



# CMM and AMM Prediction Methods in German Hard Coal Mines

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GMI Coal Mines Subcommittee Meeting

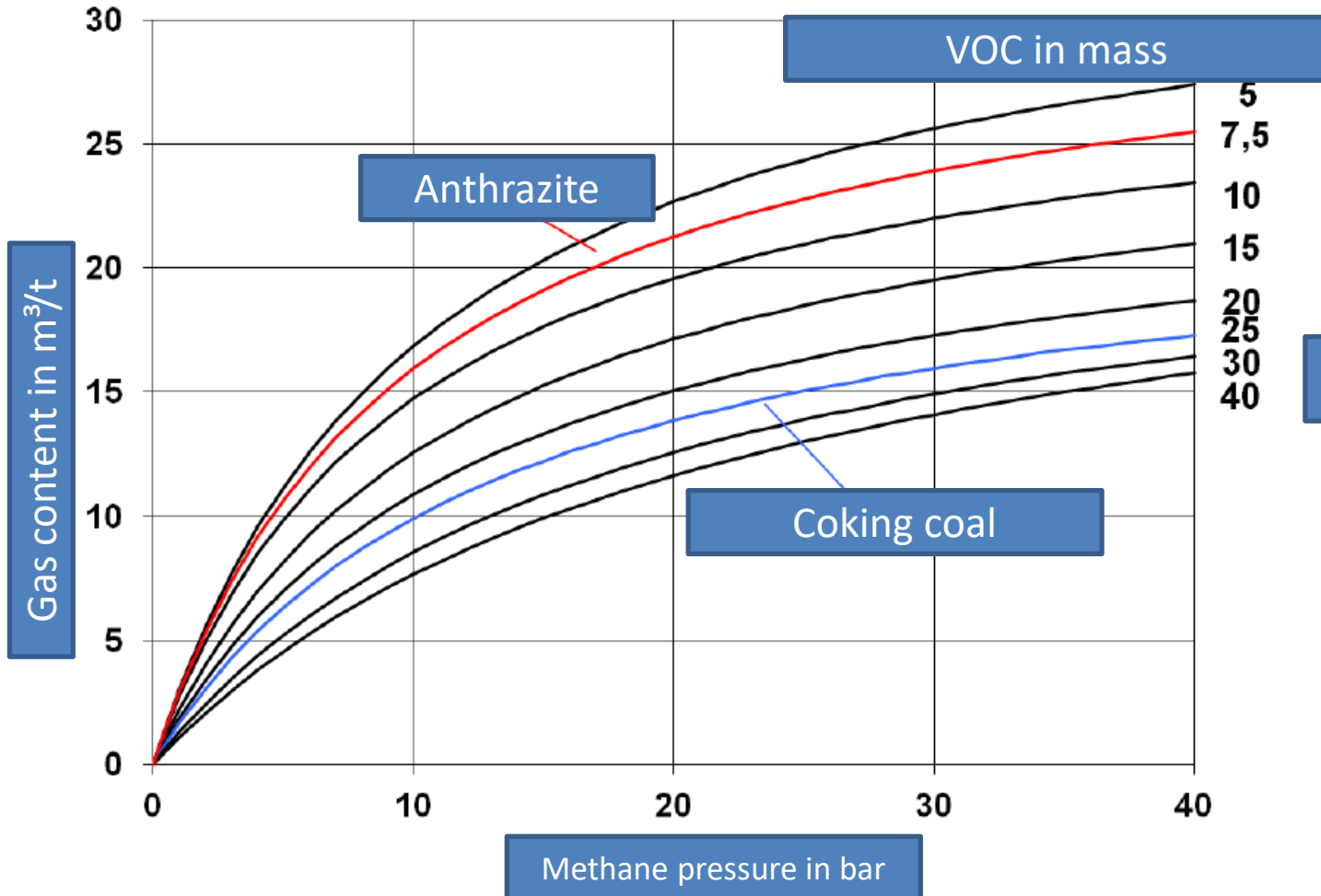
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# Gas Storage and Gas Content



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## Sorption isothermal curves for dry coal



