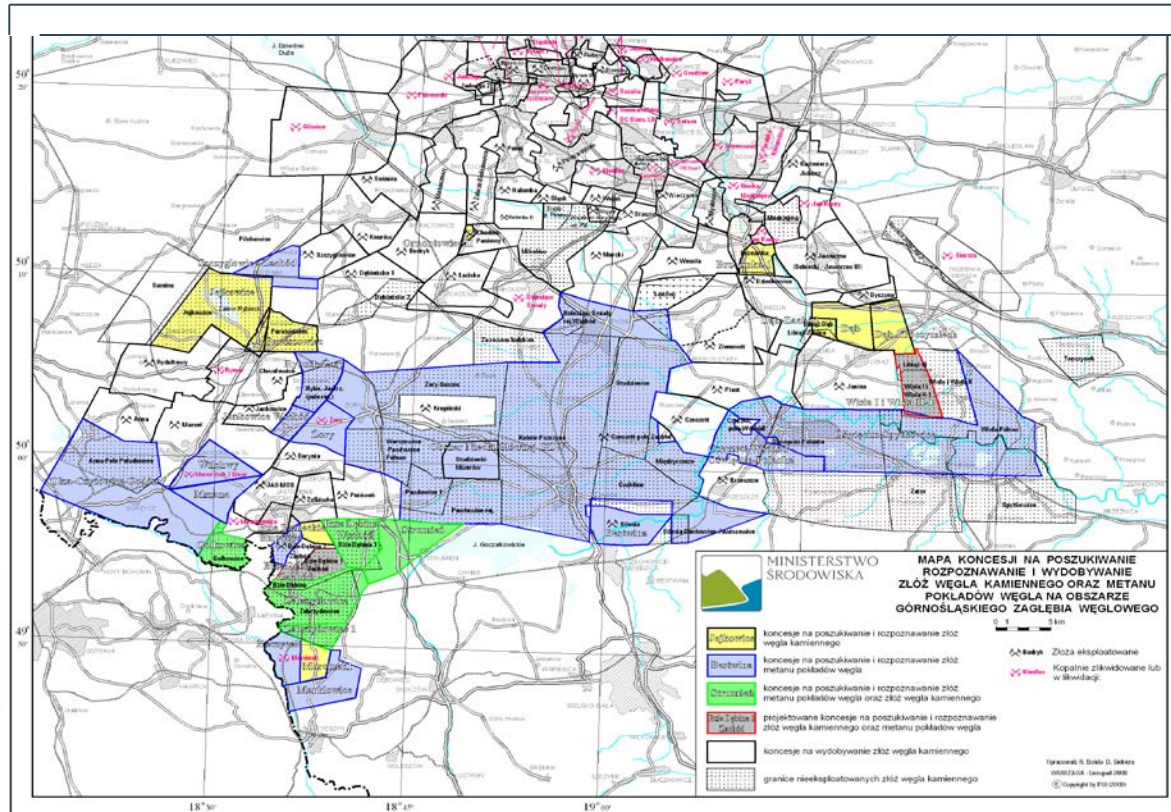


# **OBSTACLES AND INCENTIVES FOR THE DEVELOPMENT OF CMM UTILIZATION PROJECTS IN POLAND**

Kraków, October 14th, 2011

# METHANE IN POLAND



According to the data of Polish Ministry of Environment methane in the coal beds occurs mostly in the deposits of Upper Silesian Coal Basin. Prospective reserves of CBM are estimated for about 254 bln m<sup>3</sup>, including commercial exploitable reserves, which may amount to about 150 bln m<sup>3</sup> and besides additional reserve can be non- commercial exploitable reserves estimated at 38 bln m<sup>3</sup>.

