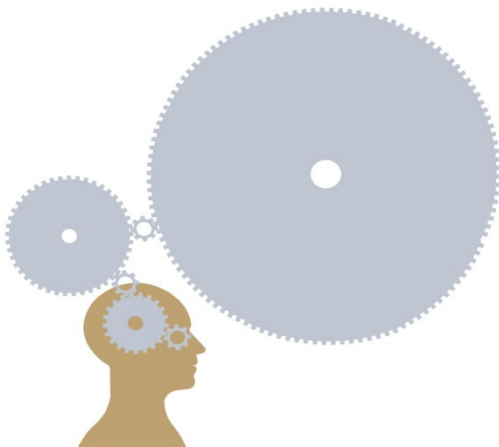


Strong nerves needed? Investing in UK gas storage

EPRG Winter Research Seminar

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The economics of storage new build

Gas market uncertainties

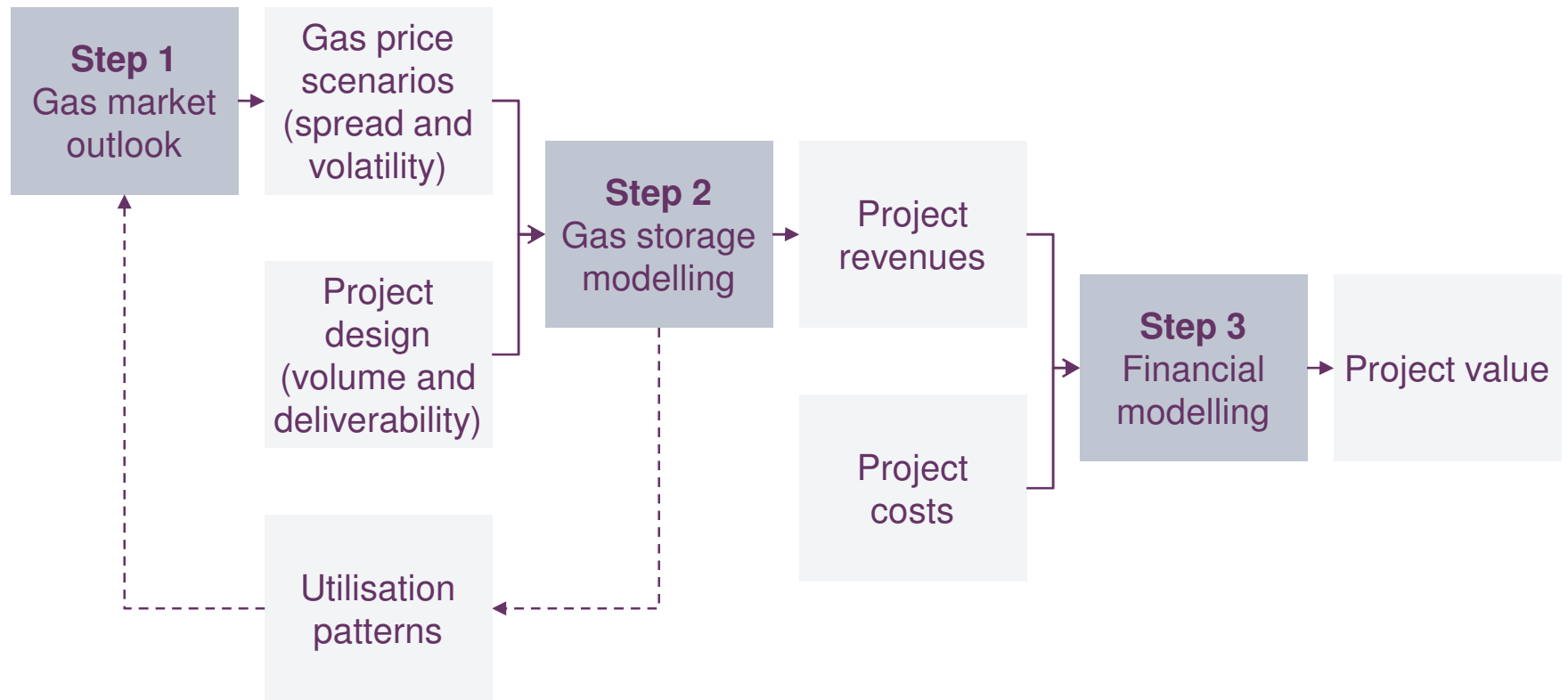
- supply
 - UKCS depletion
 - flexibility of new LNG
 - price-responsiveness of European markets
 - unconventional gas
- demand
 - role of gas in power generation
 - rate of economic recovery
 - electrification of heating
 - energy efficiency

Pipeline of storage projects

- location/technology
 - on-/offshore
 - salt cavities/depleted fields
- service offering
 - deliverability
 - volume

How do market scenarios affect the economics of different storage facilities?

