)
- Renewables – Minimal Base-Load/Back-Up
- Renewables – High Subsidies

# 3.New Nuclear-Build



- New Base-load is Crucial
- 2023 Closures (bar Sizewell B)
- Overseas Factors – Germany’s 2022 Exit
- Back-Peddalling Elsewhere inc. Italy
- French Scenario – President Hollande?
- White Paper – Carbon Price Support
- Case for Low Carbon Obligation
- AP-1000 or EPR Model

# 4. Comparative Energy Costs

- Competitive Portfolio is Crucial
- Cheapest Energy Source?
- Assumptions are Key
- Nuclear WACC of 4% + 60 Years = VG
- Nuclear WACC of 10% + 40 Years = VP
- UK Gilt 10-Year Yield is Just 2%
- Nuclear Capital Costs have Risen Sharply
- 5p per KWh, if Low WACC
- Higher Gas Investment by Default

## 5.High Debts of Big 6



- £200bn 10-Year Investment Figure
- EdF, E.On, RWE, Iberdrola, SSE, Centrica
- Combined Net Debts Exceed £110bn
- Major Investment Elsewhere – E.On/Russia
- EdF (>80% Publicly Owned in France)
- E.On/RWE Horizon JV Doubts
- Real Risk of No Nuclear Investors - So?

# Conclusion



- ❑ Real Doubts about UK Banking & Energy
- ❑ Delivering New Base-load is Key
- ❑ Hence, Real Limitations for Renewables
- ❑ Over-Dependence on Gas is Probable
- ❑ Massive Challenge for New Nuclear-Build

# “Reflections on the UK and global energy market”

Economic Research Council Meeting

Monday 9th January, 2011

@

The Royal Overseas League,

Park Place, St James Street, London SW1A 1LR

Michael Laughton, FREng.

*Emeritus Professor, University of London*

# Background

- White Paper, “Planning our electric future: for secure, affordable and low carbon electricity”, July 2011
- The Government’s emissions and renewables targets set out in the Climate Change Act 2008,
- “establishes a long-term framework to tackle climate change. The Act aims to encourage the transition to a low-carbon economy in the UK through unilateral legally binding emissions reductions targets”.
- The aim is to achieve a reduction of at least 34 per cent in greenhouse gas emissions by 2020
- and at least 80 per cent by 2050 (against a baseline of 1990),
- eradicate fuel poverty by 2016; and
- ensure energy security through primarily the development of renewable energy capacity which is to account for 15 percent of the UK’s energy supply by 2020.

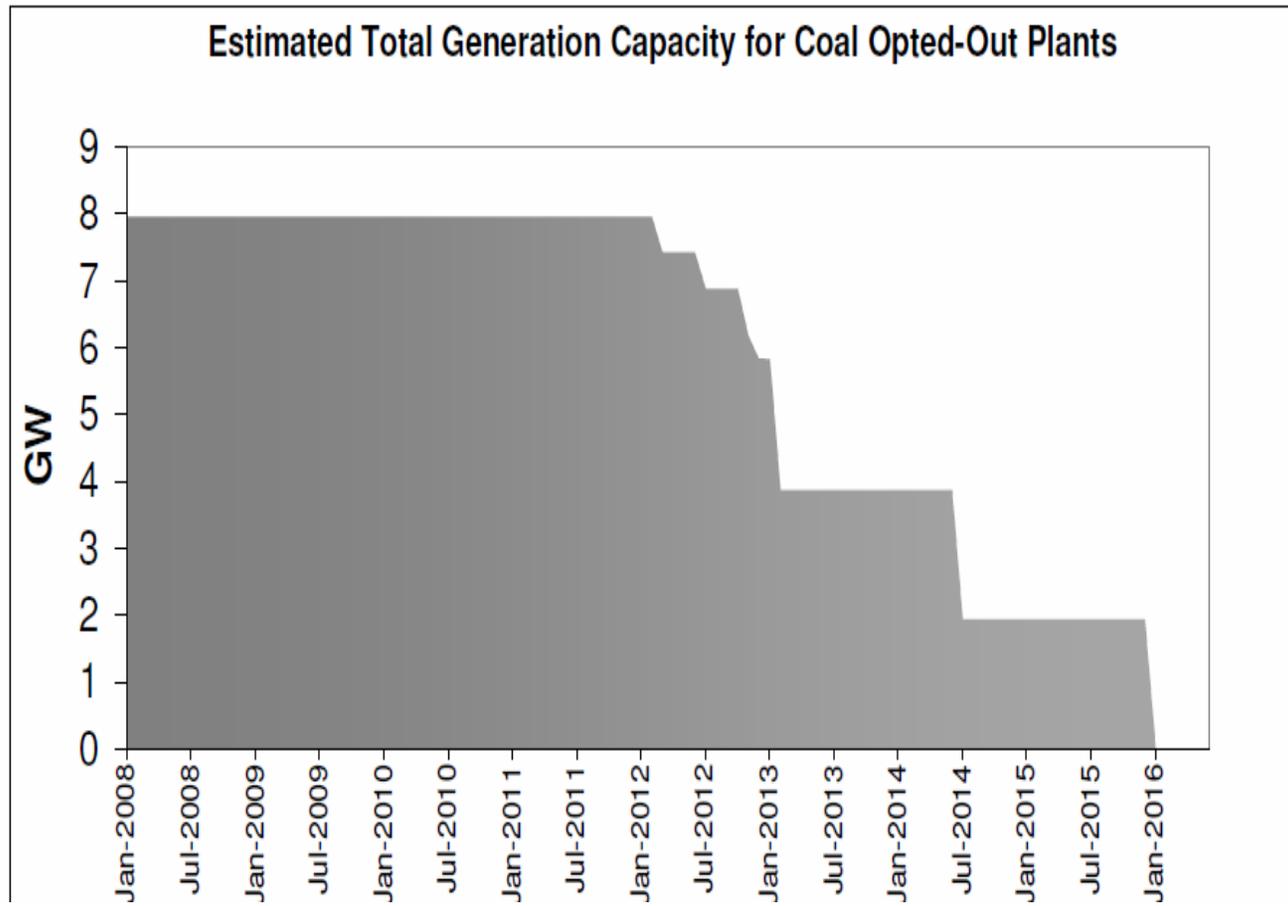
# Electricity Market Reform (EMR)

