



# **Introduction to Workshop**

**Jacek Skiba**

Central Mining Institute of Katowice, Poland

Deputy Chairman of UNECE

Ad-hoc Group of Experts on CMM Utilisation



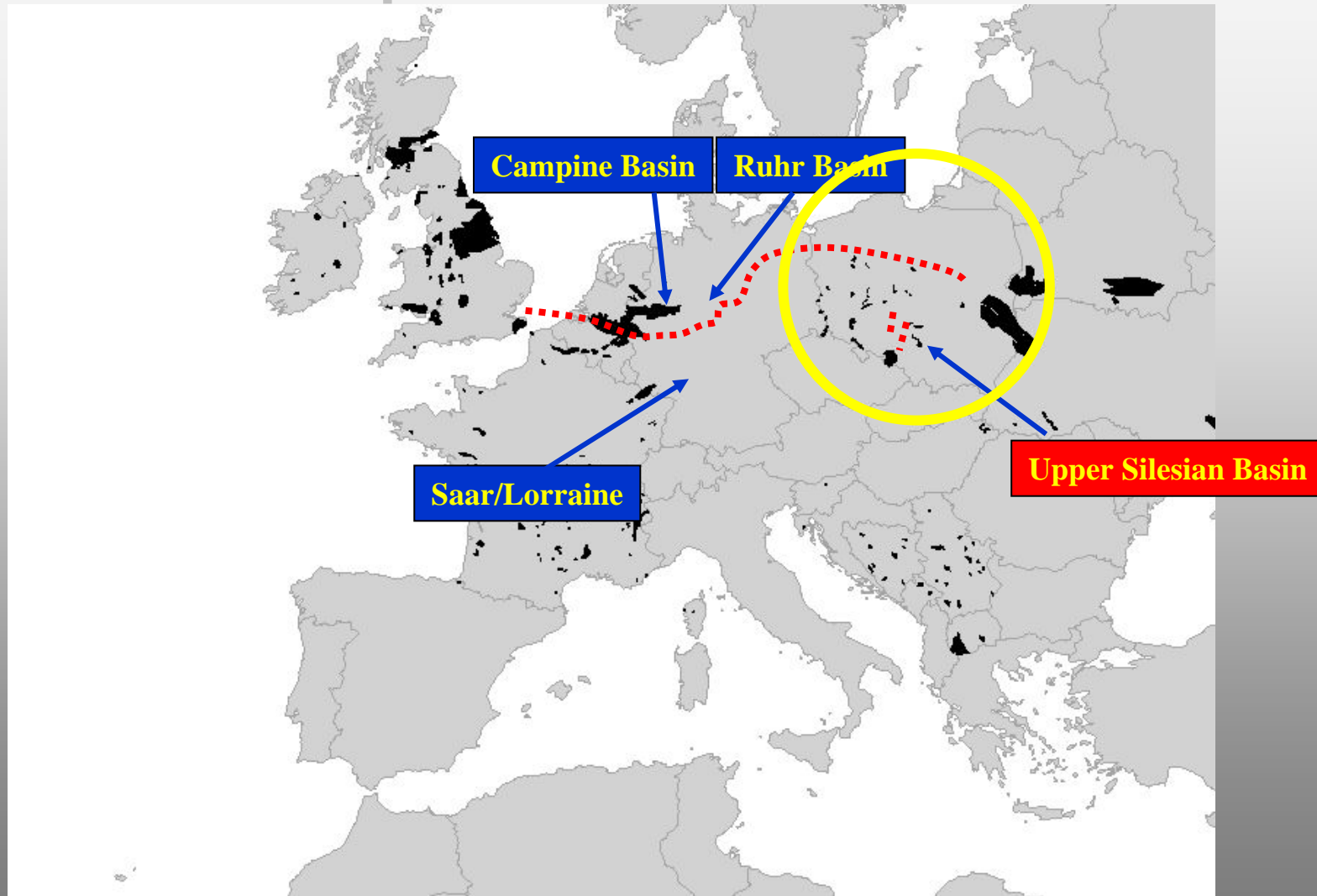
## OUTLINE OF COAL AND METHANE RESOURCES IN POLAND

In Poland hard coal deposits are located in:

- the Upper Silesian Coal Basin (USCB),
- Lower Silesia Coal Basin (fully abandoned at present)
- Lublin Coal Basin (only one active mine).

