

# Managing Risk in a Power Generation Company operating in competitive market: Including the role of insurance

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An **RWE** company

- > **Power Generation in a highly competitive market is all about **managing** Risks**
  - > What kinds of risk do we face?
  - > How do we evaluate how big those risks are?
  - > What techniques do we employ to mitigate those risks?
- > **Power Generation in a highly competitive market is not about **minimising** all risks, by minimising risks we would certainly not be competitive**

# Scope of Presentation

- > The UK Electricity Market
- > RWE npower UK Portfolio
- > Types of Risk we Face
- > Management of Reliability Risk
- > Decision Support Tools
- > Risk Based Engineering
- > Managing Market Risk
- > The Role of Insurance
- > Conclusions



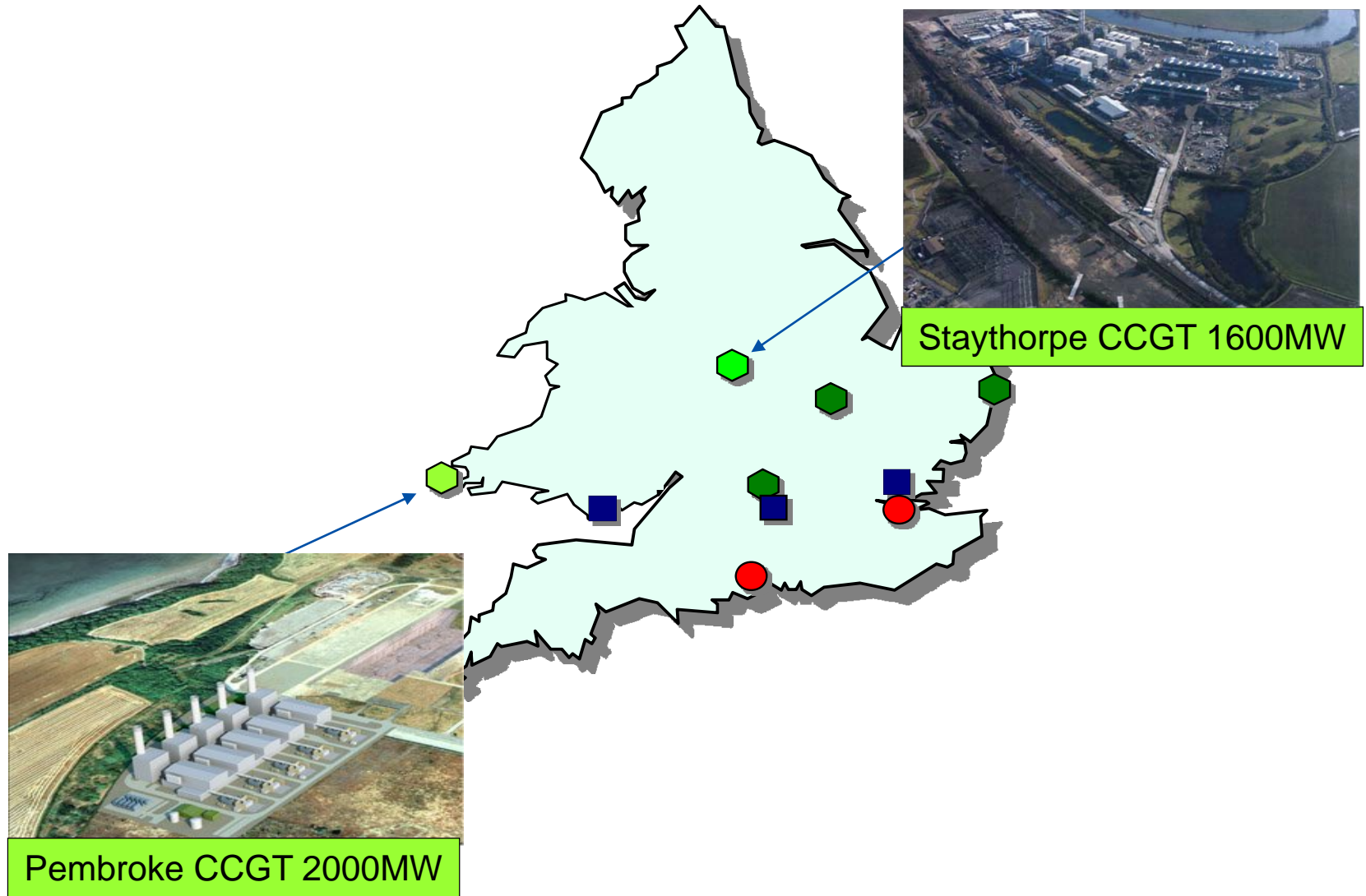
# The UK Electricity Market

- > A highly competitive market with 6 major vertically integrated companies and a number of other generators.
- > An island market with limited scope for import - results in a high degree of volatility as the supply/demand margins change over time- both short term and in the longer term
- > A market which ruthlessly exploits the economics of power generation with each generating unit treated separately according to the market rules- means that all generating capacity has to be remunerated (or it won't exist)
- > Poses a challenge for commercial risk management as the value of future capacity is difficult to predict, both in terms of the value in maintaining high plant availability and in terms of likely future business interruption due to breakdowns

# RWE npower Main Plant Portfolio



# Sites Under Construction



# What Sorts of Risk do we Face in Commercial Operation of Power Stations?

- > **Safety Risks:** Process, Safety from the System and General Safety
- > **Compliance Risks** - especially environmental
- > **Plant Reliability Risks**
  - the risk that the plant does not deliver the required level of availability when called to generate:
    - Core breakdown rate - day to day events
    - On Load losses - not able to achieve required generation level
    - Major Breakdown Risk - any breakdown of more than 14 days duration
- > **Repair Costs risk** of major breakdown
- > **Market Risk:** the risk that market prices are high at a time of plant breakdown



# Reliability Risk Management





# What level of Reliability Risk should we take?

- > Specific process safety risks related to reliability have to be reduced to a level 'as low as reasonably practicable'
- > All other risks have to be managed to the right level - not necessarily minimised - a no-risk approach is not feasible in a competitive market
- > Management of plant reliability risk is achieved through plant maintenance and investment
  - Assuming that all the basics are in place such as high levels of plant operator competency and rigorous standards which are followed
- > So when planning maintenance and investment we need to relate the plant risks to future levels of performance and spending - '**Risk Based Engineering**'

# What is Risk Based Engineering?

- > Developing maintenance investment strategies based on risk assessment, not purely on OEM recommendations and standardised approaches.
- > Deciding on the overall levels and proportions of investment targeted at improving the different aspects of reliability:
  - Core reliability - breakdowns that happen many times in one year
  - Major breakdown reliability losses due to 'once in a lifetime events'
- > Having an overall portfolio strategy which reflects the relative commercial value of generating units
- > Using low investment risk management strategies where appropriate, for example based on increased plant inspection.
- > We use risk based **decision support tools** to devise these strategies.

# Decision Support Tools

- > Market conditions are always changing in a competitive market so analysis of historic information is not a good guide to future strategy.
- > Npower use two forward looking tools to support and justify maintenance and investment decision making at a plant or fleet level:-
  1. Plant Life Usage System 'PLUS' which assesses the condition of plant system by system and benchmarks that condition against overall levels of plant reliability and level of maintenance spending.
  2. Engineering Risk Assessment Process 'ERAP' which assesses the severity of major plant risks in terms of safety, repair cost and plant availability loss.
- > Results can be used at various levels, from entire portfolio to individual plant system