Langmuir function

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

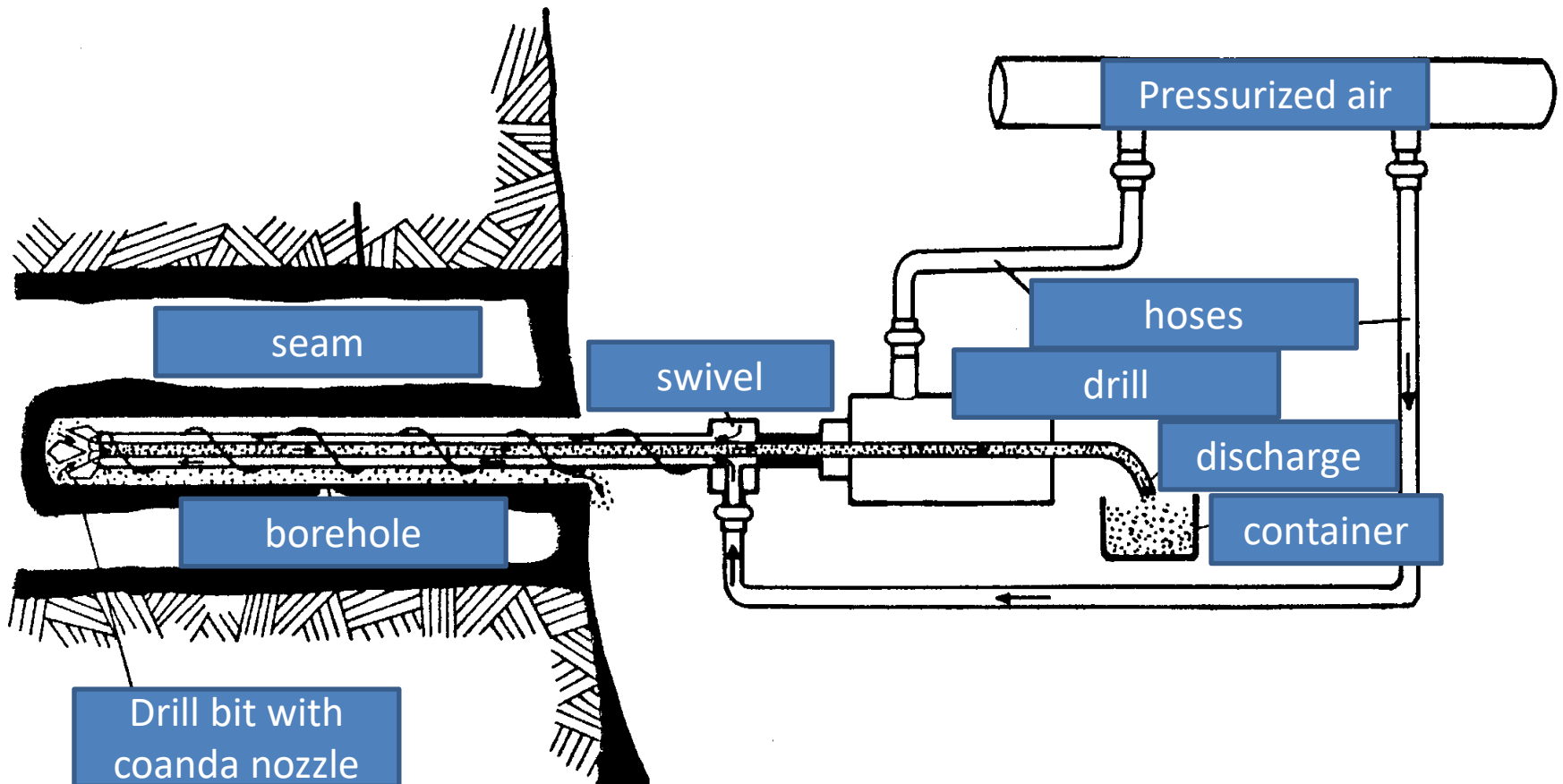
$$p = \frac{q}{b \cdot (a - q)} \quad [\text{bar}]$$