Upper Silesian Coal Basin is expected to be a promising site for CMM recovery/utilization. The most gassy mines are located in south and south-west part of the coal basin.

# European Coal Basins



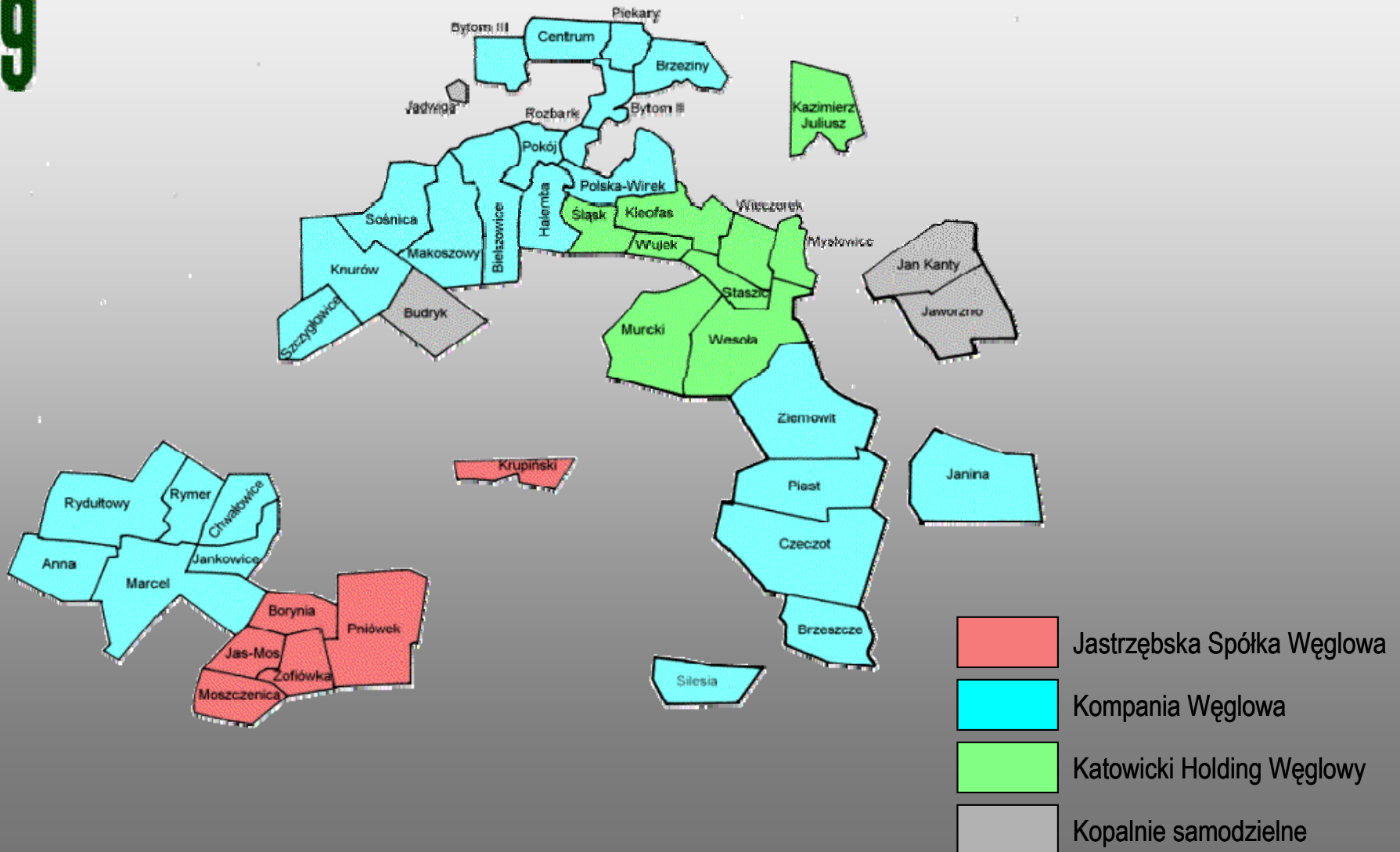


# LOCATION OF HARD AND BROWN COAL DEPOSITS IN POLAND





# LOCATION