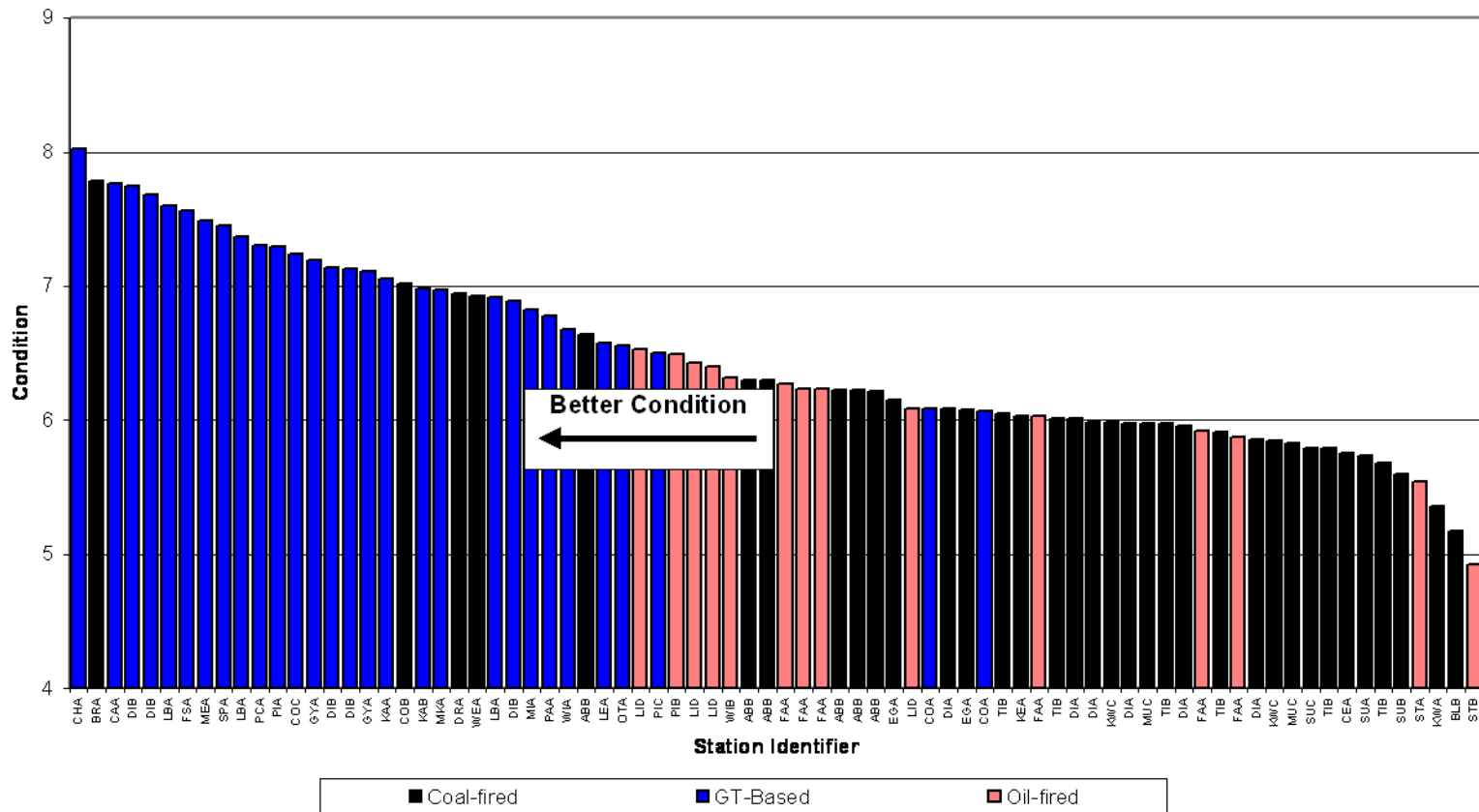
# 'PLUS' Condition Assessment

- > Uses a systematic benchmarking process to assess the condition of a plant, system by system. Delivers a 'condition score' for each system and for the whole plant.
- > Uses the premise (now proven through repeated assessment) that the condition of a plant sets the expected level of plant performance, particularly 'core' reliability – the day-to-day reliability of the plant.
- > Condition degrades with plant operation and time, the rate being dependent also on the level of maintenance spending.
- > Condition can be improved through plant investment.
- > The ideal condition is not as high as possible, it depends on market conditions, in particular expected load factor and value of reliability:
  - For example the ideal condition for a peaking plant operating in a low price market is lower than that for a base load plant operating in a high price market
  - The justifiable maintenance spend on that peaking plant will also be much lower.