- NETA was introduced in England and Wales on 27 March 2001 and replaced the Pool trading system introduced by the Conservatives following the industry privatisation.
- The Pool system rewarded both production of energy and production capacity, whereas NETA rewarded only pure energy trades.

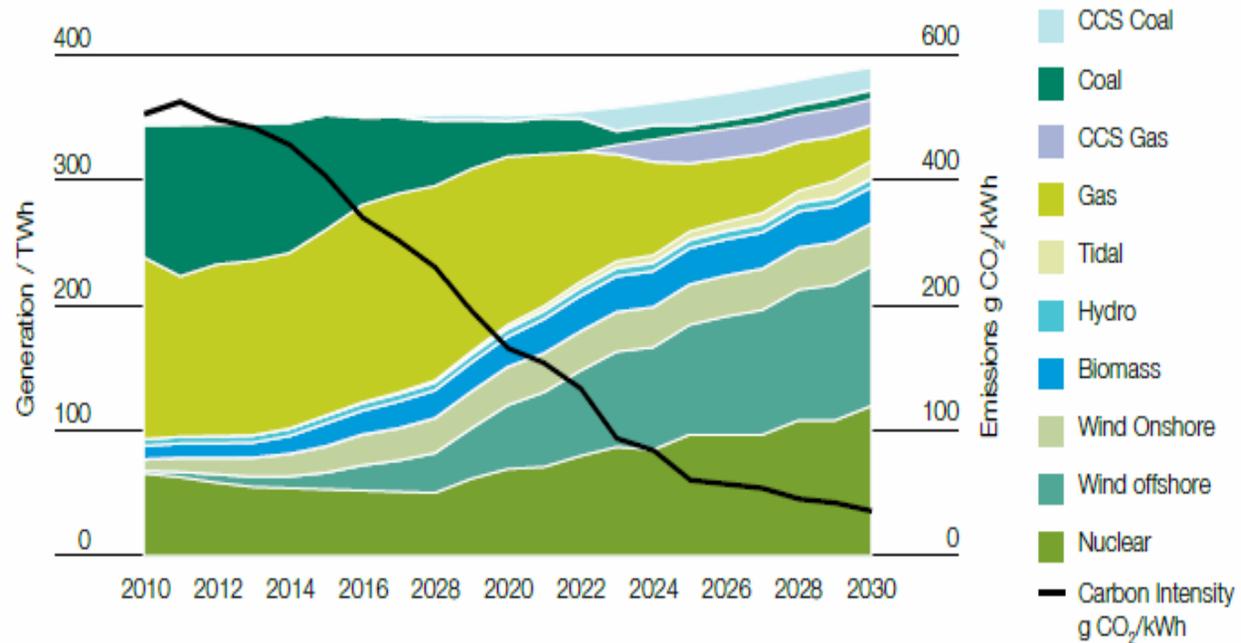
Short term wholesale electricity price reductions followed, but forced fire sales of capacity followed. Many billions of pounds were lost and the nuclear industry had to be nationalised.