OF THE HARD COAL MINES IN UPPER SILESIAN COAL BASIN





## **Upper Silesian Coal Basin :**

Presently **33** operating hard coalmines including

**29** gassy coalmines

**20** use drainage systems

**14** utilise CMM



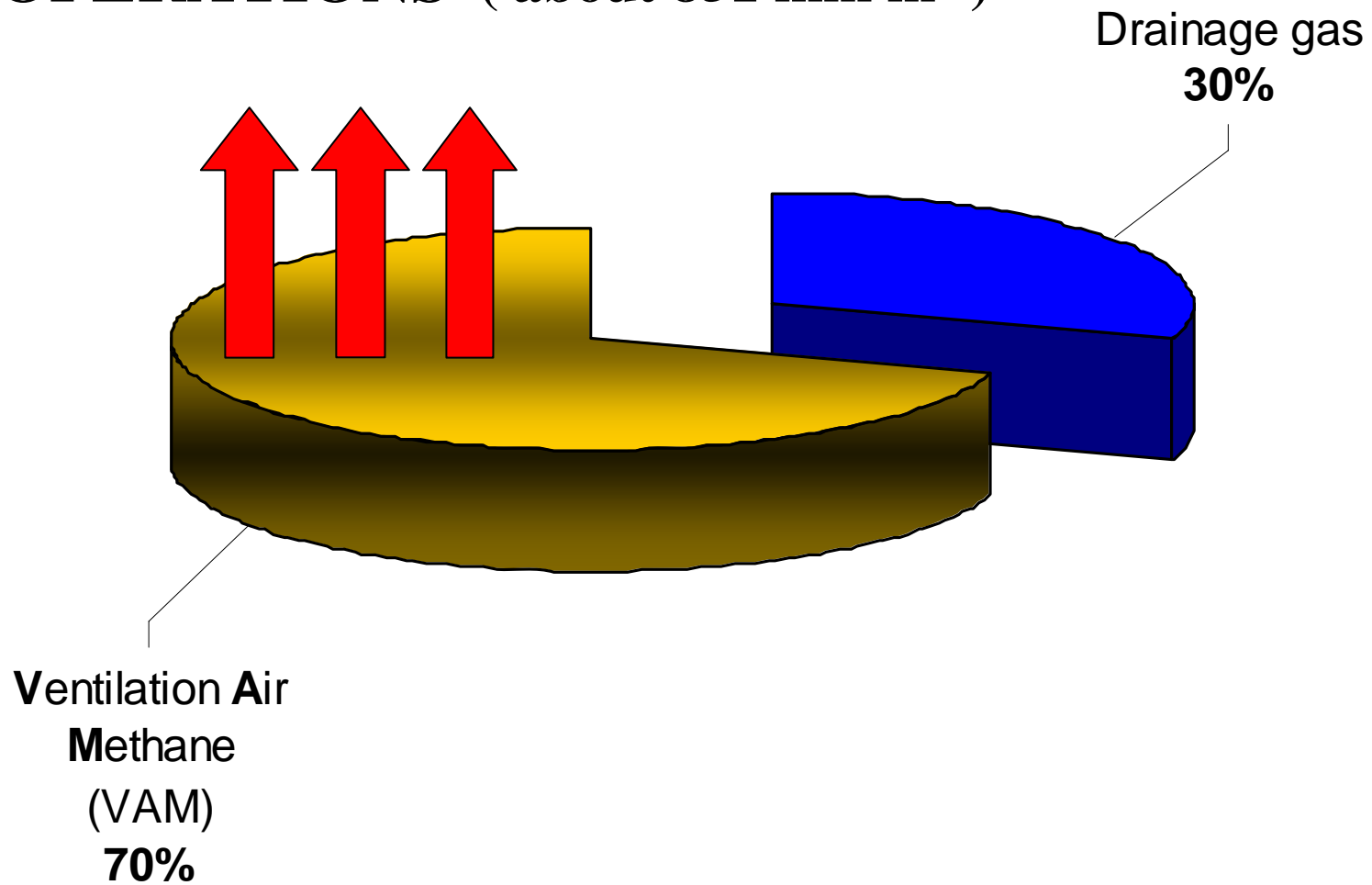
# TOTAL ANNUAL HARD COAL & CMM PRODUCTION