# Gas Content Determination



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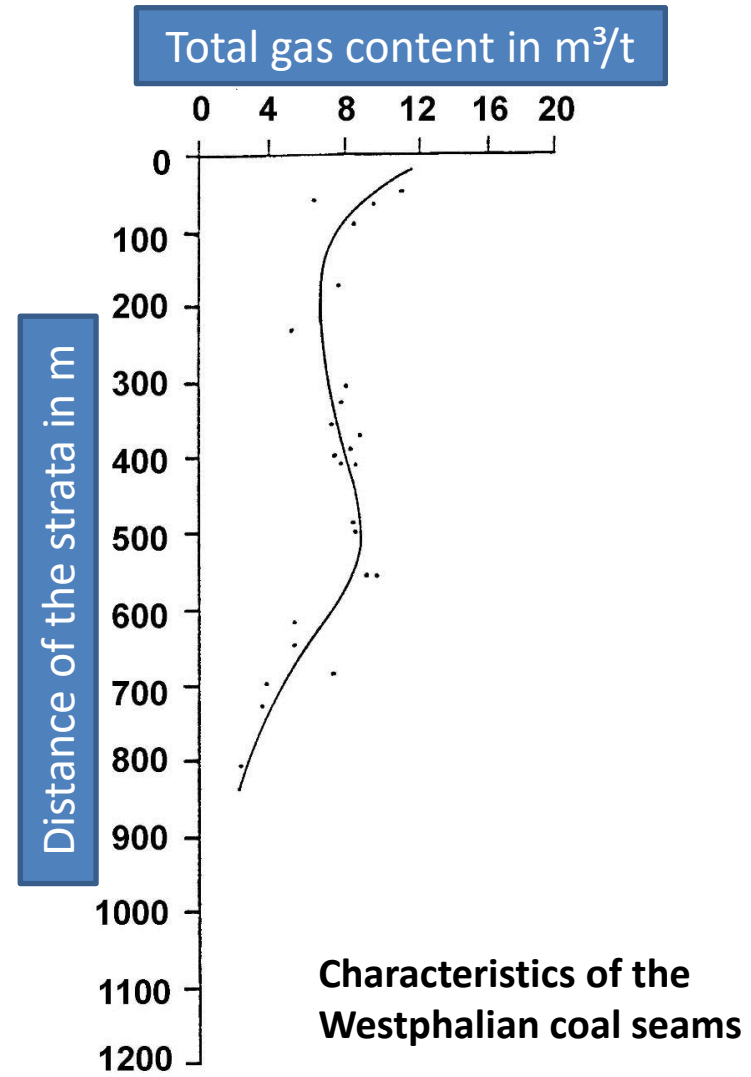
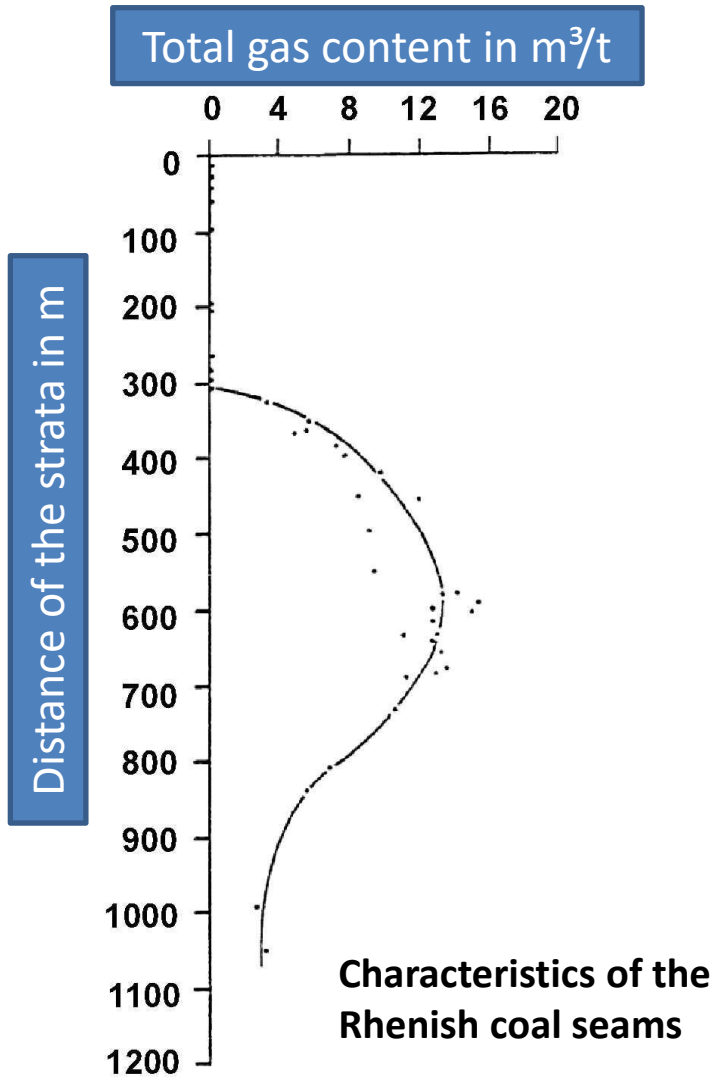
## *Drilling equipment for underground coal probes*