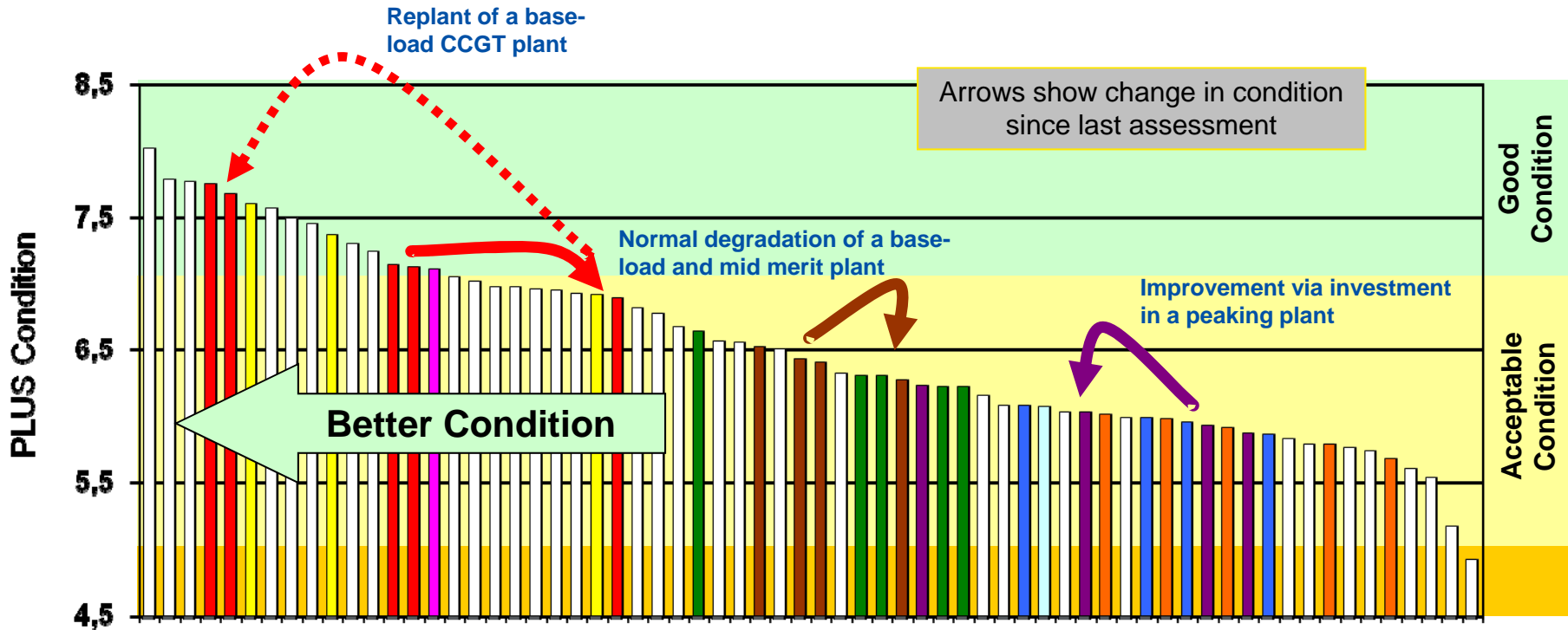
# PLUS Condition

Uses a scale of 0 (inoperable) to 10 (New and Flawless)

