



# Financing CCS Projects

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26 February, 2007

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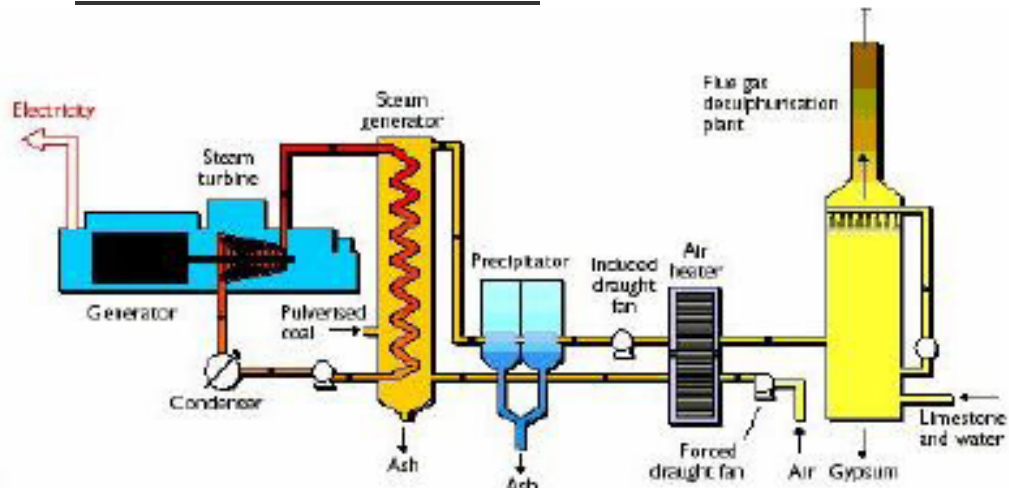
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Climate Change **Capital** 

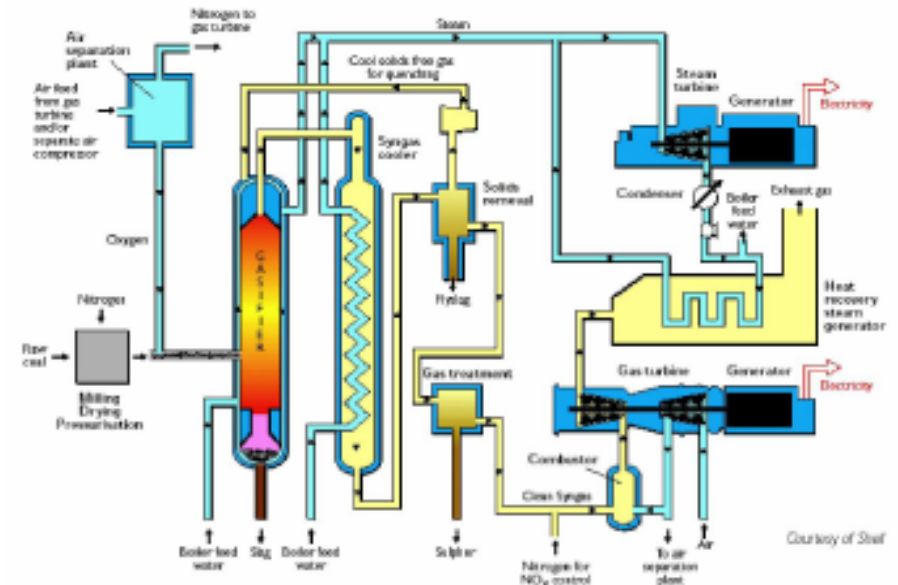
# New Build Coal Plants

## Supercritical pulverised coal boiler/steam turbine 400-10000MW



- Up to 46-47% efficient
- Can match IGCC for emissions
- CCS possible

## IGCC 500MW+



- 3 plants in operation on coal and 3 demonstration plants in the US to come
- Still relatively high cost

At what carbon price is CCS economic?

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**Around €25-30/tCO<sub>2</sub>e for coal?**

But far lower if you can use the CO<sub>2</sub>

# Difference Between Economics and Financing

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Economics  
Is it conceptually possible?