## METHANE IN POLAND

**Methane in Poland is mainly recovered as an accompanying mineral when extracting hard coal. It is also exploited as a primary mineral.**

Presently valid concessions for methane - as a primary mineral :

### ***Concessions for methane deposits' prospecting and exploration.***

Cetus - Energetyka Gazowa joint venture – 6

Composite Energy (Poland) joint venture - 2

EurEnergy Resources Poland joint venture –3

European Diversified Resources joint venture – 1

Pol-Tex Methane joint venture –2

(including 1 „joint” concession in the exploratory-prospecting stage)

Urządzenia i Konstrukcje joint stock company – 1

### ***Concessions for methane exploitation.***

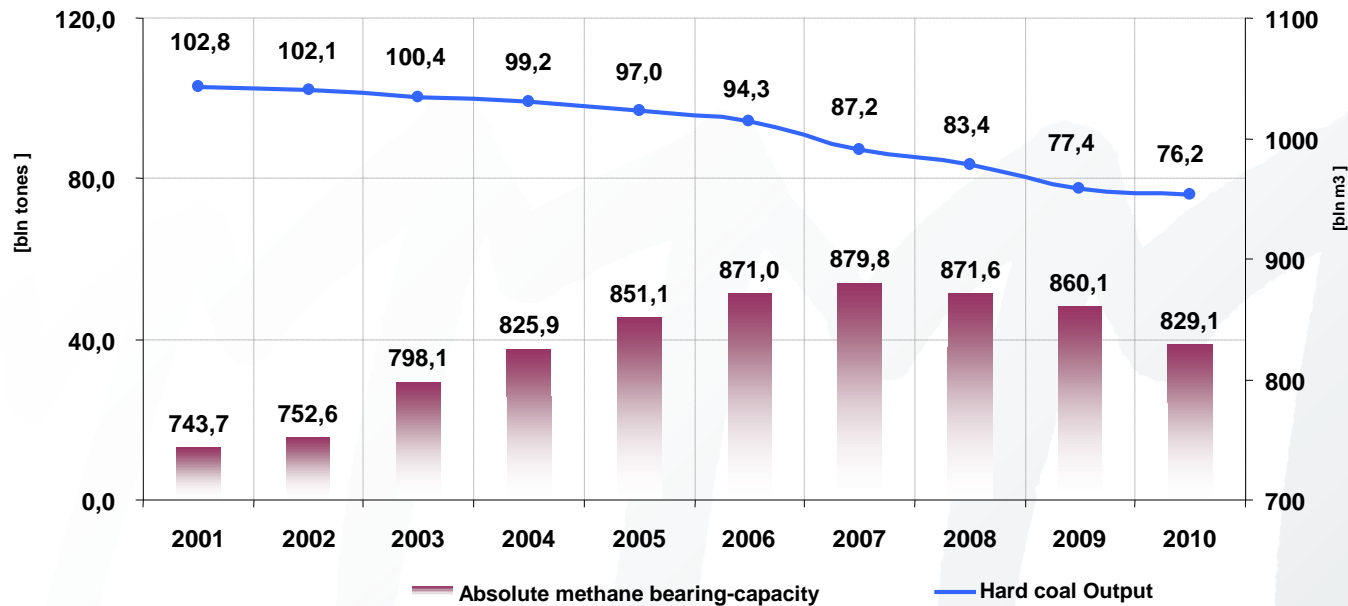
Karbonia PL joint venture – 1 („joint concession”1) in the stage of exploitation)

Metanel S.A. – 1 concession for methane exploitation from the deposit „Silesia Głęboka”.