PLUS Condition All Plants

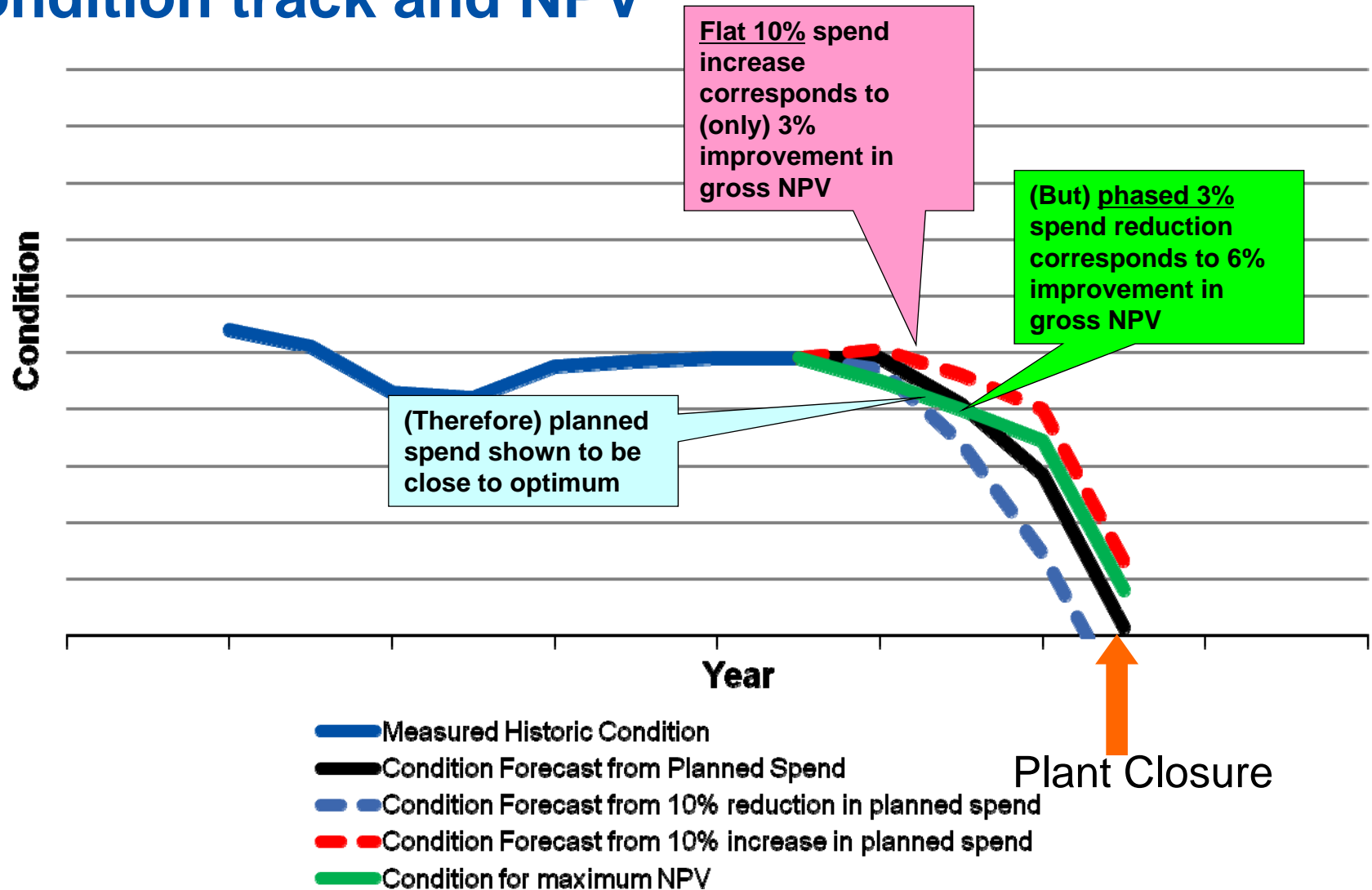


# Use in Investment Planning



- > Better Condition = Higher Reliability
- > Higher Reliability has a value dependant on market conditions

