

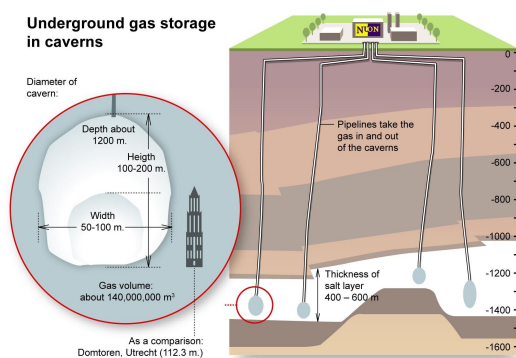
## Proposal Master/Bachelor Thesis „Numerical Methods for Gas Storage Valuation“

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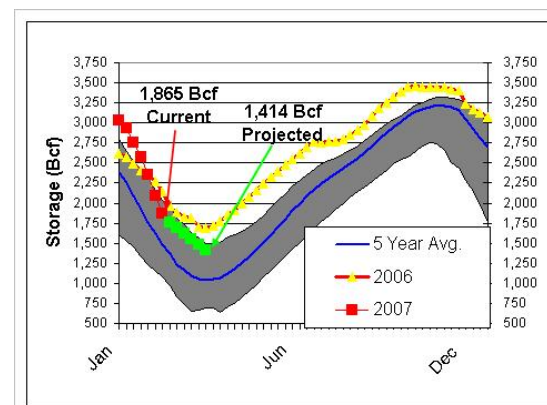
Energy markets are a rapidly evolving application field in computational finance. Developed countries increasingly rely on gas storage for security of supply. The special properties of the financial gas market motivates the analysis of gas storage as a separate asset, using the market value context for utilization and valuation.

Storage valuation is nevertheless a challenging task if we consider both the financial and physical aspects of storage. In the recent literature, there exist different approaches for the valuation of gas storage, based on Monte Carlo simulation, Finite Difference methods, real option theory, etc. Each existing method has its own disadvantages, which is mostly the simplification of the model and, thus, including a modelling error.

Therefore, within the increasing influence of energy market on the world economy, there exist an urgent need to improve current methods or discover novel approaches.



(a) Gas storage facility



(b) Analysis of gas storage for 5 years

Abbildung 1: Gas storage valuation

Tasks:

- Studying a financial part of the problem
- Detailed analysis of existing methods
- MATLAB/C programming of pricing models
- Goal: Applying modern (novel) methods for the gas storage valuation (Master);

Alternatives/Extentions:

- Monte Carlo simulation
- Goal: Make comparison analysis of existing approaches for gas storage valuation (Bachelor)

Possible Cooperation:

- Dr. Benedikt Großer RWE Supply&Trading GmbH, Essen

Literature:

- A. Boogert, C. de Jong, Gas Storage Valuation Using a Monte Carlo Method, The Journal of Derivatives 15 (2008), 81-98.
- K.W. Hedman, Comparing hedging methods for wind power: Using pumped storage hydro units vs. options purchasing, International Conference on Probabilistic Methods Applied to Power Systems, Stockholm, June 11-15, 2006, pp. 1-6.