CMM and AMM Prediction Methods in German Hard Coal Mines

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Global Methane Initiative

Technische Hochschule Georg Agricola

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Gas Storage and Gas Content

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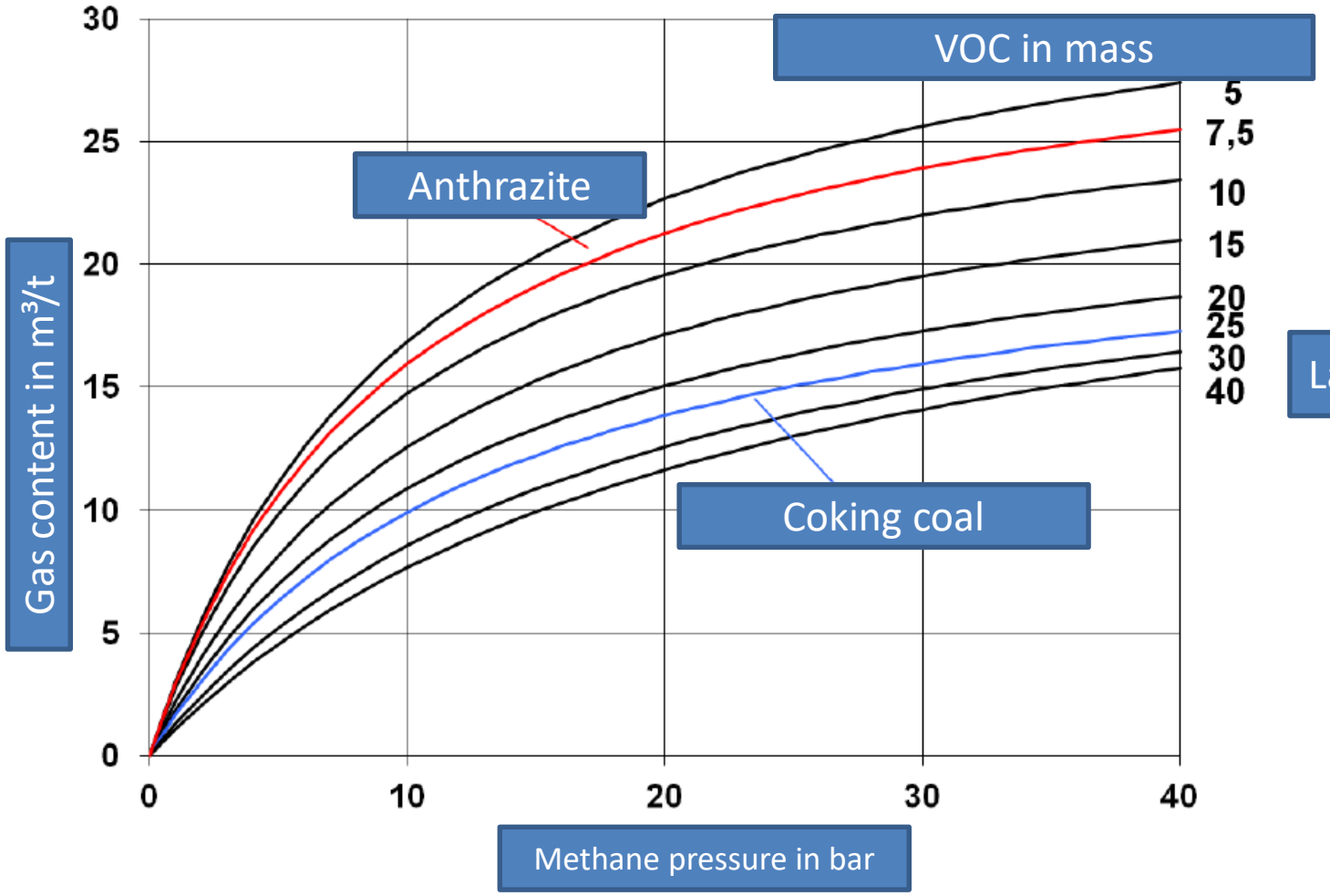
Sorption isothermal curves for dry coal