# Example: impact of level of investment on future condition track and NPV



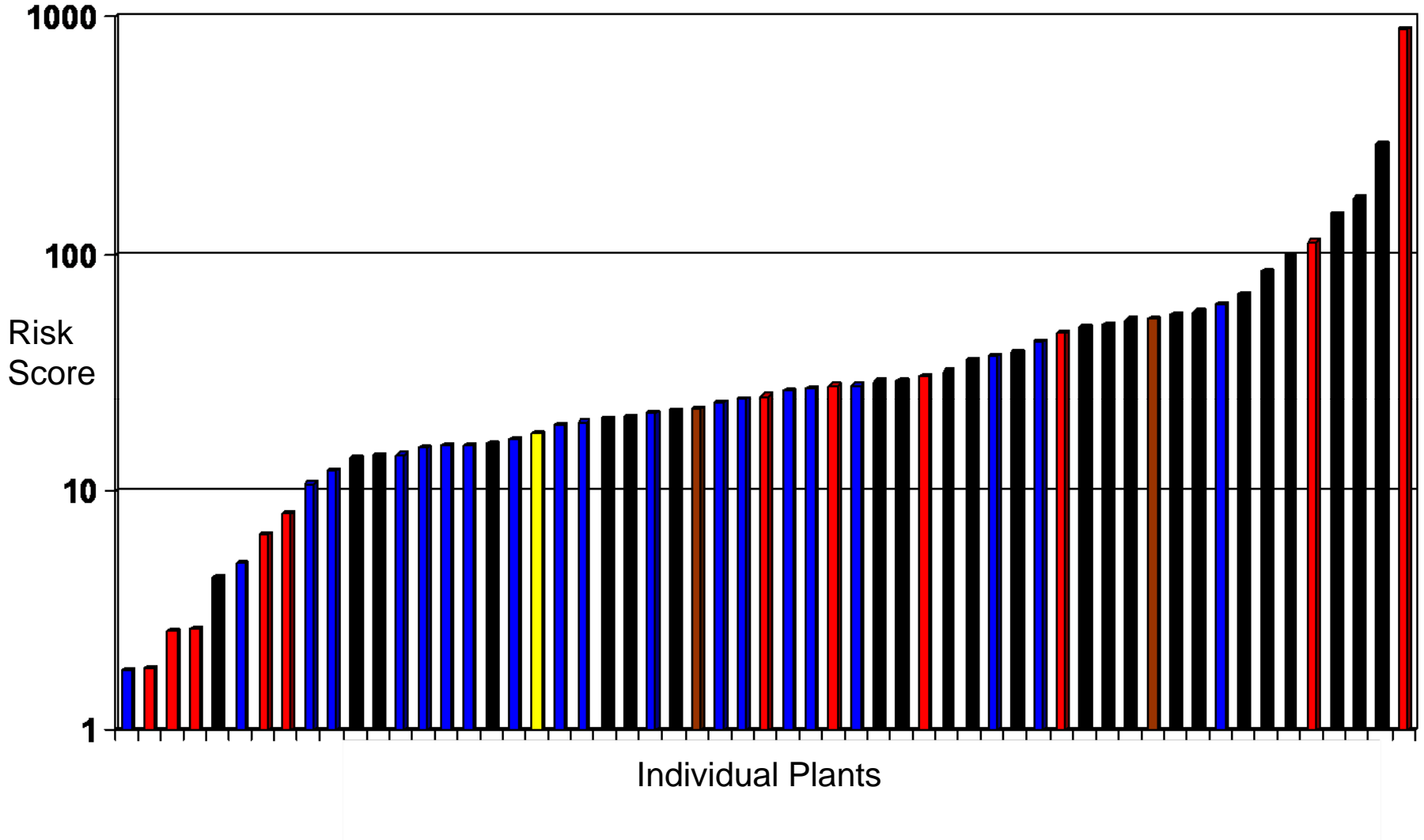
# Engineering Risk Assessment Process (ERAP)