Valuation road map for gas storage



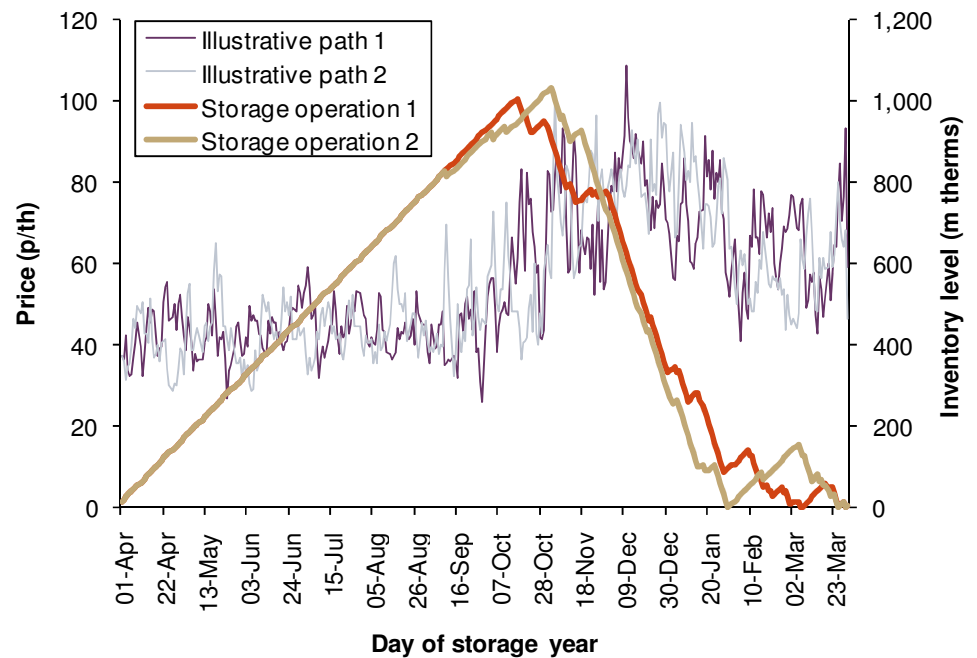
For large projects there can be an element of circularity in the assessment

Gas storage modelling ('step 2')

Outstanding issues

- stochastic dynamic models provide good estimates of the economic value of storage capacity
- further analysis is needed of 'real-life' market conditions in order to estimate how much of this value can be captured by storage owners

Expected storage use under alternative price paths (an illustration)



Source: Oxera gas storage model.

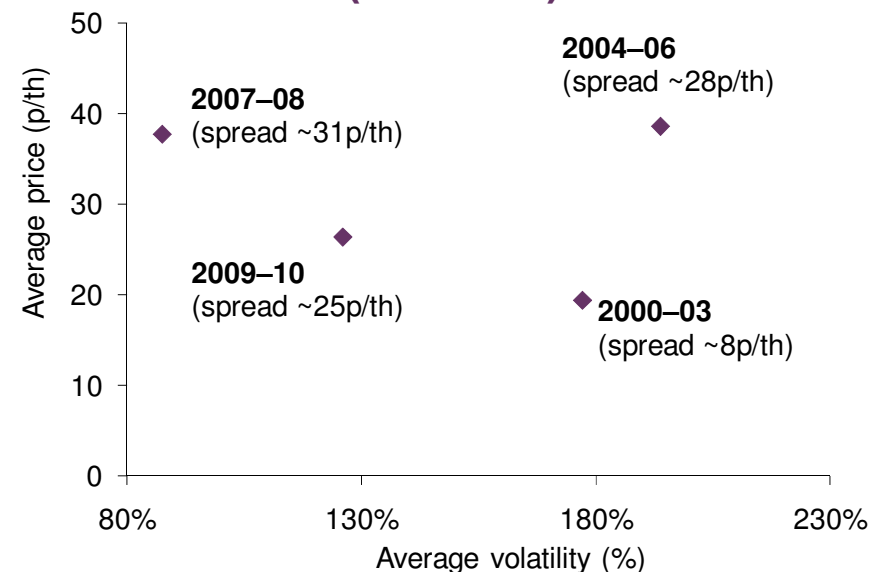
Valuation tools are becoming more sophisticated, but the revenue forecasting exercise cannot rely exclusively on 'mechanistic' modelling results

Financial modelling ('step 3')

Outstanding issues

- capital expenditure (CAPEX)
 - the lack of recent experience with offshore storage means that cost estimates are very uncertain
 - unit costs vary widely depending on location, geology, and pre-existing infrastructure
- cost of capital
 - correlation between storage value and market risk

Gas price and volatility in the UK (2000–10)



Source: Bloomberg, Oxera.