Langmuir function

$$q = \frac{a \cdot b \cdot p}{1 + b \cdot p} \ [m^3 / t]$$

$$p = \frac{q}{b \cdot (a - q)} \ [bar]$$

Gas Content Determination

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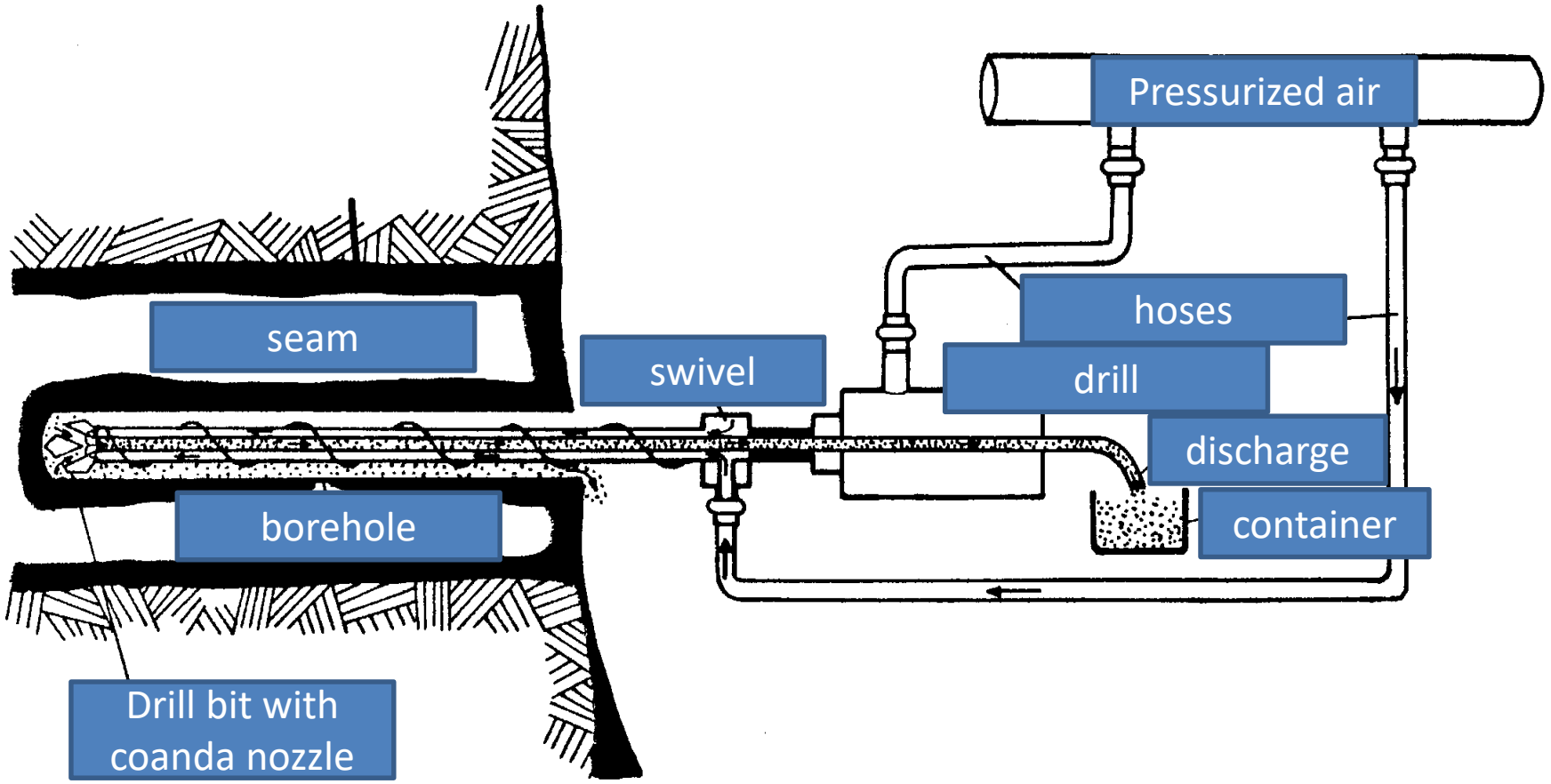
Drilling equipment for underground coal probes