# Gas Content



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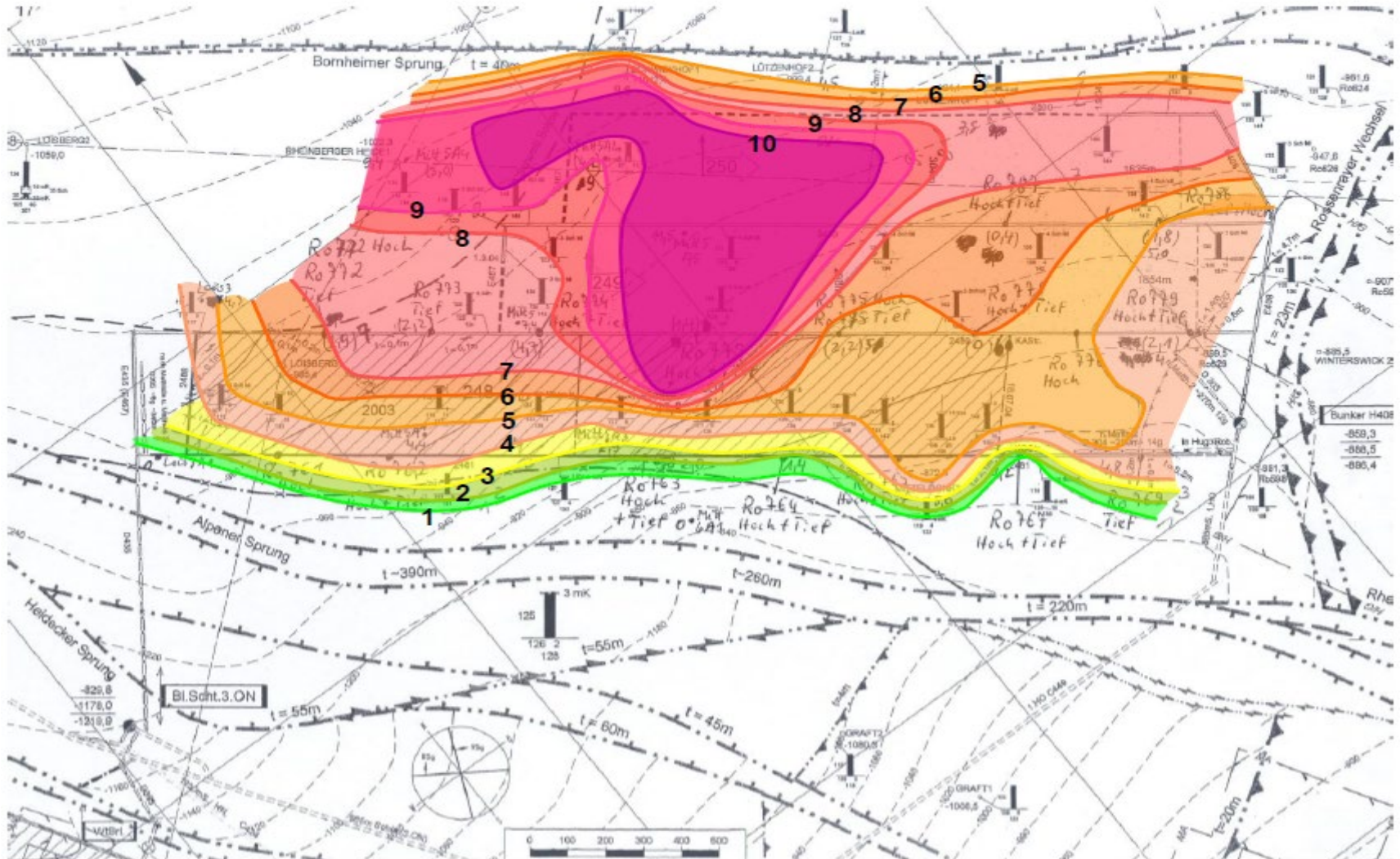