- > Assesses severity of major engineering risks arising from potential technical faults or breakdowns in terms of:
  - Safety Risk – particularly Process Safety
  - Reliability and Repair Cost Risk
  - Environmental Risk
- > Considers not only the inherent risk level but also the effectiveness of risk management
- > Provides a snapshot of the overall risk at a point in time, not an assessment of condition, focussing on major breakdown risks.
- > Gives data at Plant or Individual Risk area level.
- > Allows comparison of plants and areas within a plant to focus investment.





# Overall Availability Risk Comparison

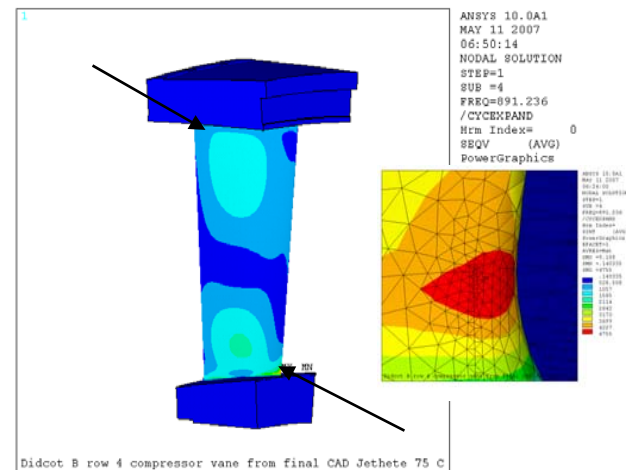


# Value in using Assessment Tools like these

- > Allows the holistic approach across systems in one plant or across a portfolio of plants.
- > Allows a forward look at possible investment scenarios with an indication of best value.
- > Puts engineering risk and plant condition into a language that 'Company Executives' can understand!
- > Condition and risk assessment post investment provides an indicator of expected benefits which is robust to changes in market conditions etc.