Gas Content

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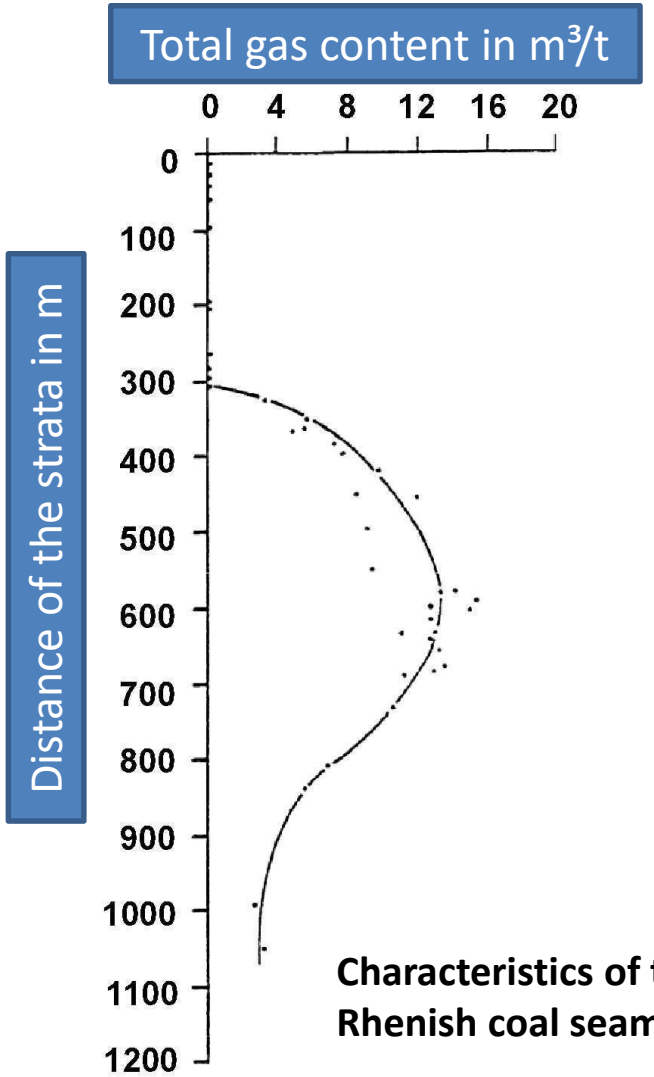
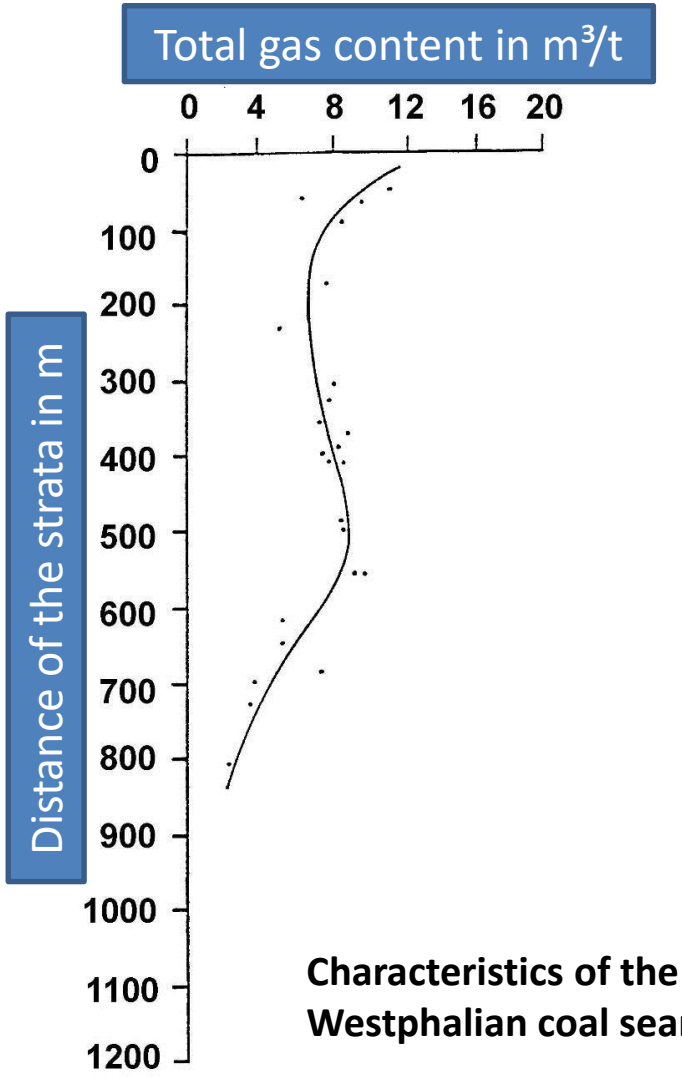