- Is it a positive NPV under-taking?
- Are all the component parts economically viable?
- Does it meet a reasonable cost of capital?

Financing  
Can you raise the money?

- Are the risks correctly allocated?
- Are risks well managed?
- Is the capital structure right?
- Is there investor appetite?
- What does the asset-class look like?

**Issues in clean coal exist in the gap between economics and financing**

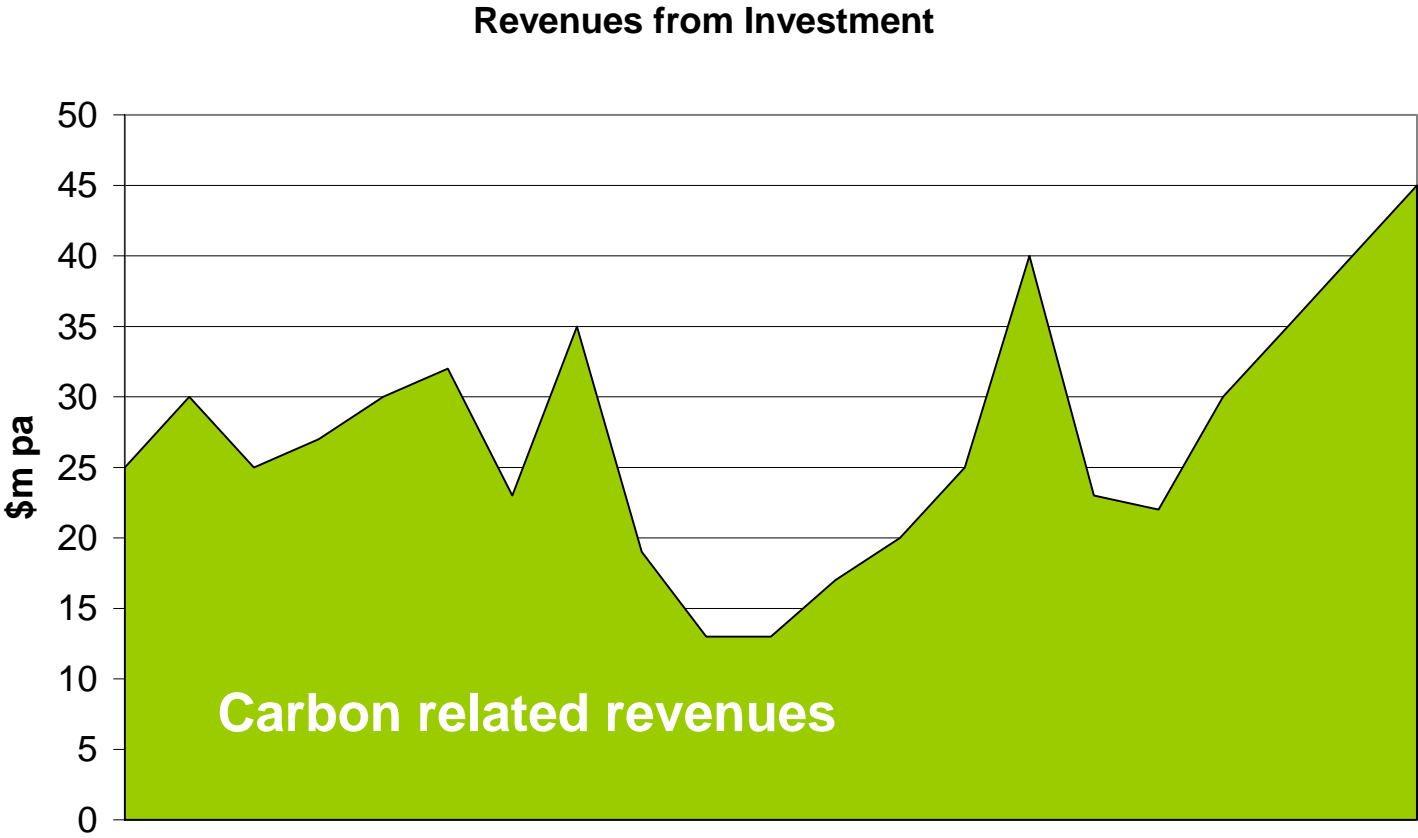
# Hypothetical abatement related investment