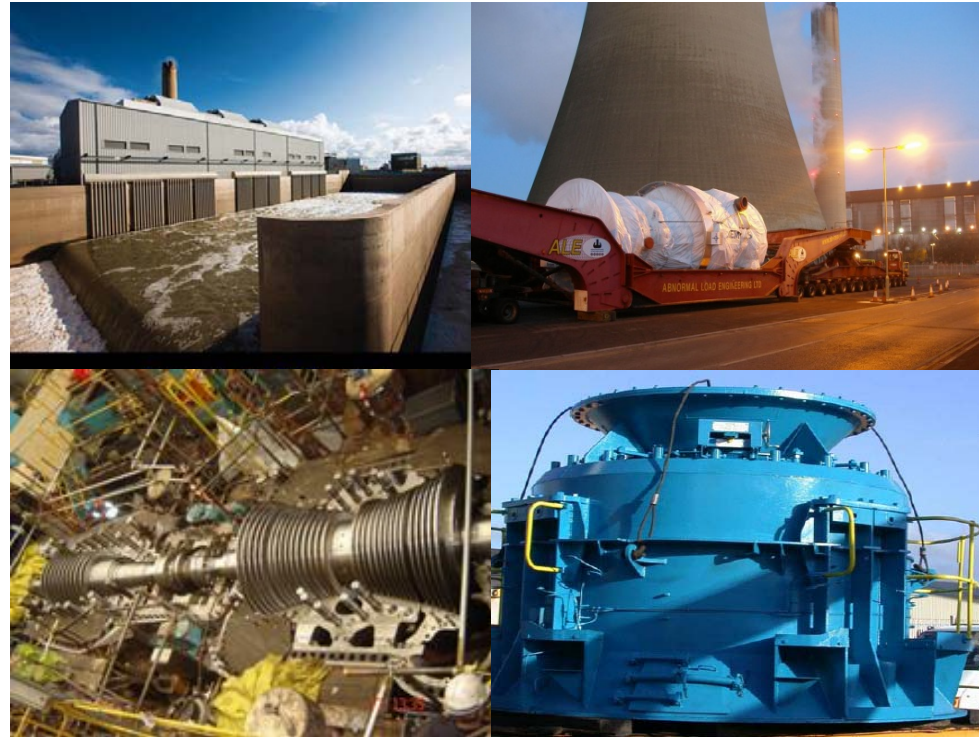
# Risk Based Engineering: In Practice

- > A key feature of our maintenance strategy.
- > We make our own judgments on maintenance intervals and scope, based on, but not always, following OEM recommendations.
- > We are comfortable with re-engineering major components where we can gain a cost or performance advantage.



# Examples of Recent Plant Investment

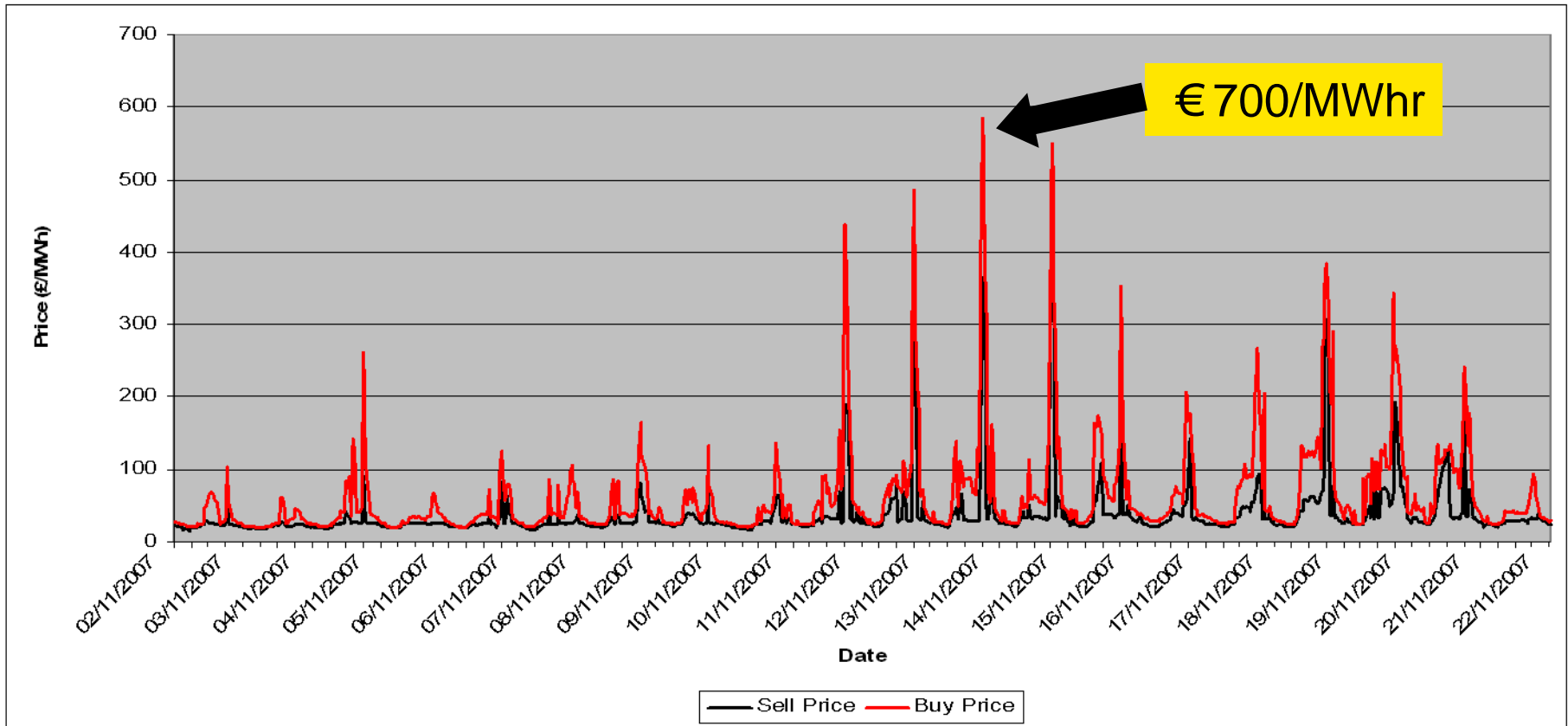
- > FGD - £200M
- > Steam Turbine Re-Plant - £60M
- > Gas Turbine Re-Plant - £60M
- > Coal Fired Boiler combustion upgrade - £16M