Characteristics of the Rhenish coal seams



Characteristics of the Westphalian coal seams

Gas Content

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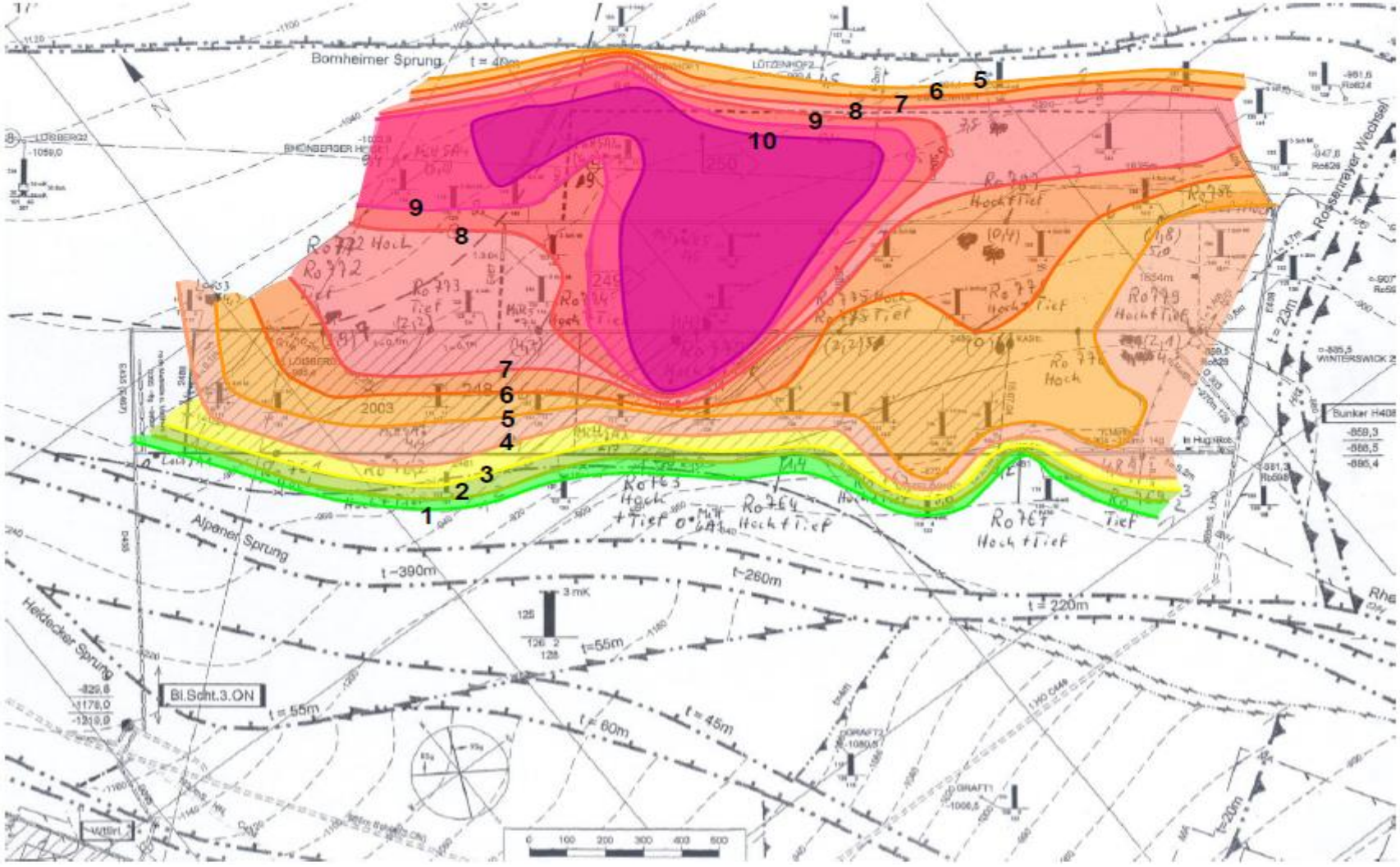
Example of a gas content map