- Energy regulator OFGEM in *Project Discovery* realised in 2009 that NETA and its successor, BETTA, are not fit for purpose!
- Radical electricity market reform is needed to incentivise investment in new dispatchable generators, but past financial losses from arbitrary changes to market rules have created caution until EMR is complete.

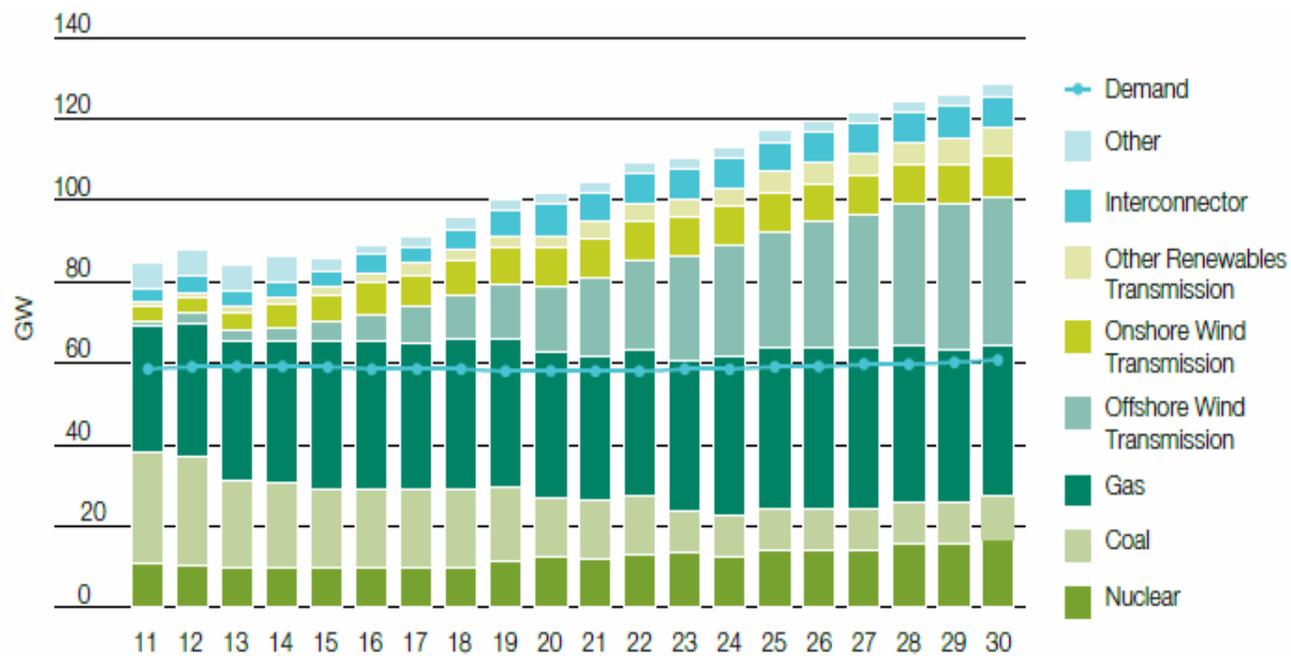
# Indicative LCPD Coal Opt Out Plant Closing Dates



