Progressive Energy

Financing a First of a Kind CCS Project based on IGCC

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Agenda

- **The Market Opportunity**
- The Technology
- Economics
- Financing

The UK Electricity Market

- Requirement for new generating capacity over next decade is around 15GW
- It is unlikely that excess capacity will be built over this period and therefore market will be structurally short and remunerate new entry
- Carbon Market now working but policy position and price confidence post 2012 is still uncertain
- Carbon Capture and Storage firmly on the agenda of clean energy options

Strategic Issues for New Capacity

- Fossil fuel prices likely to remain firm in the medium to long term
- Governments determined to significantly reduce CO2 emissions from current levels
- UK will be importer of gas so a mix of fuel sources and supply will provide best risk mitigation against supply and price risk
- EUTS in place but still uncertainty about long term policy and hence price stability

The UK has a large technical capability for geological CO_2 storage (Mte CO_2)

- North Sea has a large potential for storage of CO2
  - End of life Oil Fields
  - End of life Gas Fields
  - Aquifers
- A considerable proportion are available for CO2 capture in the UK
- CO2 storage and the possibility of Enhanced Oil Recovery are options for UK CCS projects

Full potential of UK storage could accommodate lifetime production of CO_2 from 100GWe of coal plant

CCS in UK has best chance of Success

- UK market needs new clean power stations
- Climate Change high on the agenda and CO2 capture likely to be rewarded
- Readily available storage for CO2 at acceptable cost
- Opportunity for Enhanced Oil Recovery

The UK has an excellent market climate for CCS to work and presents a major opportunity

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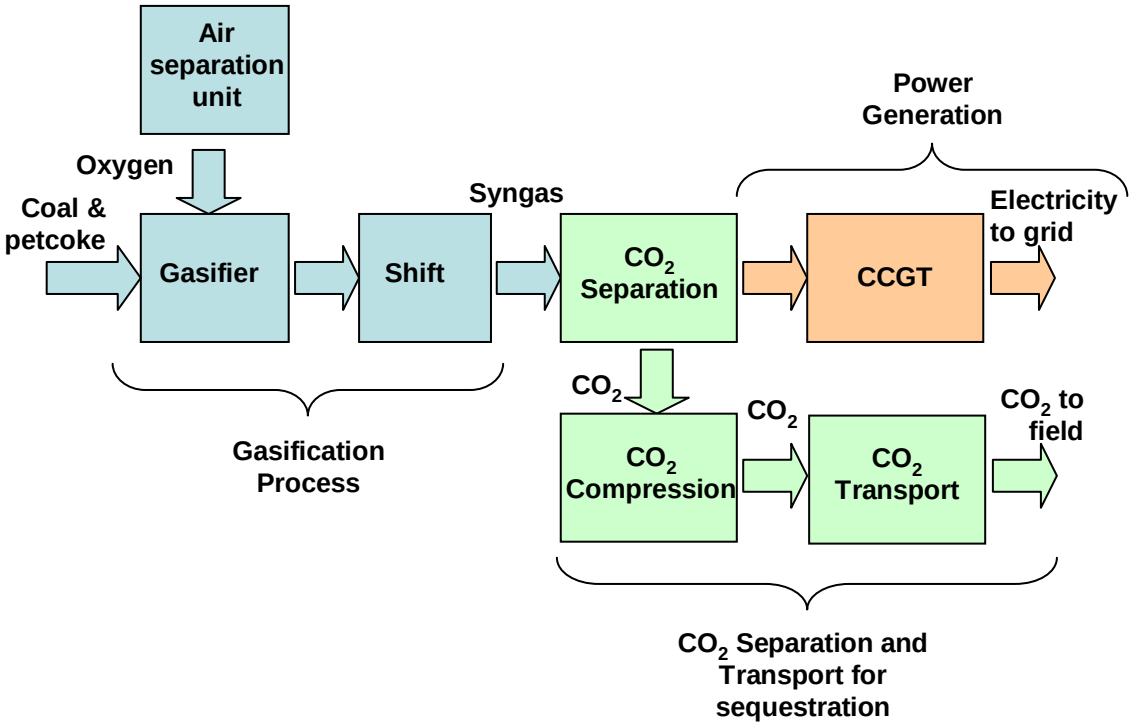
IGCC Technology

Optimised design - proven technology



Global Experience

- 160 commercial gasification plants
- 4,000MW IGCC (16 plants)
- >25m tonnes p.a. CO_2 reinjected in US
- 1,600km of CO_2 pipeline

IGCC Technology Risk

- All major components are proven at the scale
  - Gasifier
  - Gas separation plant
  - Gas Turbine burning Hydrogen
  - High Pressure CO2 pipeline
  - CO2 Storage