RWE npower invested around £350M between 2005 and 2008 in improving the condition of its existing plant. This is in addition to investments in environmental improvement and new capability.

# Managing Market Risk

## UK Electricity Market short term price volatility



> A price of €700/MWh means losing €350k in one hour through breakdown of a 500MW Unit

# Risk Management through Hedging

- > The UK market doesn't enable self balancing so holding spare capacity to cover breakdowns is not an option.
- > Management of plant reliability is therefore of key importance. In addition we need to mitigate the commercial impacts where possible.
- > The route adopted by npower is:
  - Predict as accurately as possible well in advance the most likely risk of breakdown, including a profile of the duration of breakdowns.
  - Take out power and fuel hedges to match that level of breakdown.
  - Release the hedges back to the market according to schedule running up to real time.
  - The value of release should mitigate the cost of breakdown so long as the overall level of breakdown is near to that predicted.
  - This process can't make breakdowns free of charge but it can level out the risks of a breakdown coinciding with a peak in prices.
  - Major Breakdowns are most difficult to cover in this way as even in a portfolio the size of npower's the rate of breakdown across the fleet varies considerably from year to year.

# The Role of Insurance

- > We manage our levels of risk through risk based engineering and maintenance strategy, combined with commercial hedging strategy.
- > We act as if uninsured when developing these strategies.
- > Where these strategies are most challenged is in the management of both the repair costs and commercial losses associated with major breakdowns:
  - We can't anticipate every eventuality in our maintenance approach;
  - Hedging to cover commercial loss of the worst possible event in a year would on average be dramatically too much.
- > So our insurance strategy is about providing cover for major breakdown risk - either in plant repairs or lost generation:- 'business interruption'.
- > A key aspect is in maintaining stable earnings:
  - Slow settlement of claims does however dilute this benefit;
  - Settling on a projected costs basis could be appropriate in some cases.

# Key Relationships with our Insurers

- > We don't want insurers to tell us how to manage our business.
- > We share our major engineering risks with insurers as soon as we know them.
- > We must take them with us in taking major risk based engineering decisions, e.g. re-engineering.
- > We're happy to receive insurance surveys and act on the results
  - Some survey recommendations are however quite out of proportion to the risks, especially for old plant which is approaching closure



# What could Insurers do better for us ?

- > Sharing of major risk information based on claims from other companies:
  - In a highly competitive market companies do not as a rule share such information unless there are safety implications;
  - OEMs are often reluctant to give details of major breakdowns;
  - Sharing via insurers should reduce overall risk levels - and hence premiums.
- > OEMs often make costly recommendations which insurers push us to follow - better understanding needed of OEM motives.
- > Insurers could have a role in promoting sharing of major strategic spares - again reducing overall risk levels.
- > Speed of claims settlement - could claims be settled on a projected basis more often?

# Conclusions

- > There are a whole range of risks associated with operating power plant in a highly competitive market.
- > To be successful we need to manage those risks - not reduce them to a minimum in all cases.
- > We employ a range of techniques to manage those risks based around plant maintenance and commercial hedging.
- > Insurance plays an important role in mitigating the impacts of major breakdown risks.
- > Insurers may be able to play a more active role in sharing major risk information between power generators.