Investment costs  
\$200m

NPV of savings  
amounts to \$220 m  
over period

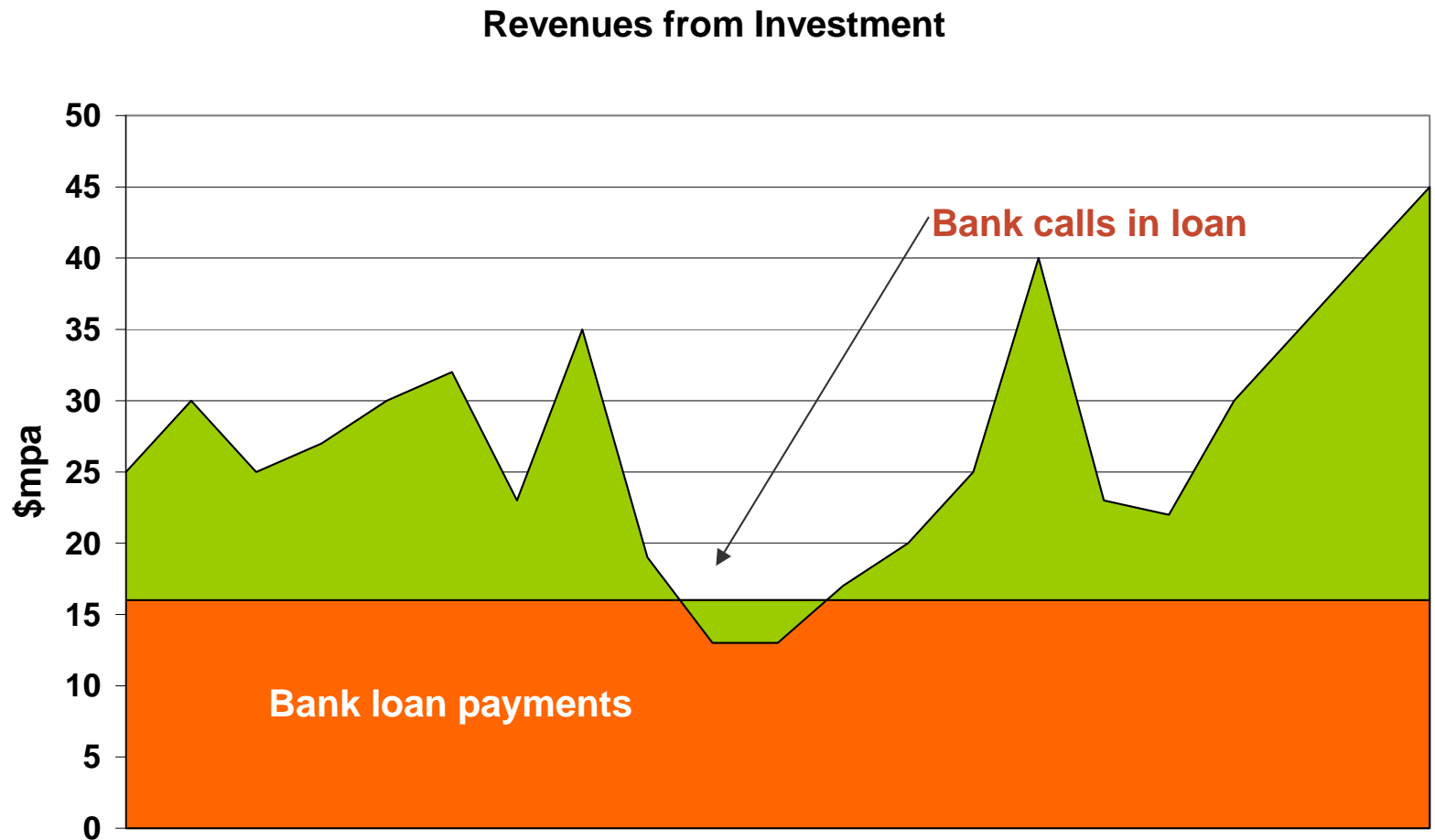
So go ahead?