Gas Content (residual gas content after mining)

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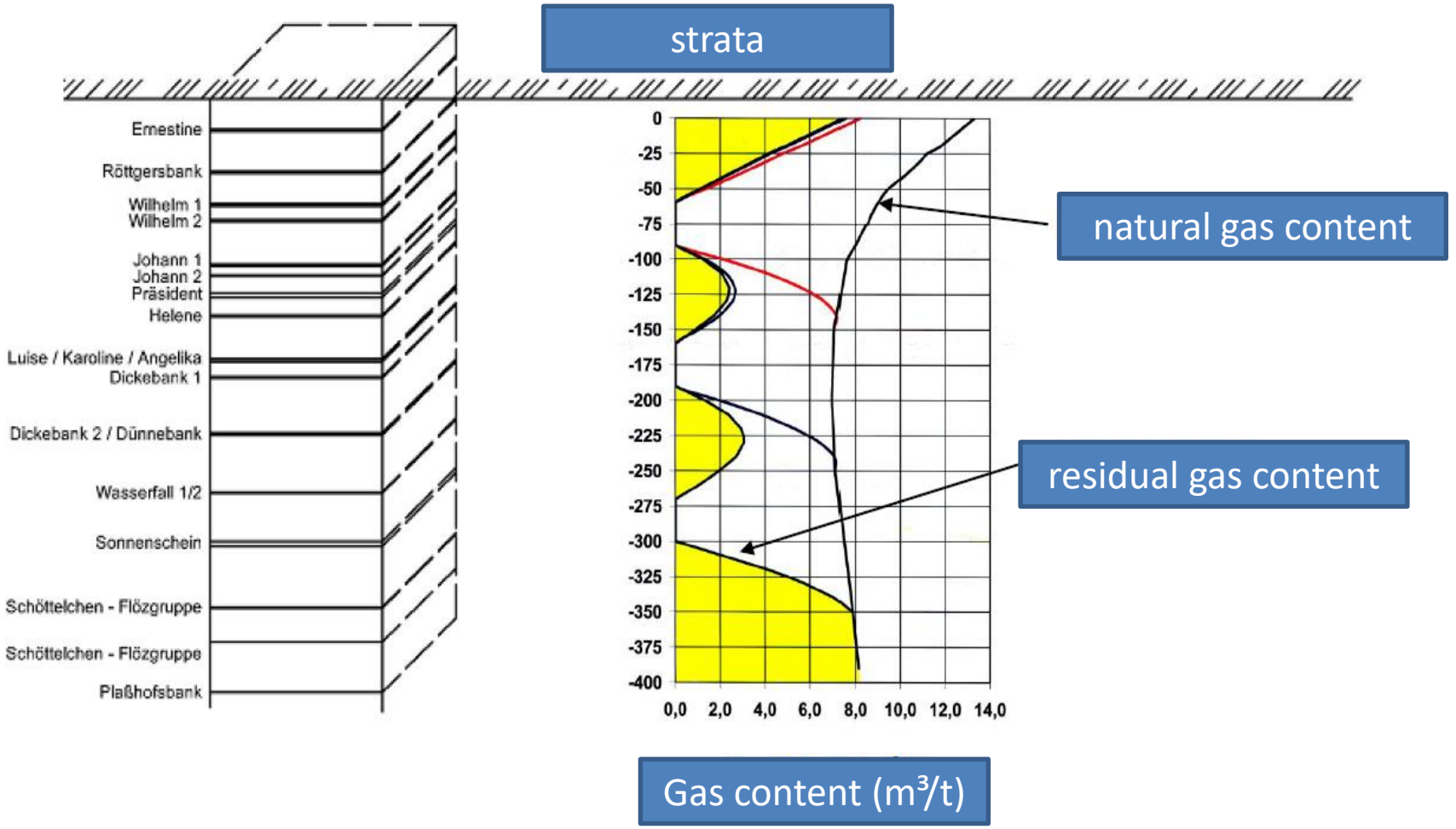

