



Coal mine methane reduction. Legal proposals versus technical capabilities.

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Drainage and Management Office

Proposal for a regulation of the European Parliament and of the Council on methane emissions reduction in the Energy sector

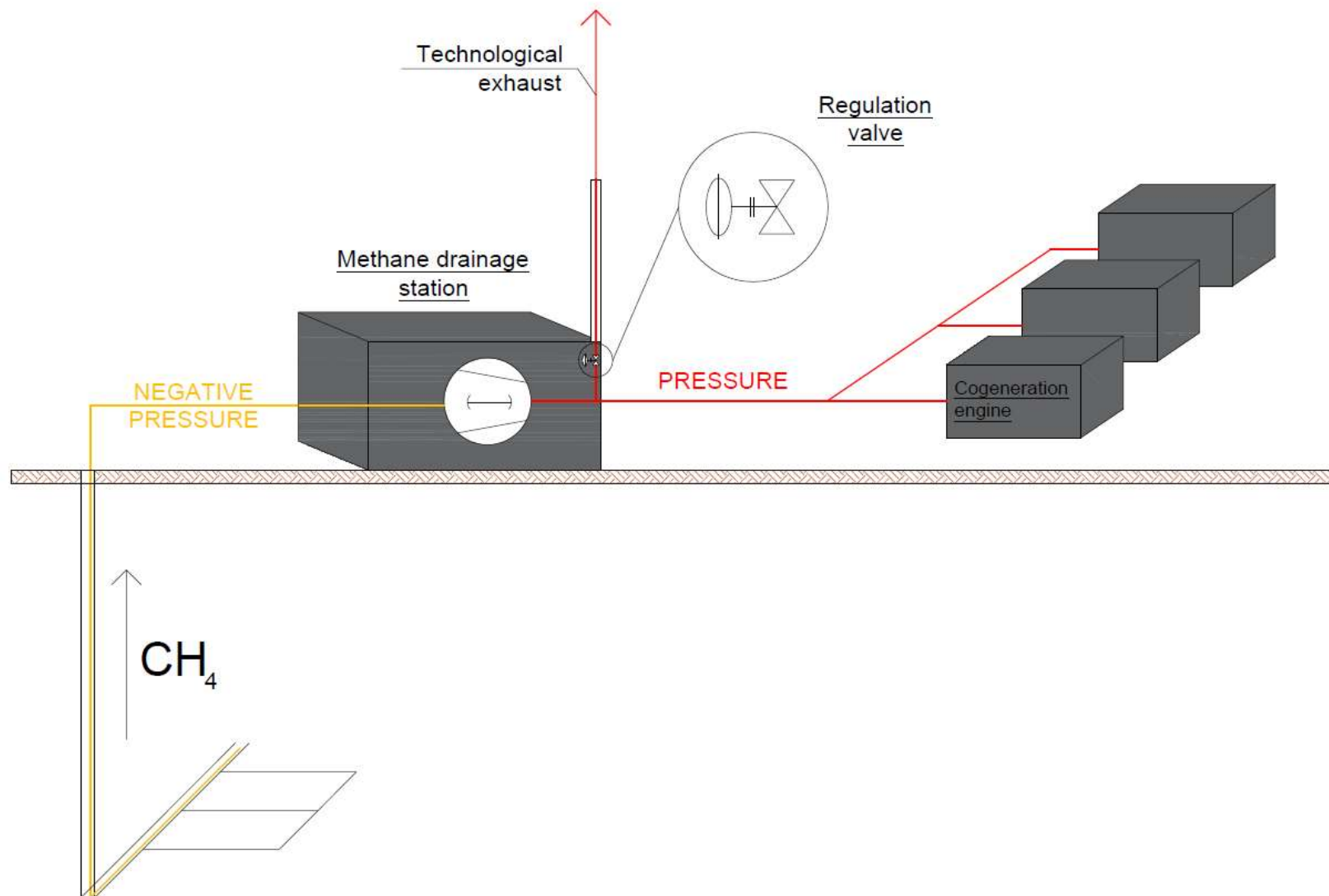


Article 22

*„1. Venting and flaring of methane from drainage station shall be prohibited from **1 January 2025**[...].”*