Hard coal output: **94.3 mln Tonnes**

Total absolute gasiness: **870.3 mln m<sup>3</sup>**

data for the end of 2006

# TOTAL GAS RELEASED DURING MINING OPERATIONS ( about 851 mln m<sup>3</sup> )







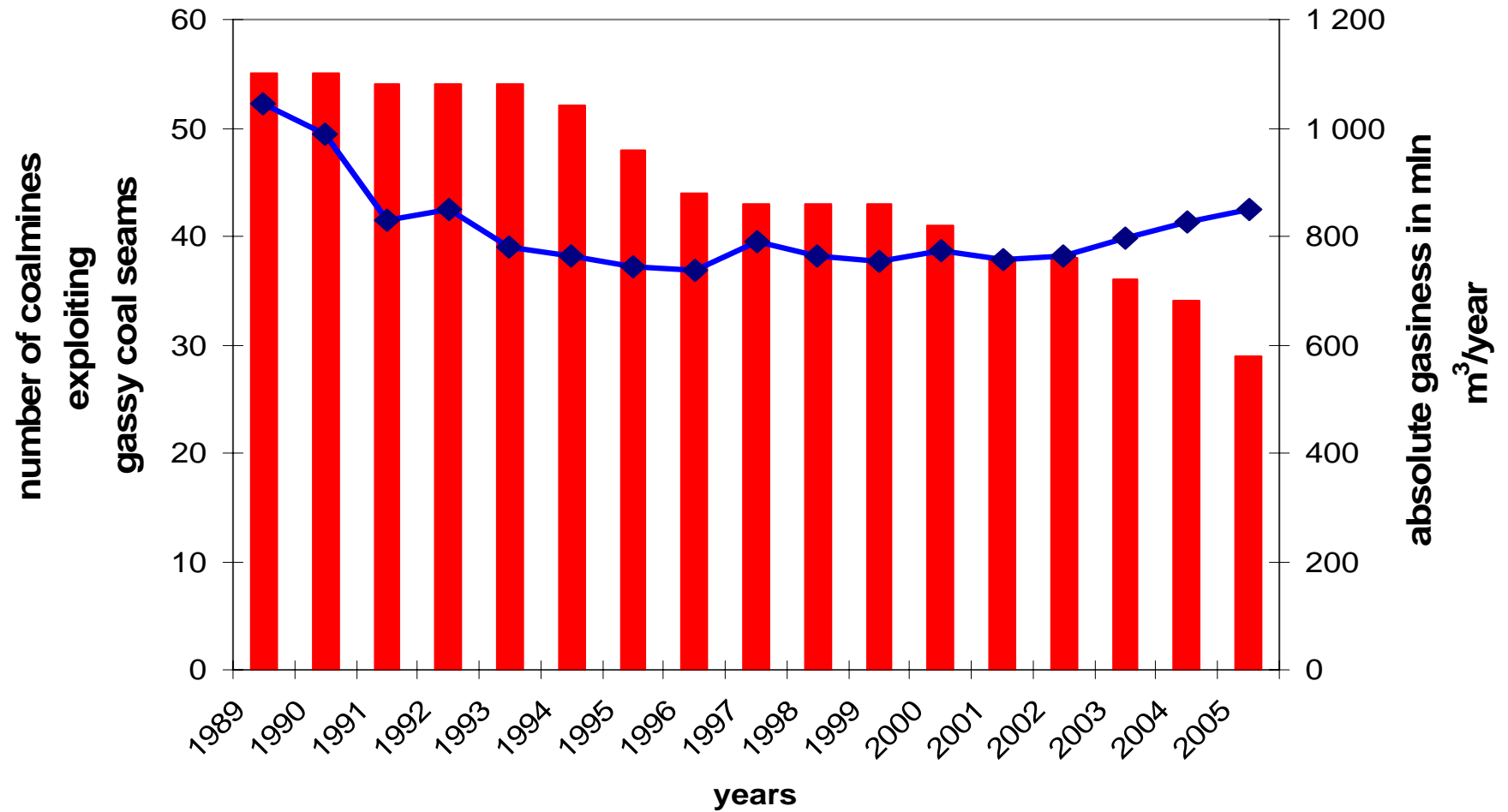
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# Coal Mine Methane Resources