# Gas Content



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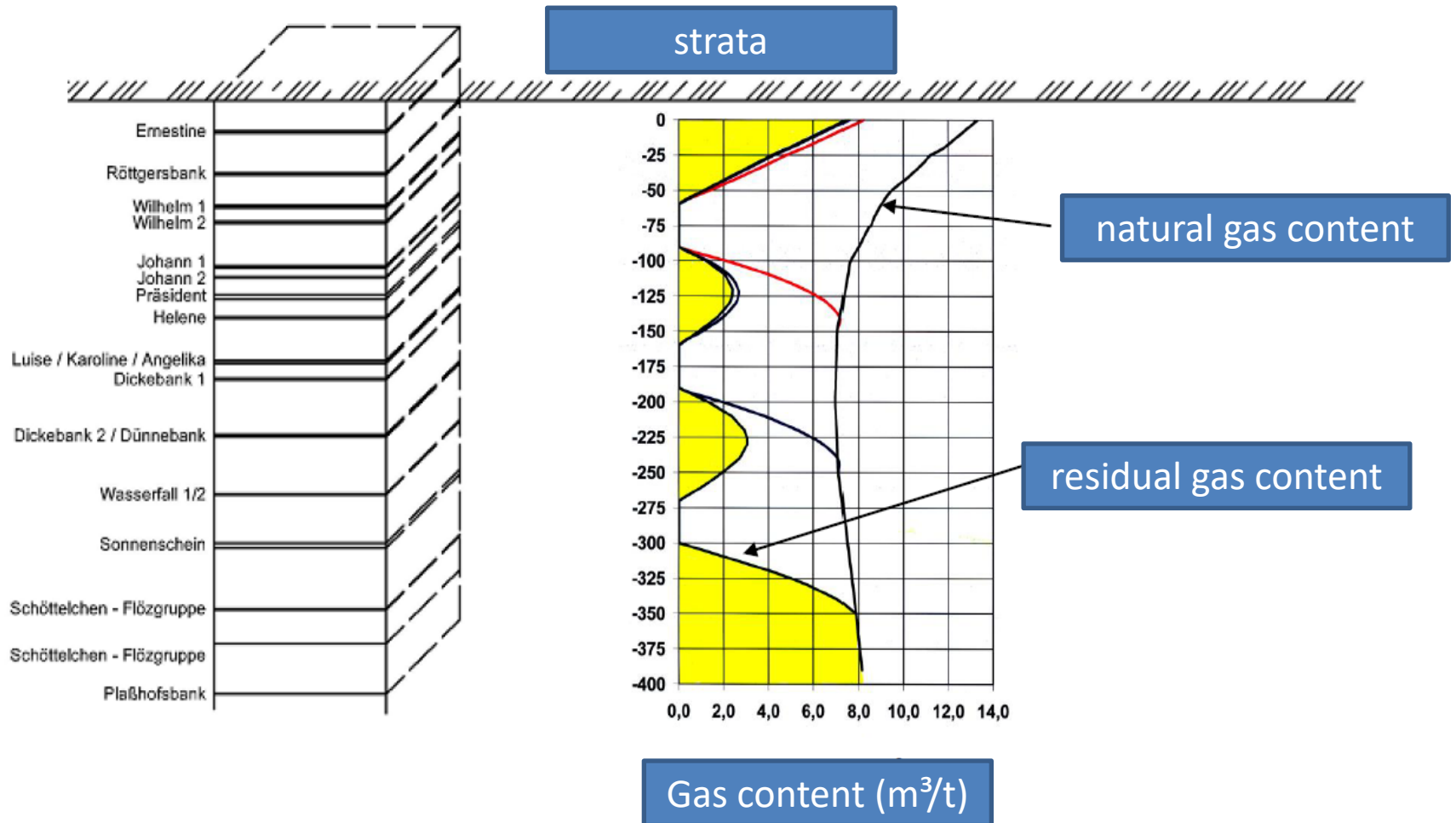
## Example of a gas content map



# Gas Content (residual gas content after mining)



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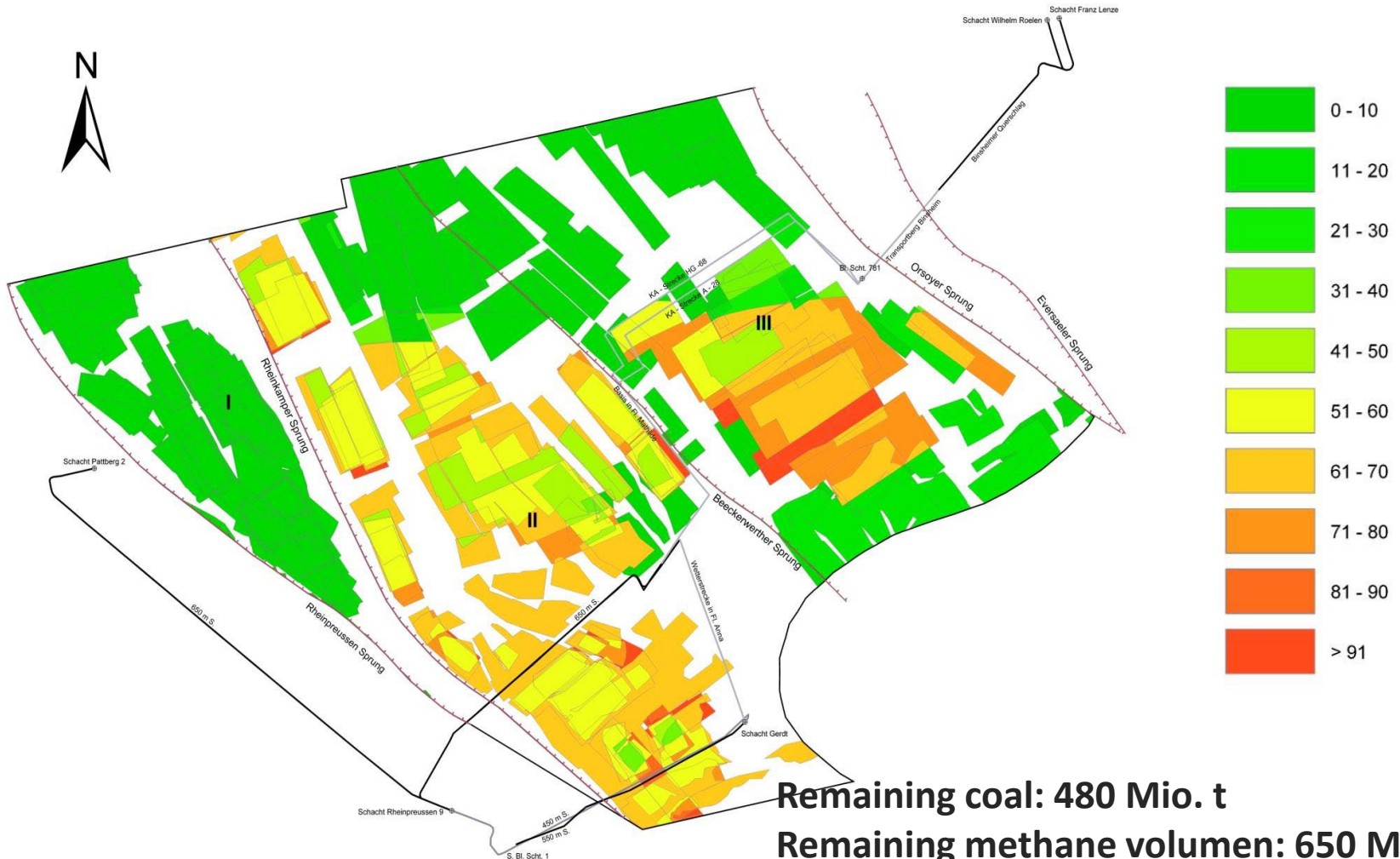