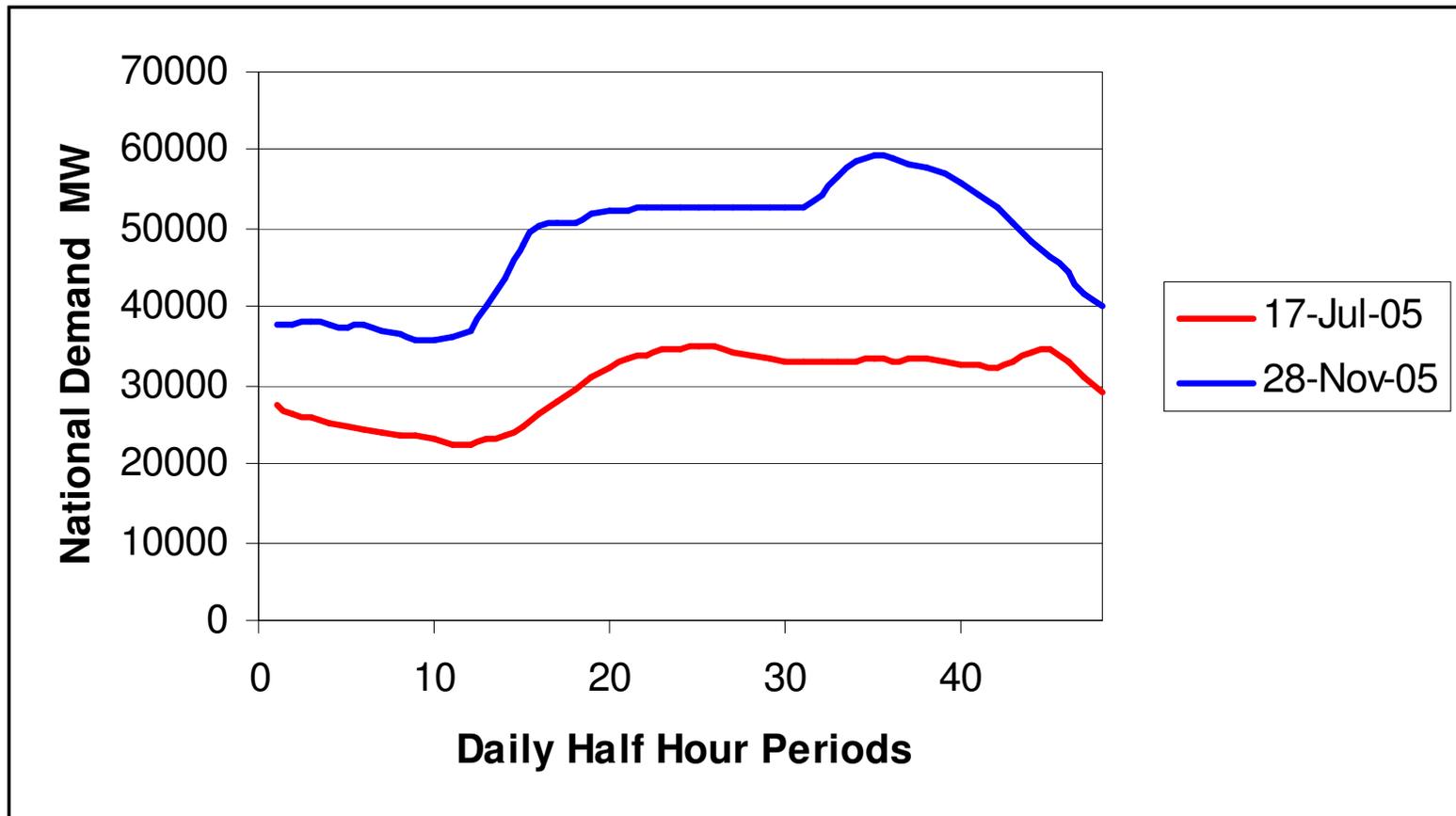
# Generation by fuel type and carbon intensity