Can we raise debt?



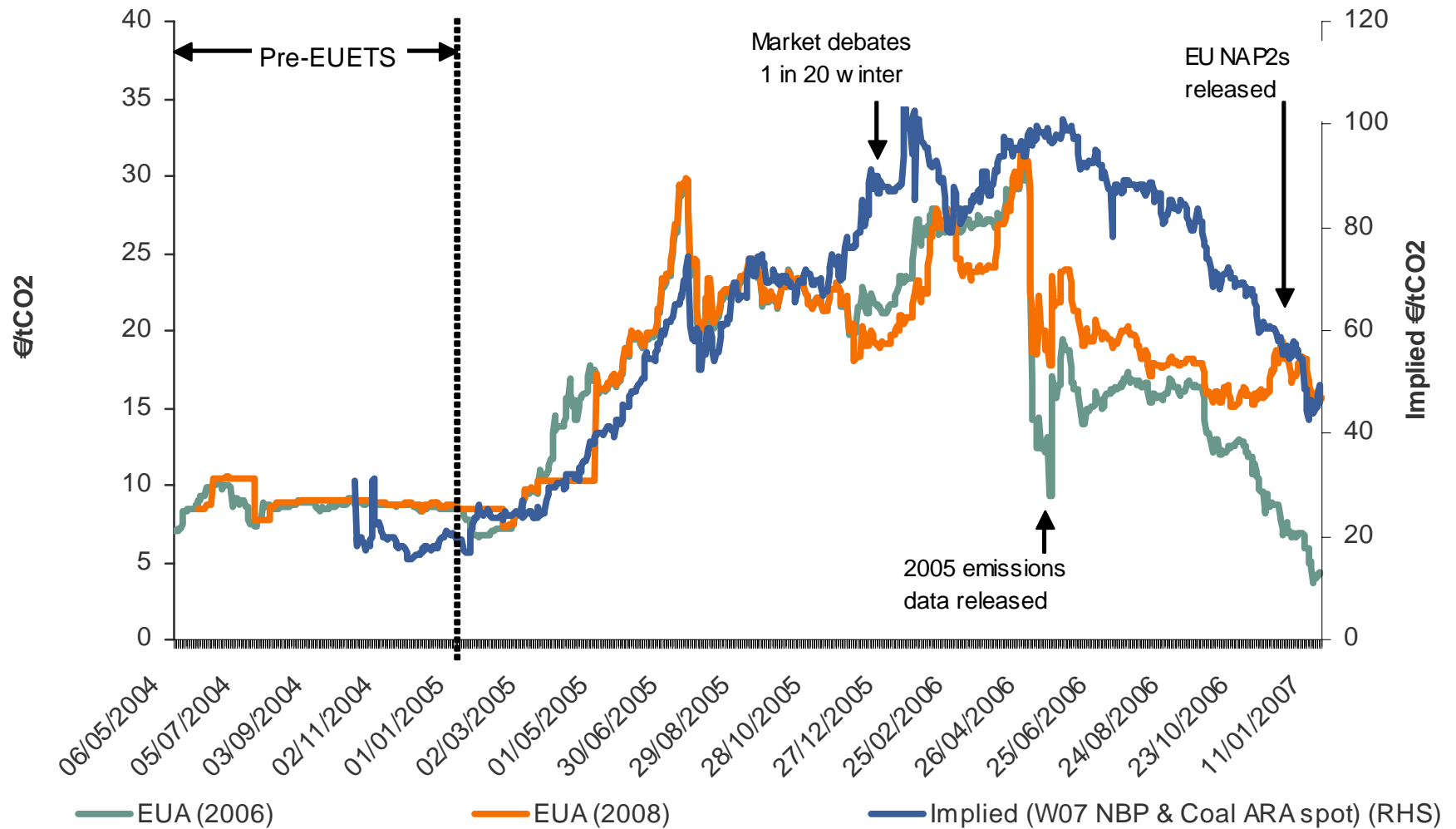
# But it helps if you know how low prices can go!