Reduction of the gas content after mining of three seams

# Residual Gas Content after Mining

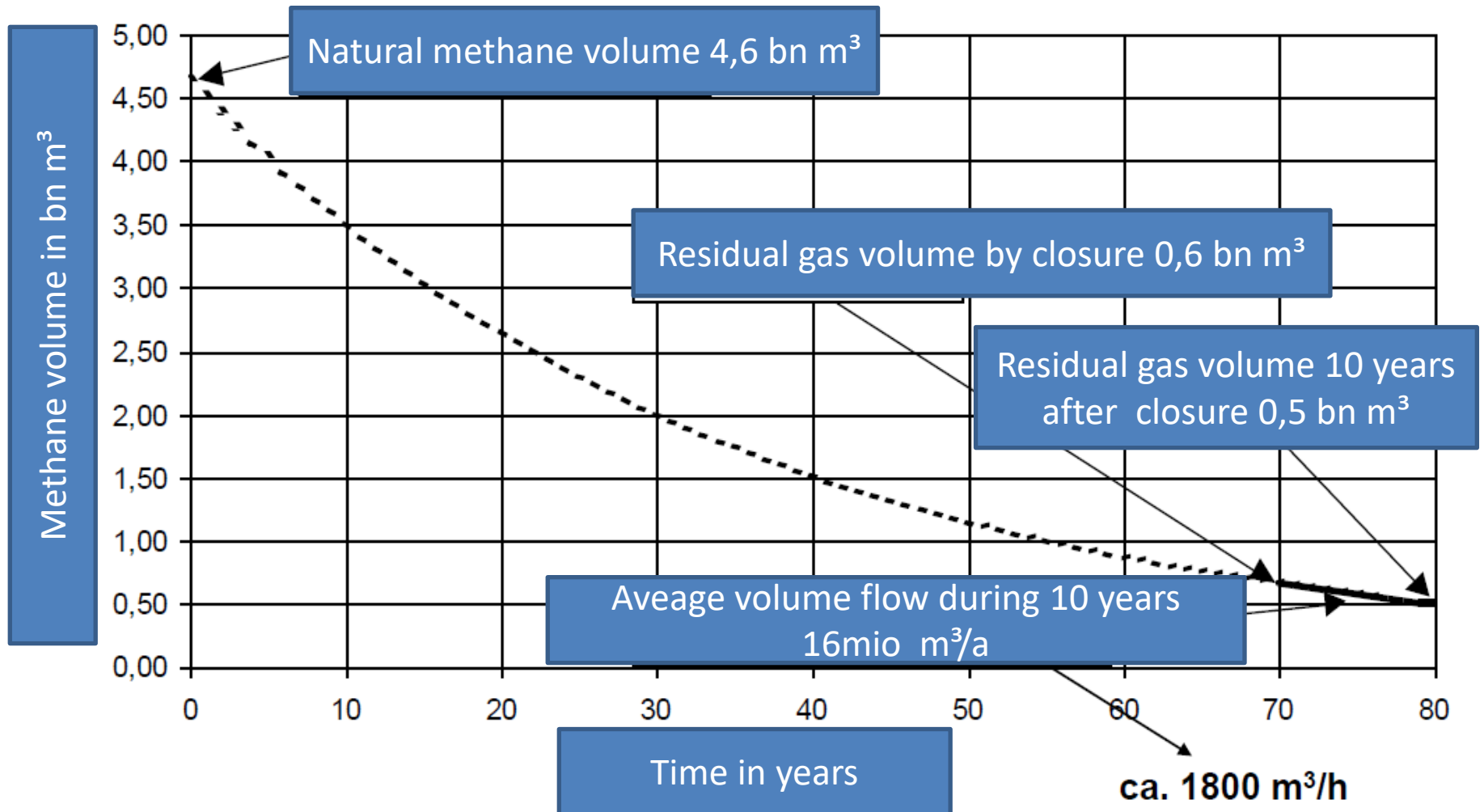


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**Remaining coal: 480 Mio. t**  
**Remaining methane volumen: 650 Mio. m<sup>3</sup>**  