Key residual technical risk is system Integration

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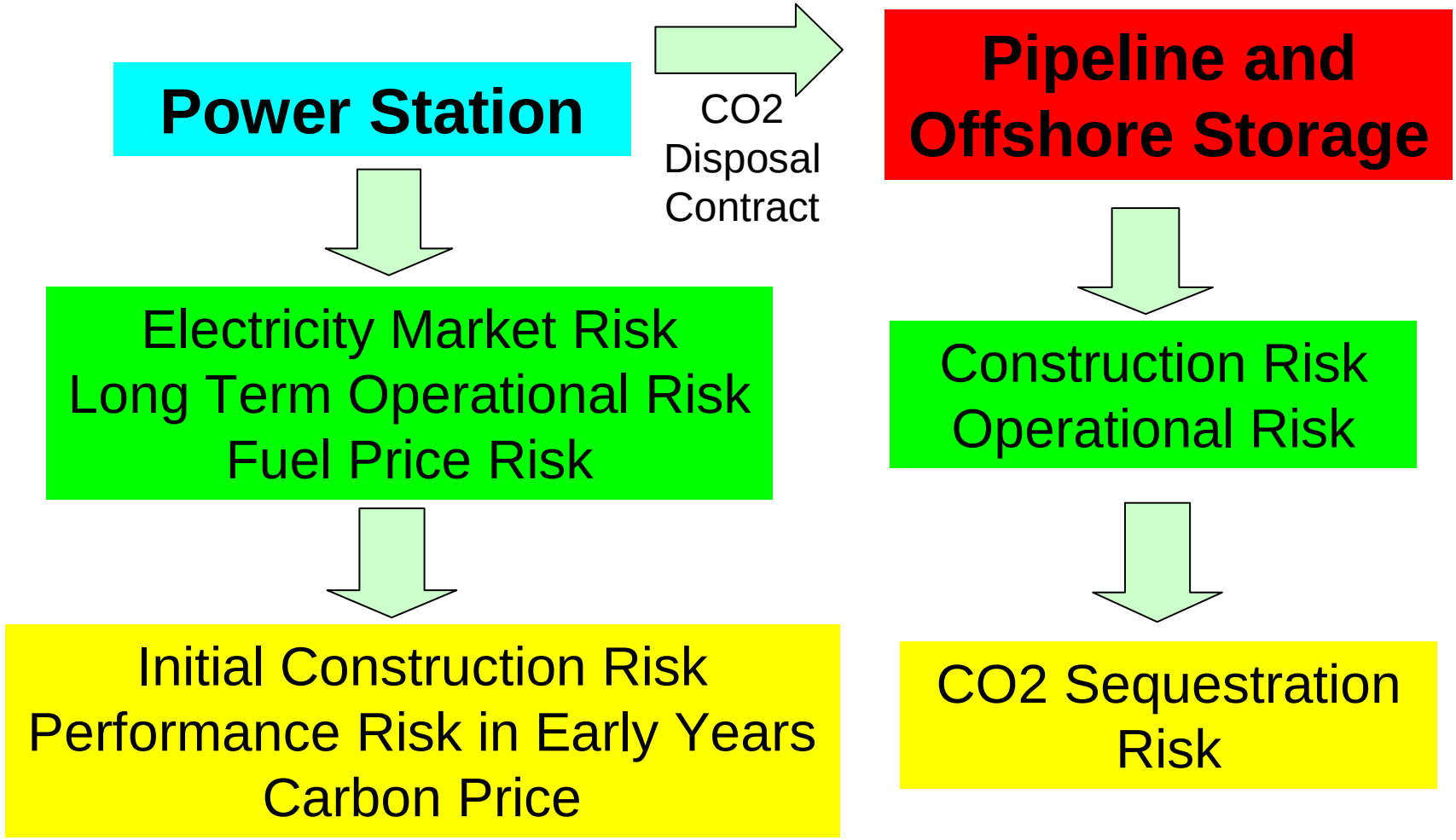
New plant options: Plant relative Economics

- Only the lowest cost new entrant plant will be remunerated
- Gas CCGT will tend to be default option together with some new coal fired plant based on supercritical plant design without CO2 capture
- Base load operation is preferred for new entrant plant and low short run marginal cost is important
- The present uncertainty over post 2011 implementation and future CO2 price creates difficulty in making investment decisions on CO2 reducing plant options that lock in cost of CO2 reduction
  - Unless long term CO2 prices can be confidently assessed in excess of £20 per tonne there will be minimal impact on technology choices
- Renewables will be built as they are supported with ROC's

IGCC with Carbon Capture – A Possible Risk Allocation



The Basic Economic Factors

- To make IGCC with CO2 capture comparable with other New Entrant costs current estimates indicate that a CO2 price in excess of £20 per tonne is required. This level of remuneration covers the capital and operational costs of capture, CO2 transport and sequestration
- Without such support the economic choice will be plant without CO2 capture
- Additional support will be needed to cover the first of a kind risk on construction and commissioning:
  - After experience these risks can be eliminated from future decisions