- Bank interest payments of \$16m pa
- Company goes bust
- Lose access to later cash-flows



# EU ETS: What has happened?

Historical EUA and UK fuel prices



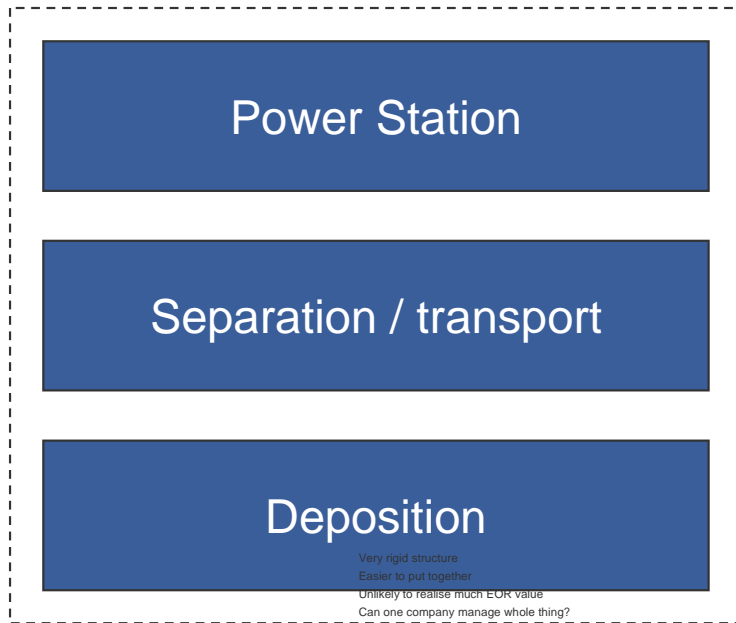
# Consequences

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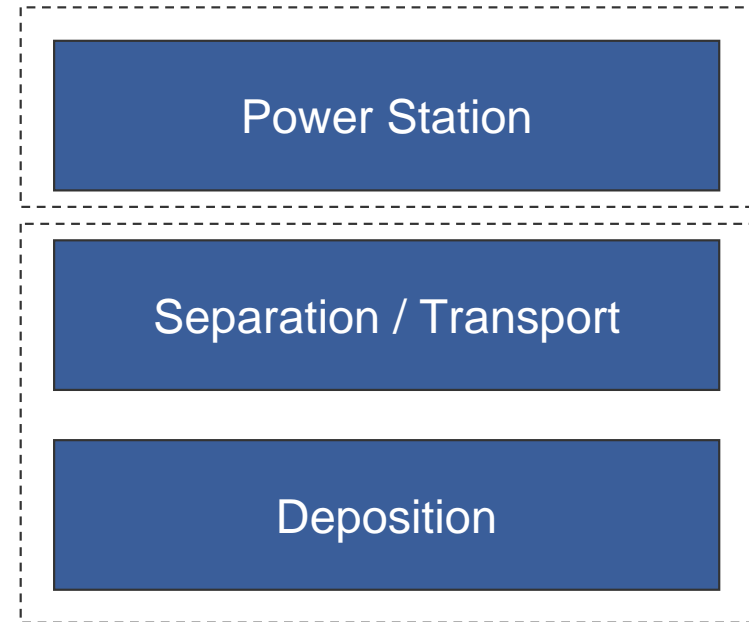
- Prices driven by coal & gas prices AND policy
  - Minimal change in operating behaviour
  - No investment in Europe
  - Large scale investment in developing world
- so a floor to carbon emission costs would be helpful