**Average residual gas content: 1,35 m<sup>3</sup>/t**

# Residual Gas Content after Mining

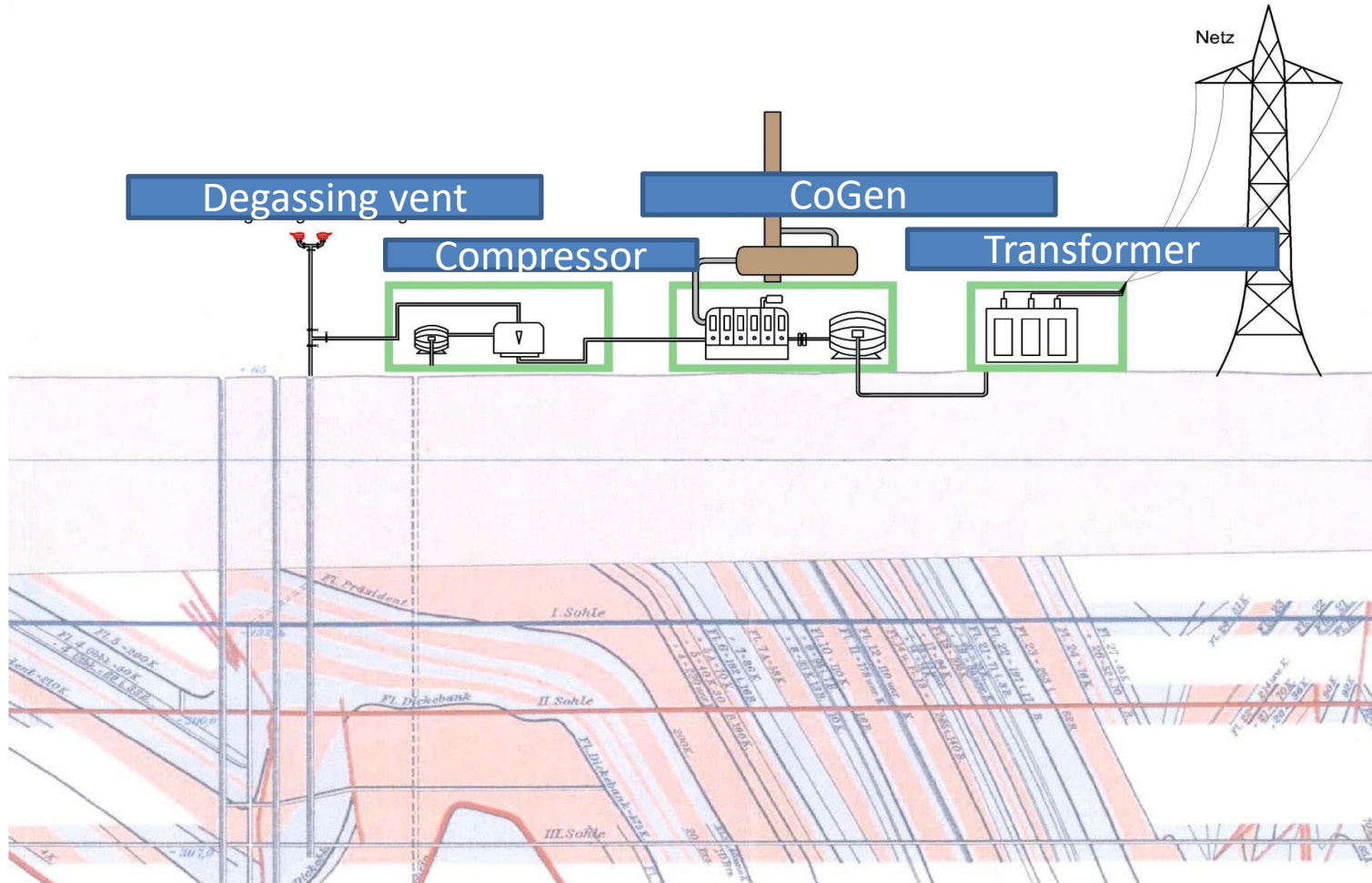




# Gas Utilization from Abandoned mines



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# Gas Utilization from Abandoned Mines