## METHANE IN POLISH MINING

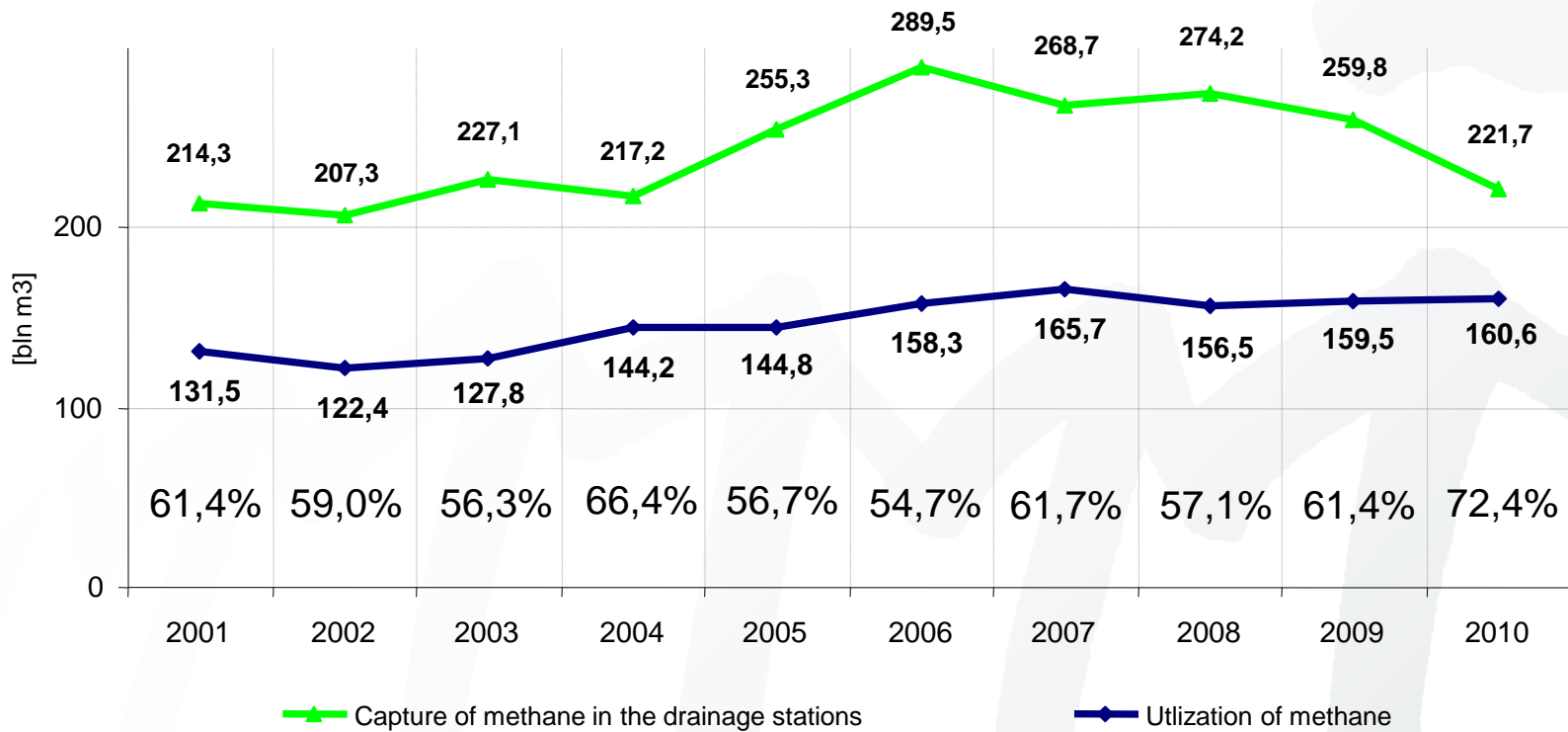
Occurrence of methane in underground mining plants is recognized as a big problem from the labor safety point of view and impact on the environment.