- > geological resources about 250 bln m<sup>3</sup>
- > balance resources to be exploited: 95 bln m<sup>3</sup> ,  
including mining areas  
of hard coal mines: 29.8 bln m<sup>3</sup>
- > industrial resources 4.8 bln m<sup>3</sup>
- > annual methane emission about 1 bln m<sup>3</sup>
- > methane recovery by the mines about 250 mln m<sup>3</sup>  
economical utilization about 200 mln m<sup>3</sup>

**Changes of absolute gasiness versus decrease of active gassy coalmines' number**



■ number of coalmines exploiting gassy coal seams    ◆ absolute gasiness in mln m³/year

## **Changes of absolute gasiness versus decrease of active gassy coalmines' number**

Since 1989 till now...

- Drop of number of gassy coalmines by **48%**
- Drop of absolute gasiness by **19%**



## Some history of degasification....

In Marklowice area in 1929 – very first CBM capture. Totally 330 mln  $\text{m}^3$   $\text{CH}_4$  was produced, with the quantity of 25  $\text{m}^3/\text{min}$

„Silesia” coalmine – 4 wells were drilled, totally 6.5 mln  $\text{m}^3$   $\text{CH}_4$  was captured with the quantity of 7.6-30  $\text{m}^3/\text{min}$



In 1990-1996 – CBM activities of many foreign companies mainly from USA and GB e.g. : Mc Kenzie, AMOCO, TEXACO, Mc Cormick, Cee Bee Natural Gas Inc. and domestic e.g.: METANEL S.A. and POLTEX-METHANE. Task : - CH<sub>4</sub> exploitation from the coal beds  
- method: drilling the vertical wells from the surface.

Stopping the operations and withdrawal from further activities .



Low gas permeability of Polish coals: about 1 mD and even lower incline towards drainage operations from underground excavations – Polish precursor „Silesia” coalmine in 1956.



Efficiency of methane drainage with the underground methods depends on mining and geological conditions and applied technology of drainage :

- drainage conducted from the development works,
- exploitation drainage in the neighbourhood of coal faces – the most effective,





## **Real Effectiveness of drainage in the neighborhood of longwalls reaches:**

- in the retreat longwalls 20-30% of total amount of methane released in the neighbourhood of mining exploitation,
- in the longwalls on the advance 25-50%
- in the longwalls with double ventilation galleries 40-60%,
- in the longwalls with drainage galleries over the longwalls' gobs 50-76%.



## QUANTIFICATION AND UTILIZATION OF METHANE GAS IN THE COALMINES

- Different content of methane in the captured gas depends on the applied method as well as other factors i.e.:
- during the operations conducted from the surface with the deep wells - so called drilling wells concentration of methane in the gas could be over 90%, what gives parameters comparable with the natural gas (pipeline quality ),



- in the underground drainage of the coal seams and the surrounding strata by the bore-holes in the neighbourhood of conducted exploitation, concentration of methane varies from 30 to 70% according to the applied method of drainage, system of exploitation and ventilation, sealing of the bore-holes and sizes of fractures in the neighbourhood strata,
- during the drainage of the gobs and the workings isolated with the dams – by the installed pipelines, concentration of methane varies a lot, in the range of 20 - 90%,



- in the drainage over the gobs by the isolated workings or big diameter drainage wells, performed over the longwall to be exploited concentrations of methane vary from 60 to 95%.



**Thank you for your attention ...**

**[jskiba@gig.katowice.pl](mailto:jskiba@gig.katowice.pl)**