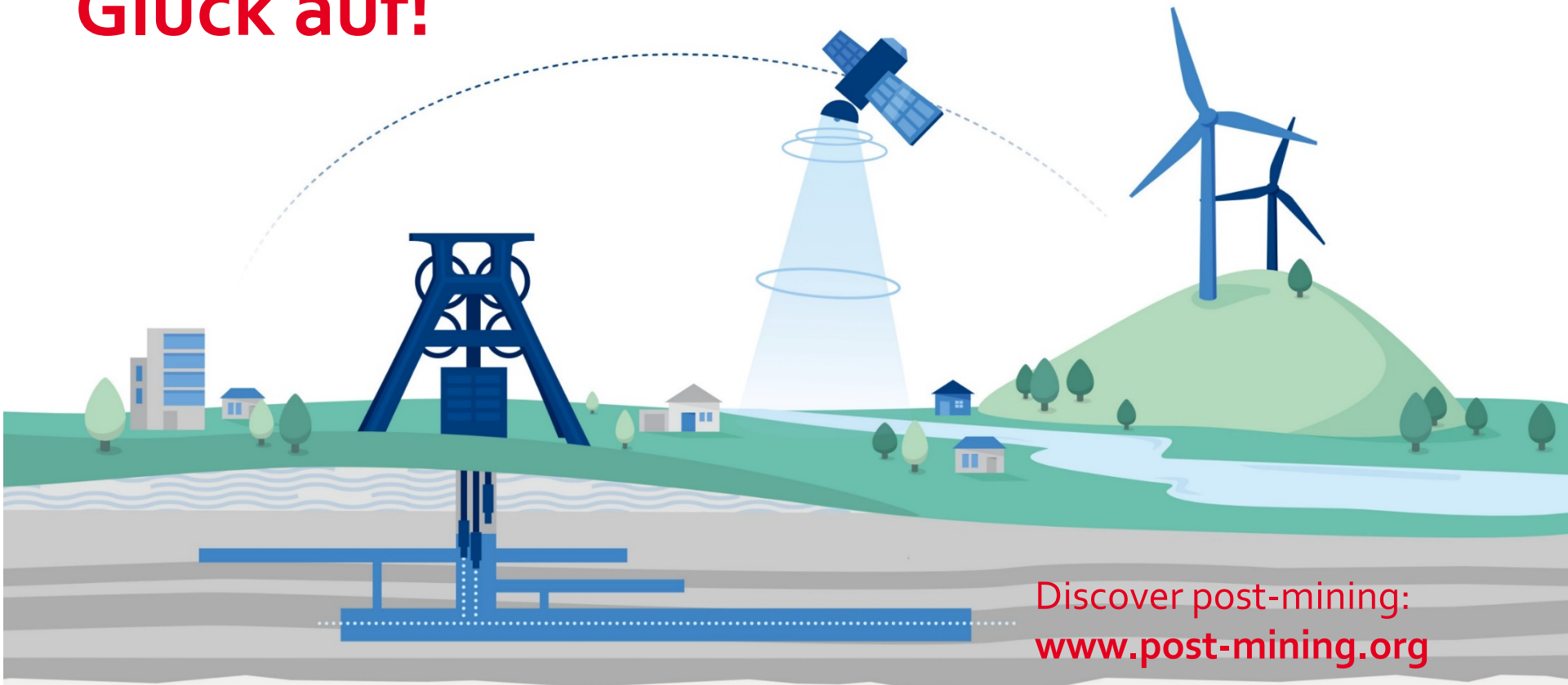


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## Example:

- Calorific value methane: ca. 10 kWh/m<sup>3</sup>
- Gas volume flow: 625 m<sup>3</sup>/h
- Methane content: 40 Vol.-%
- Methane volumen flow: 625 m<sup>3</sup>/h \* 0,4 = 250 m<sup>3</sup>/h
- Thermal output: 250 m<sup>3</sup>/h \* 10 kWh/m<sup>3</sup> = 2500 kW
- Energy efficiency: 40%
- Electrical output: 2500 kW \* 0,4 = 1000 kW

Thank you for your attention!  
**Glück auf!**



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