**Absolute methane-bearing capacity and hard coal output in the years 2001– 2010 in Polish hard coal mining.**



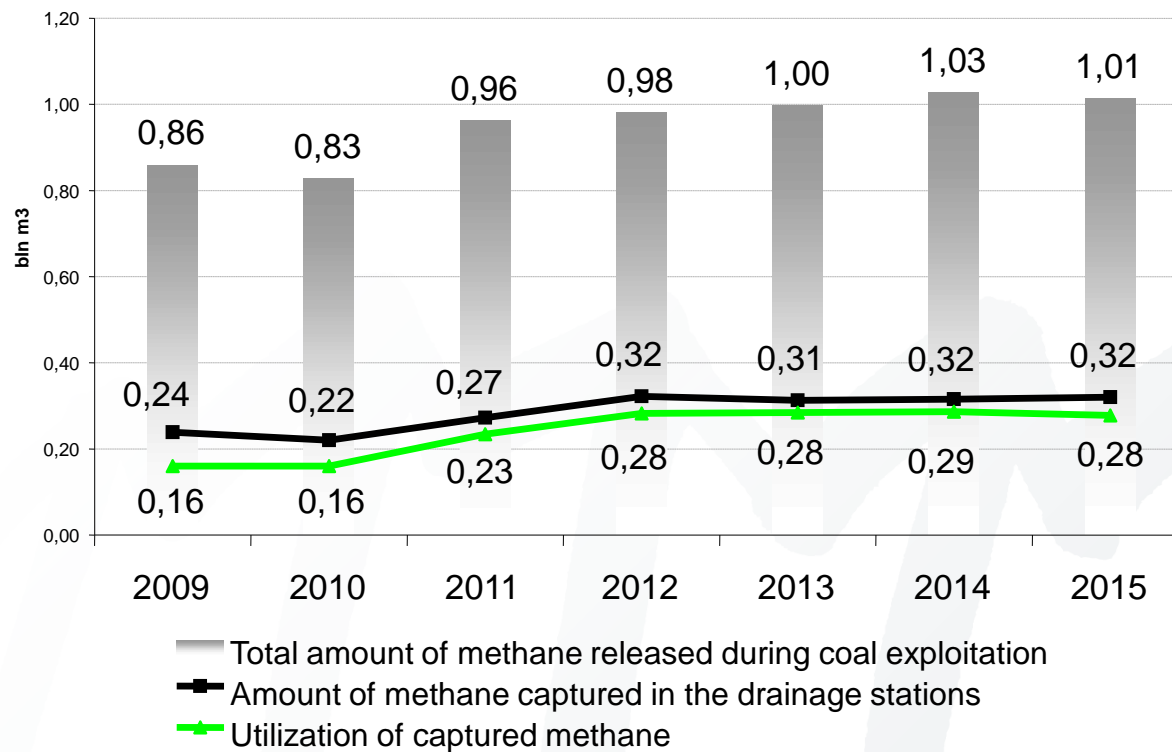
## METHANE IN POLISH MINING

### Utilization of methane captured during hard coal exploitation in Polish hard coal mining in the years 2001 - 2010



## UTILIZATION OF METHANE

Utilization of methane captured during hard coal exploitation to produce electricity and heat in Polish hard coal mining in 2010 and its forecast for the years 2011 - 2015.



**Methane not utilized is being emitted to the atmosphere**

## METHANE IN THE VENTILATION AIR

Presently about **70%** of methane released during mining exploitation is being released to the atmosphere



21 x



Global Warming Effect

Essential problems connected with utilization of methane contained in the ventilation air are following:

- low admissible methane content in the ventilation shafts i.e. 0.75% (in practice about 0.5%) resulting from Polish safety regulations,
- huge ventilation air flows (in average size shaft about 10,000 m<sup>3</sup>/min),
- fluctuations of both: content and flow connected mainly with progress of mining operations.



## SUPPORT FOR ENERGY PRODUCTION


To promote utilization of renewable sources of energy several mechanisms of their development support are being applied:

- certificates of energy origin,
- investment assistance,
- tax exemptions or reductions,
- tax refunds and
- systems of direct prices support.

To promote utilization of methane to produce electricity following supporting mechanisms are being applied:

- certificates of energy origin from cogeneration,
- subsidies from National Fund,
- exemptions from the excise tax

 In the year 2010 **4** certificates of energy origin from cogeneration coming from methane were issued what resulted in 33.3 GWh of energy.

 In the year 2010 number of certificates of energy origin coming from renewable sources reached over **8,500** what resulted in more than 8.7 TWh energy.