# Demand and Generation



# National Grid daily load demand



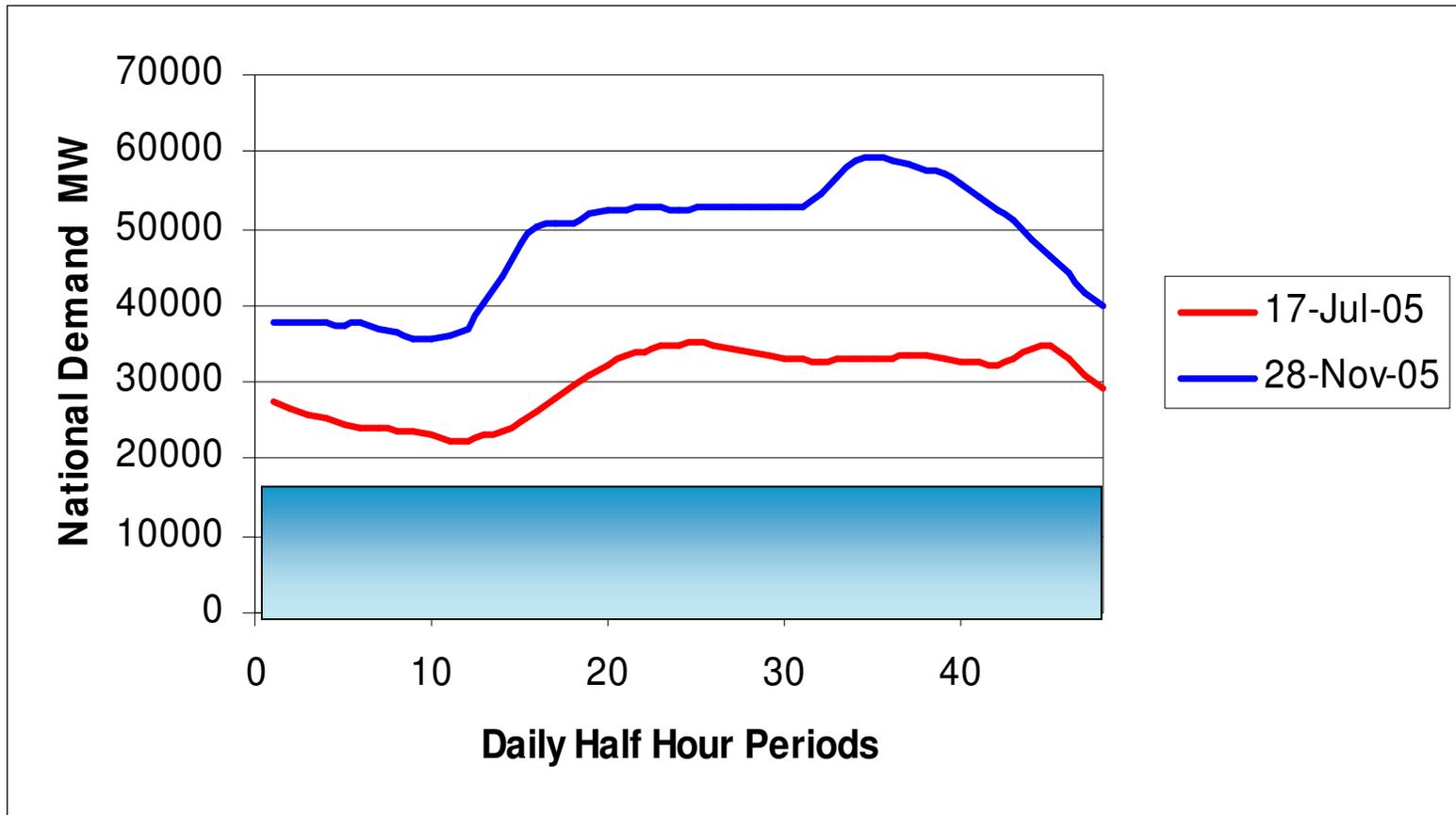
# Wind Generation ?



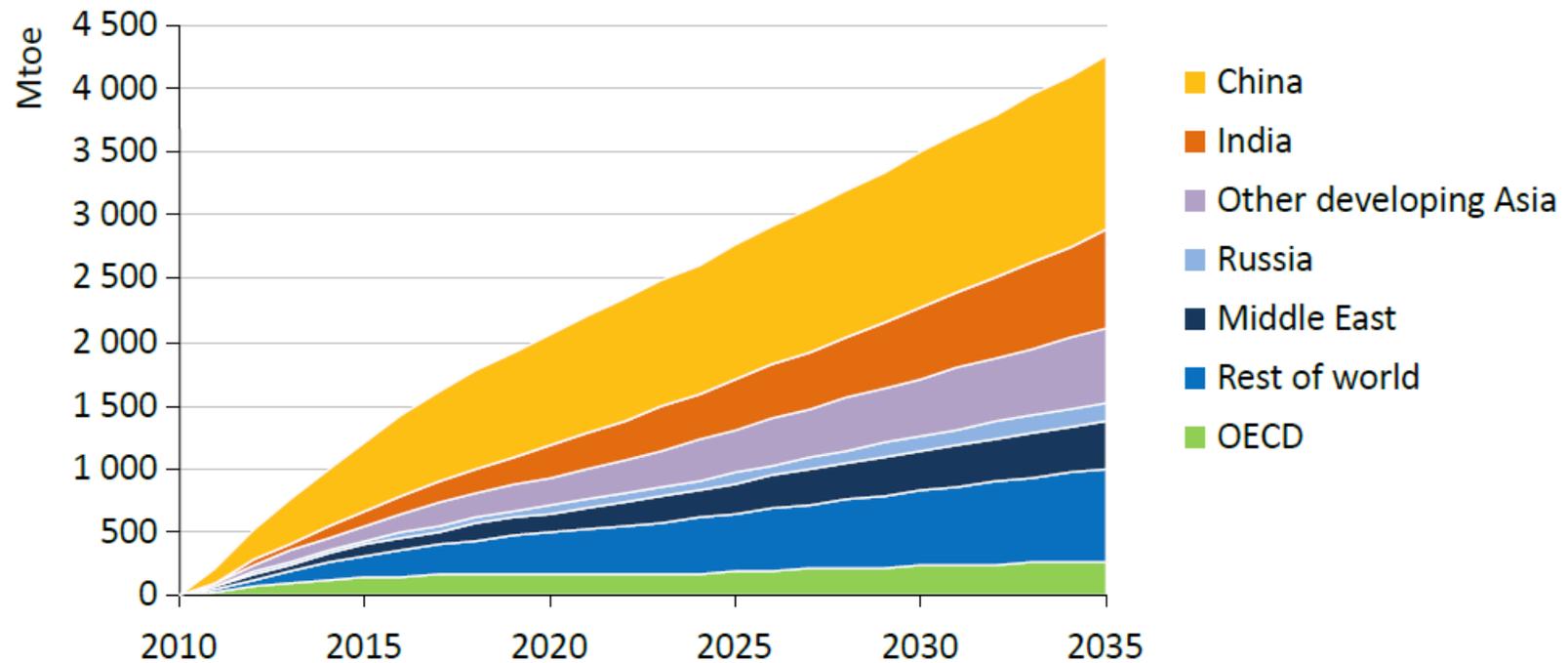
- The conventional generating plant capacity required will always be greater than the system peak load irrespective of the amount of wind capacity installed in the system!
- As conventional plant capacity is retired over the coming years, it will have to be replaced with new conventional plant capacity.