The risk profile of gas storage could be very different from that of conventional utilities or oil and gas projects

Project financials under market scenarios

	Scenario 1 'Business as usual'	Scenario 2 'Unconventional gas'	Scenario 3 'Green policy'	Scenario 4 'Conventional growth'
Daily volatility (%)	150	100	200	100
Summer/winter spread (p/th)	21	10.5	10.5	30
Post-tax net present value (£m)				
Offshore seasonal	78.0	-407.0	-0.8	327.3
Offshore mid-range	213.2	-93.6	224.4	310.2
Onshore short-range	80.5	-44.0	130.4	74.4
Post-tax internal rate of return(%)				
Offshore seasonal	10.6%	6.6%	10.0%	12.4%
Offshore mid-range	13.7%	8.3%	13.8%	15.2%
Onshore short-range	14.0%	7.6%	16.4%	13.7%

Note: These calculations assume CAPEX unit costs between 70p and 85p per cubic metre of capacity, OPEX unit costs of 1.5p and 3.5p per cubic metre of capacity, and a real, post-tax weighted average cost of capital (WACC) of 10%.

Source: Oxera.

The relative attractiveness of large seasonal projects remains uncertain

Other issues

- availability of finance
 - projects sponsored by independent players faced a shortage of commercial finance over 2008–09
 - projects developed by international energy companies face internal competition from storage projects in other countries (where storage obligations are stricter)
- feasibility of risk-sharing arrangements
 - the EU Gas Regulation requires storage sites that are subject to third-party access (TPA) requirements to offer part of the capacity on a short-term basis
 - the commercial appetite for long-term contracts is not evident
- risk of delay in planning process (or NTS connection)

Additional hurdles mean that project sponsors will probably require robust financials before undertaking investment

The policy context

- Wicks report on energy security (August 2009)

‘My own view is that the case for strategic storage should be considered very carefully, as an insurance policy against unpredictable developments in an uncertain world’
- DECC policy statement on security of supply (April 2010)

‘There is little evidence to suggest that the market will not deliver a sufficient level of capacity, once existing barriers to delivery are removed.’
- Pöyry report to DECC on security of supply (March 2010)

‘The policy option of investing in strategic storage (...) would be expensive, and is unlikely to provide sufficient benefit in improving security of supply to justify its costs.’
- DECC Annual energy statement (July 2010)

‘We will introduce further measures on gas security as promised in the Coalition Programme for Government’
- DECC Statutory security of supply report (November 2010)

‘While production from the UKCS is projected to continue to decline, GB has an increasingly large and diverse range of import sources on which to draw. New import and storage capacity is identified at various stages of development and delivery [...] However, [some of these projects] might slip, and some of this a capacity might not come forward.’

Further measures possible, but UK project sponsors should probably assume that they will face most of the commercial risk on their storage investment(s)

The regulatory context: access requirements

- a shortage of storage capacity might warrant TPA requirements in order to mitigate market power issues
- but certain TPA requirements may, in turn, have implications for the economics of new projects
 - restrictions on long-term contracts (may limit risk-sharing)
 - 'own use' limitations and service specifications (may limit the ability to capture the economic value of storage)
 - unbundling requirements (may increase compliance costs)
- regulatory interventions should focus on cases where market power is both significant and likely to endure

The regulatory framework must balance the (ex post) optimisation of capacity allocation and (ex ante) incentives for investment

Summary

- significant uncertainty in the drivers of gas storage value
- stochastic models and scenario analysis provide a good starting point to assess project economics
- need to assess other 'real life' market conditions
- TPA requirements could play an important role in determining the risks of larger projects

Recent Oxera publications on gas storage and energy markets

- 'Strong nerves needed? the economics of gas storage investment', *Agenda*, June 2010
- 'Taking stock: competition and investment in gas storage services', *Agenda*, April 2008
- 'Hedging your bets: why pay over the odds for forward electricity?', *Agenda*, April 2009
- 'A new nuclear dawn? Where the risks remain', *Agenda*, October 2009
- 'Market power in the power market', *Agenda*, May 2009

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