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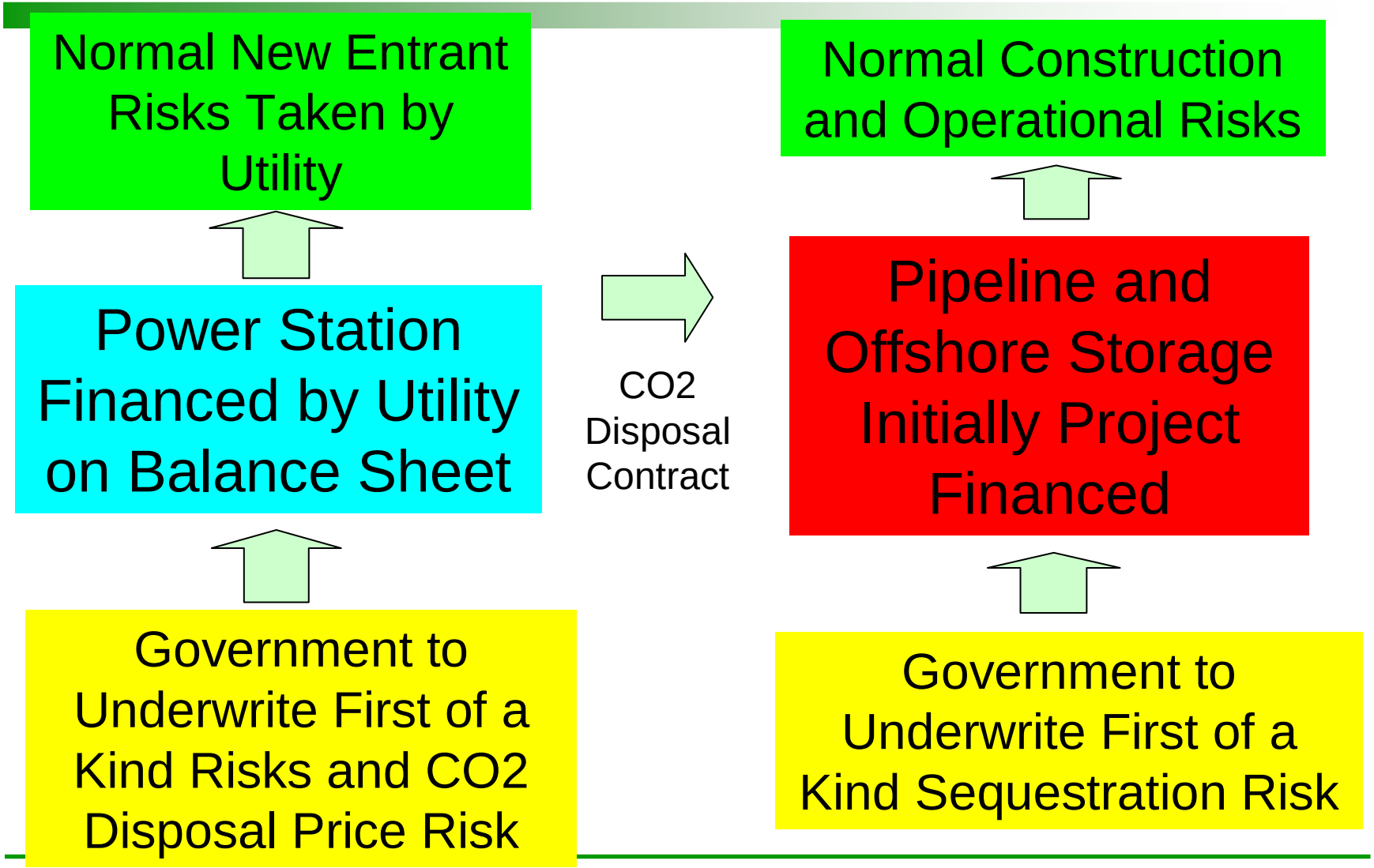
Power Station

- New Investment in the UK Power market will be dominated by large integrated players with large Balance Sheets
  - A natural consequence of a capital intensive industry
  - Portfolio players have more option value than single plant owners so should have a competitive advantage
- New Power Stations are therefore best financed on Balance Sheet as merchant plant
  - There is no reason why large players should give PPA's unless they can access projects otherwise unavailable to them
- Default new build will be CCGT's and Supercritical Coal without CO2 capture
  - As long as all players have a similar portfolio fuel and CO2 price risk will be passed to the consumer

Offshore Pipeline and Storage

- Sources of revenue are from:
  - Power Station that pays for it's CO2 disposal
  - If pipeline and storage are over sized for the first project then there is opportunity to dispose of CO2 from additional sources – eg other new Power Stations
  - Also the possibility Oil Field owners with CO2 to Enhance Oil Recovery can be explored
- Initial contract will be credit worthy if the Utility is the owner of the Power Station
- Offshore project could therefore be project financed with a mix of debt and equity in this model
- Could also be financed by Power Station owner on Balance Sheet

A Financing Model under Consideration



Conclusion

- Power Station is most likely to be best funded by Utility on Balance Sheet with sufficient support from Government to cover first of a kind risk and cost of CO2 removal and disposal
- Power Station owner would likely require a contract for the disposal of CO2 by pipeline to offshore storage facility. This is paid for by the support given to the Power Station owner to cover the costs of CCS
- If Offshore Company is separate it may elect to build in more capacity to provide CO2 disposal to others. This additional cost would likely be equity funded. This could be re-financed with additional debt as additional CO2 disposal contracts are finalised.
- Entire structure is dependent on adequate support from Government to cover the risks over and above default new entry investment risks