# National Grid daily load demand

Nuclear capacity 17GW in 2030 – NG Going Green Scenario  
Wind capacity 51GW (38GW offshore, 13GW onshore)



# Forecast Increase in Global Energy Demand 2010 to 2035



*Global energy demand increases in mtoe (million tons of oil equivalent) by one-third from 2010 to 2035, with China & India accounting for 50% of the growth (credit: International Energy Agency)*

# Carbon Tax in White Paper

A unilaterally imposed carbon price floor tax of £15.70/tCO<sub>2</sub> in 2013, £30/tCO<sub>2</sub> in 2020, rising to £70/tCO<sub>2</sub> in 2030 in real 2009 prices

Plus the EU ETS which has resulted

- at best in marginal carbon emission reductions,
- is beset by lobbying, corruption, huge profiteering, downright crime [\[1\]](#),
- carbon (and jobs) leakage through the emigration of manufacturing companies plus
- the creation of more fuel poverty.

[\[1\]](#) Crime in the EU ETS is rife, and 90% of all market activity in 2009 was estimated to be criminal by the European Law Agency

– see reference “CO<sub>2</sub>.1- beyond the EU’s Emissions Trading System”,  
David Merlin-Jones,  
Civits: Institute for the Study of Civil Society, January, 2012, ISBN 9768-1-906837-34-1

## Large potential damage to British industry!

# Planning to 2050 – the hard realities

“The scale of the challenges ahead requires sober consideration:

we are contemplating (RAE, IET, IMechE, IChemE, ICE, IofE):

- a seven-fold growth in renewables, constructed at a rate at least ten times faster than recent experience;
- building a substantial fleet of nuclear stations in a half of the time it took the CEGB to plan and build Sizewell B;
- developing and installing the smart grid;
- persuading 70% of the population to drive electric vehicles;
- eliminating gas-fired central heating; and
- achieving active consumer energy engagement to facilitate energy efficiency and smart utilisation.

This is not just one very demanding project – it is half a dozen, each of which has to succeed. The nearest comparable examples of such major effort in the UK would seem to be the redirection and expansion of industry during World War 2.”

# The fundamental responsibility of politicians charged with ministerial roles in energy

First and foremost to beware of *Self Congratulation as a Basis for Energy and Environmental Policy*,

- give priority to human needs over environmental concerns by ensuring the provision of reliable and reasonably priced energy supplies and, secondly,
- the reduction of emissions to a feasible minimum, in that priority and not in the reverse order!

Without reliable and affordable electricity supplies a modern society, as we know it, will not function and no one should underestimate this threat to our physical welfare and economy; therefore the conclusion of the KPMG/ERC Report deserves repetition:

**“We believe that the time has come to re-open the debate on energy in the UK. We simply can’t afford to wait.”**