Reduction of the gas content after mining of three seams

Residual Gas Content after Mining

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Remaining coal: 480 Mio. t
Remaining methane volumen: 650 Mio. m³
Average residual gas content: 1,35 m3/t

Residual Gas Content after Mining

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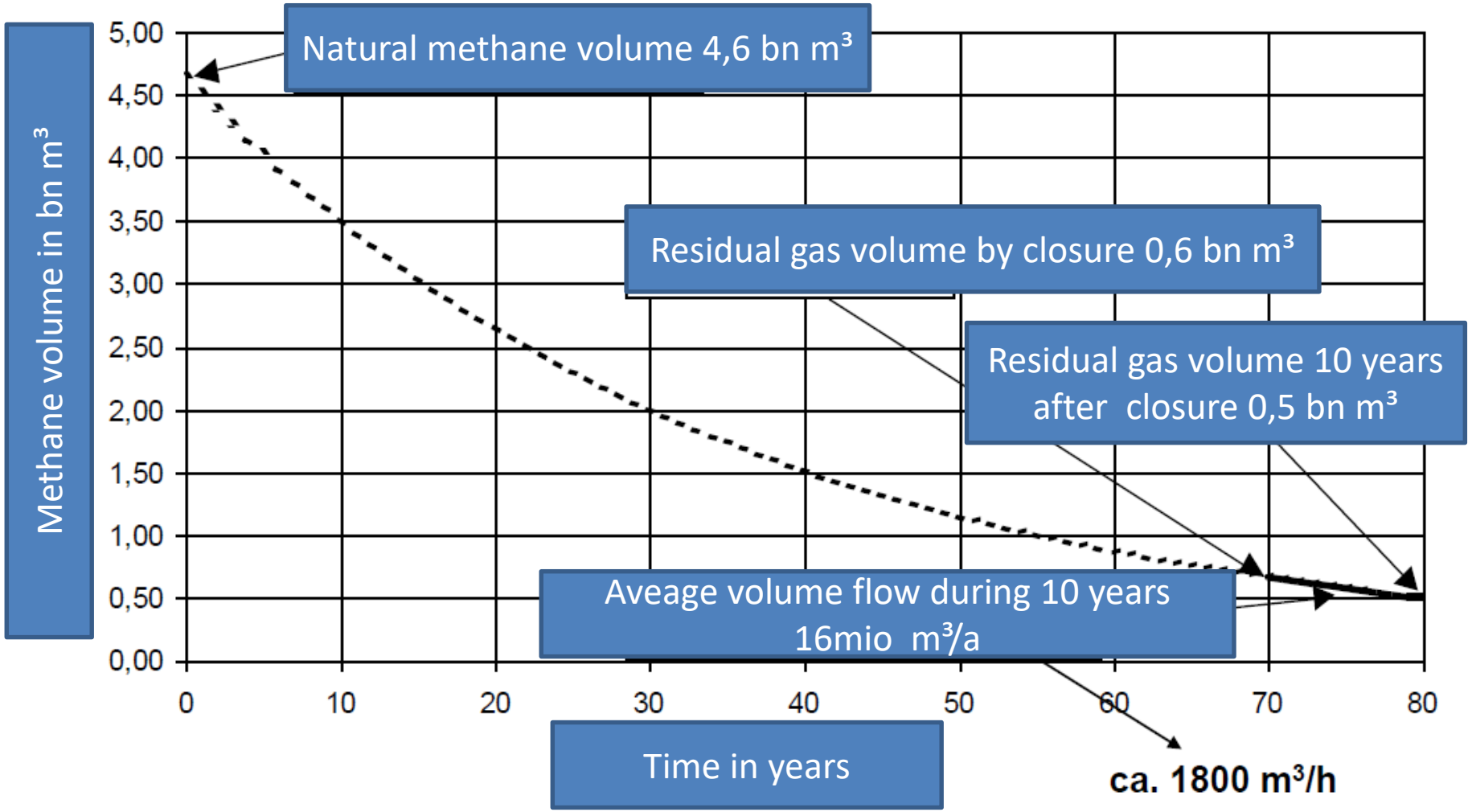