# Carbon Transport and Storage: Financing Issues

## Integrated Projects



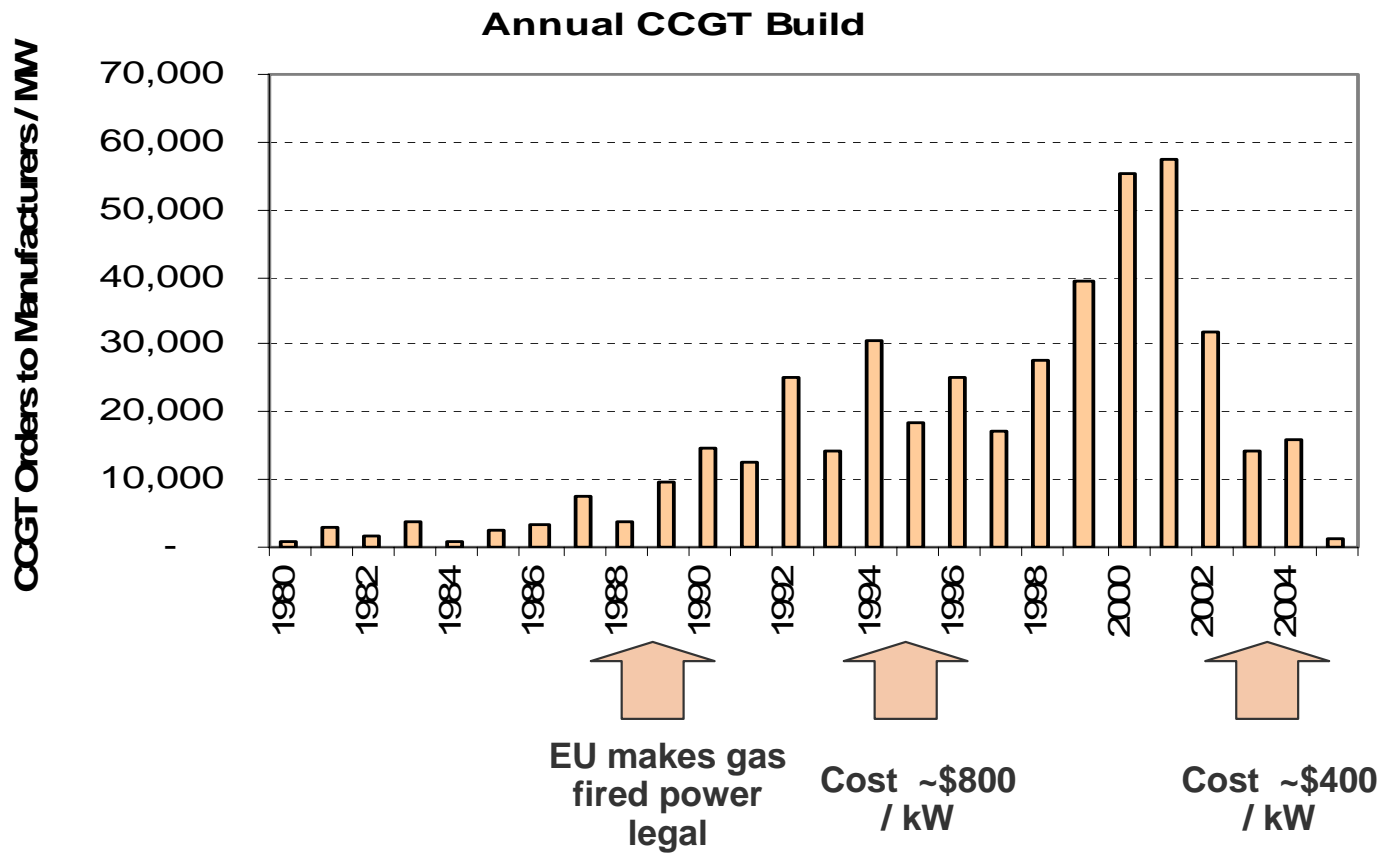
## The Value Chain



- Flexible
- Harder to put together
- Requires ability to contract at interfaces
- Better aligns tasks of parties

# Emulating the CCGT boom of the last 20 years is possible

CCGT build shows that the market can react and that there is the potential for costs to be reduced



# What is needed to encourage investment?

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- Investors to become “comfortable” with prices
  - ▶ All allowances auctioned
  - ▶ Central bank for carbon?
    - Buy allowances when cheap
    - Issue more allowances when expensive
    - - but this may not be sufficient, because
  
- Europe is replacing large amount of power generating capacity
  
- Lack of confidence will result in “lock-in” of wrong technology
  
- So take advantage of EOR potential in nearby North Sea

# Contact Climate Change Capital

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