## SYSTEM OF SUPPORT

In the act dated January 8th 2010 concerning changes of the law – *Energy Law* and changes in few other acts, new system of support by the means of certificates of electrical energy origin generated in the highly efficient cogeneration in the unit fired with methane released and captured during underground mining works, in the operating, being liquidated or already liquidated hard coal mines was introduced.

Act 9l. 1. says: „The confirmation of generation electrical energy in the highly efficient cogeneration is the certificate of this energy origin, hereafter called certificate of origin from cogeneration. Certificate of origin from cogeneration is being issued separately for the electrical energy generated in the highly efficient cogeneration in the cogeneration unit :

- 1) fired with gas fuels or with total installed electrical power of the source below 1 MW;
- 1a) fired with methane released and captured during underground mining works in the operating, being liquidated or already liquidated hard coal mines or with gas obtained from the processing of biomass as understood in art. 2 passage 1 point 2 of the act concerning biocomponents and liquid biofuels;
- 2) other than listed in points 1 and 1a.”



## CERTIFICATES OF ENERGY ORIGIN

Average sale price of electrical energy generated from highly efficient cogeneration in the cogeneration unit fired with methane released and captured during underground mining works in the operating, being liquidated or already liquidated hard coal mines or with gas obtained from the processing of biomass in the year 2010 was 243.59 PLN/MWh, while average sale price of electrical energy on the competitive market was 195.32 PLN/MWh.

President of Energy Regulation Office under his competence announced so called supplementary unit fee, marked with symbol „Ozm”, mentioned in art. 9a passage 8a of the Energy Law act, which was compulsory in 2010 and 2011 in the amount of 59.16 PLN/MWh\*, i.e. at the lowest possible level representing 30% of average sale price of electrical energy at the competitive market (when admissible by the act Energy Law was the range 30 – 120%).

In the year 2010 four certificates were issued, however six proceedings concerning issuing of certificates in 2010 are in course. Total amount of electricity generated in the cogeneration units, mentioned in art. 9l passage 1 point 1a of the act – Energy Law, covered by the certificates of origin from cogeneration amounted for the end of July 2011 101 577.011 MWh. The applications still not examined are concerning 43 347.938 MWh of energy.

\*value of OZE certificates was 267.95 PLN/MWh

## COST OF METHANE CAPTURE

Drainage of the coal mines in 2010 resulted in 221.72 mln m<sup>3</sup> of methane totally, while the drainage operations were conducted:

- from the roadway workings,
- from the exploitation workings (from the longwalls' environment) ,
- from the gobs (behind the dams).

Drainage conducted by the coal mines is covering drilling of the drainage wells together with their hook up, installation works and maintenance of the underground drainage pipeline system as well as maintenance of surface compressor stations. These are the direct costs connected with methane capture. They are increased by the costs beared by the coal mine for the maintenance of whole drainage infrastructure, (drainage pipeline system, drainage station ) covering (amortisation, labor, energy, materials) constituting extra about 35 – 40% of the direct costs.

### Cost of drainage in 2010

	[zł/m <sup>3</sup> ]
Unit drainage cost	0,17 – 0,28
Unit cost of methane hazard fighting	1,13 – 1,64
Unit cost of methane capture	1,3

## PRODUCTION OF ENERGY FROM METHANE

Support system of energy production from methane concerns only cogeneration systems.

There are also other possibilities of methane utilization.

**CH<sub>4</sub>**



production of heat for the heating and technological purposes by burning it in the boilers or technological installations (e.g. drying rooms),



cogenerated production of electricity and hot water,



cogenerated production of electricity and technological steam,



cogenerated production of electricity and medium for the purposes of drying processes,



production of electricity in the mixed systems.

- **Polish authorities support the activities aiming at increasing CMM utilization.**
- **In accordance with the assumptions of the executive activities program of Polish Energy Politics it is necessary to conduct analysis of the effectiveness of implemented system of support for generating the electricity from CMM. Eventual changes in the system of support will be conducted based on the results of the analysis.**



**THANK YOU FOR YOUR ATTENTION**