Gas Utilization from Abandoned mines

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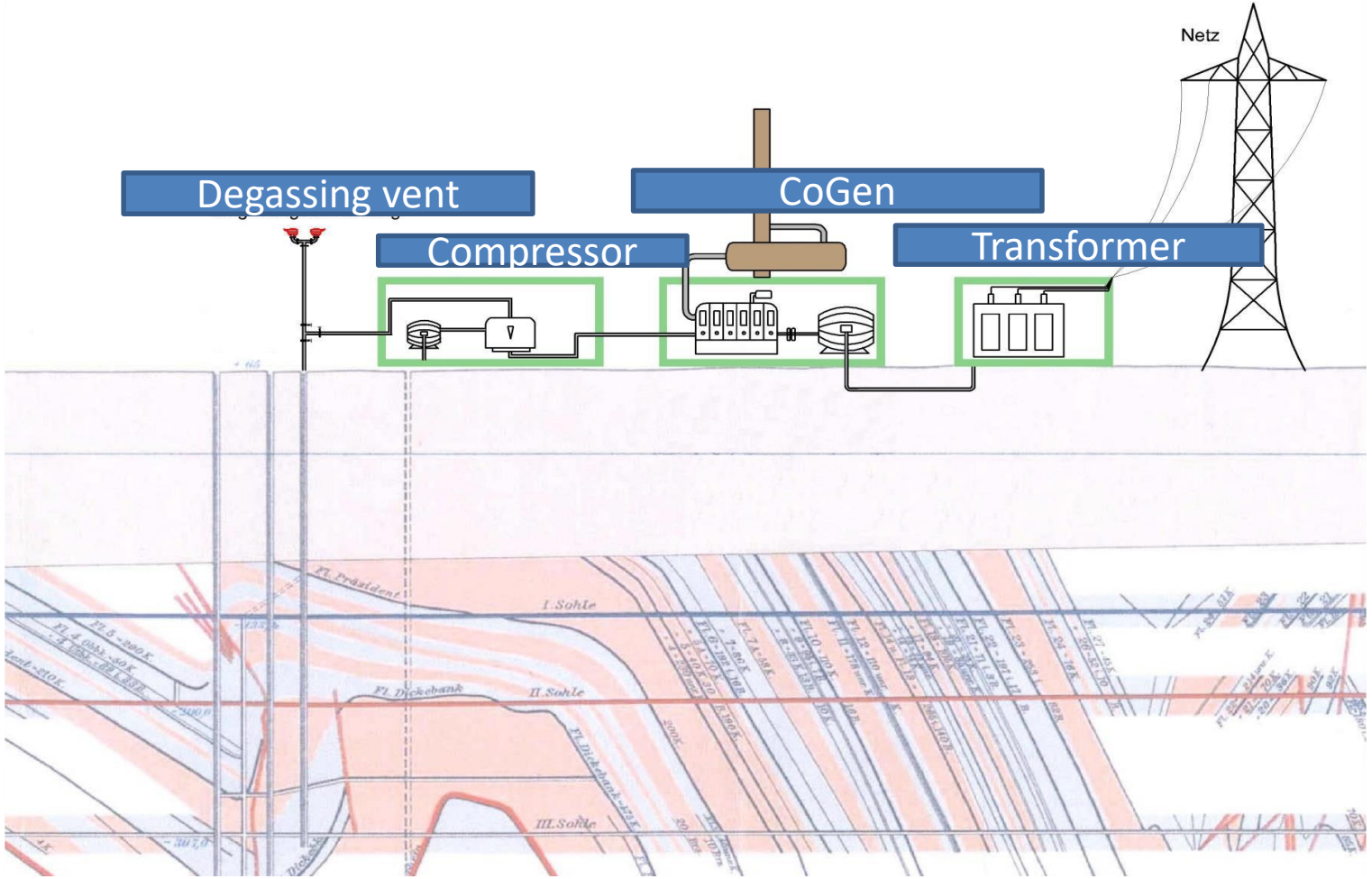

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Example:

- Calorific value methane: ca. 10 kWh/m³
- Gas volume flow: 625 m³/h
- Methane content: 40 Vol.-%
- Methane volumen flow: 625 m³/h * 0,4 = 250 m³/h
- Thermal output: 250 m³/h * 10 kWh/m³= 2500 kW
- Energy efficiency: 40%
- Electrical output: 2500 kW * 0,4 = 1000 kW

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Thank you for your attention!

Glück auf!