*„2. Venting of methane through ventilation shafts in coal mines emitting more than 0.5 tonnes of methane/kilotonne of coal mined, other than coking coal mines, shall be prohibited from **1 January 2027**.”*

*„3. By ... **three years from the date of entry into force of this Regulation** the Commission shall adopt a delegated act in accordance with Article 31 to supplement this Regulation by setting out restrictions on venting methane from ventilation shafts for coking coal mines.”*



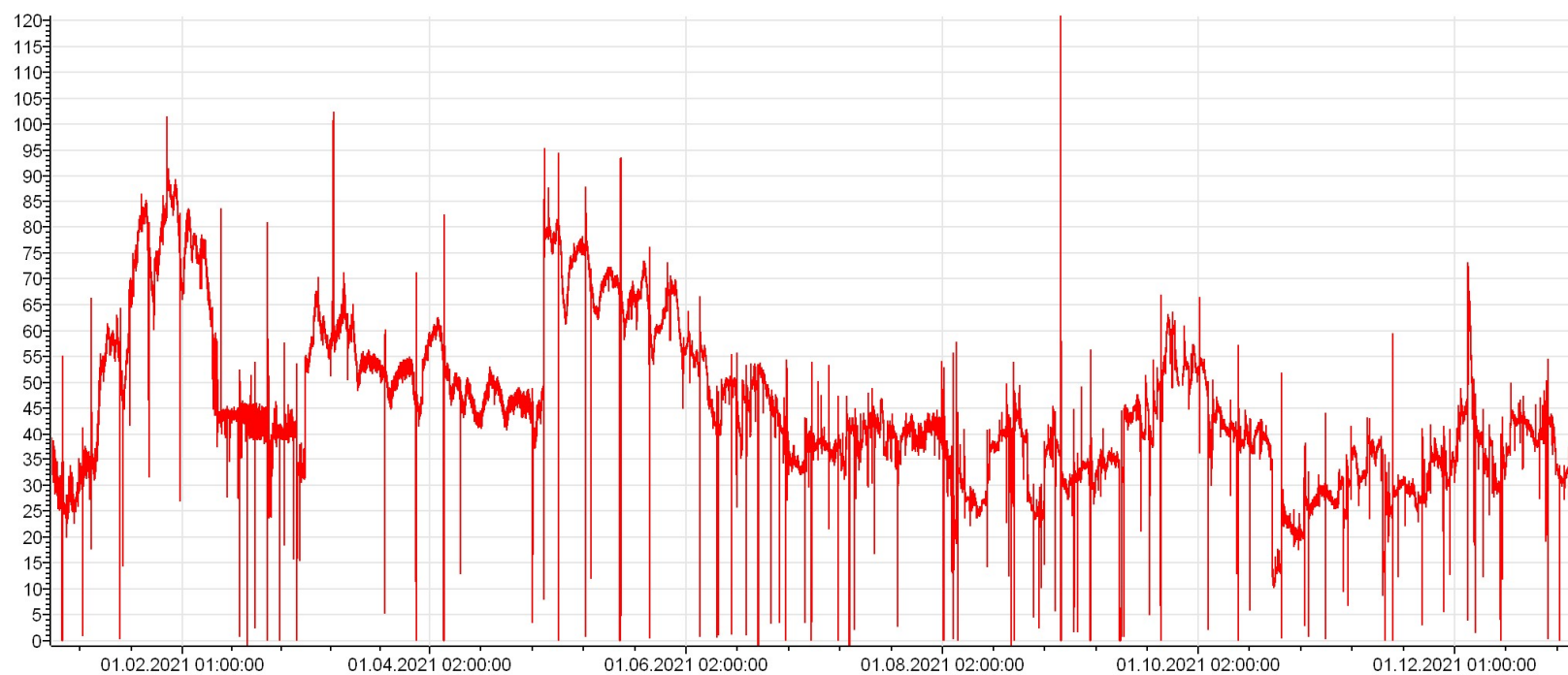
Jastrzębska Spółka Węglowa

Capture of methane. Methane drainage station KWK „Budryk”



Okres: 01.01.2021 00:00:00 - 01.01.2022 00:00:00

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Concentration. Methane drainage station Ruch „Zofiówka”



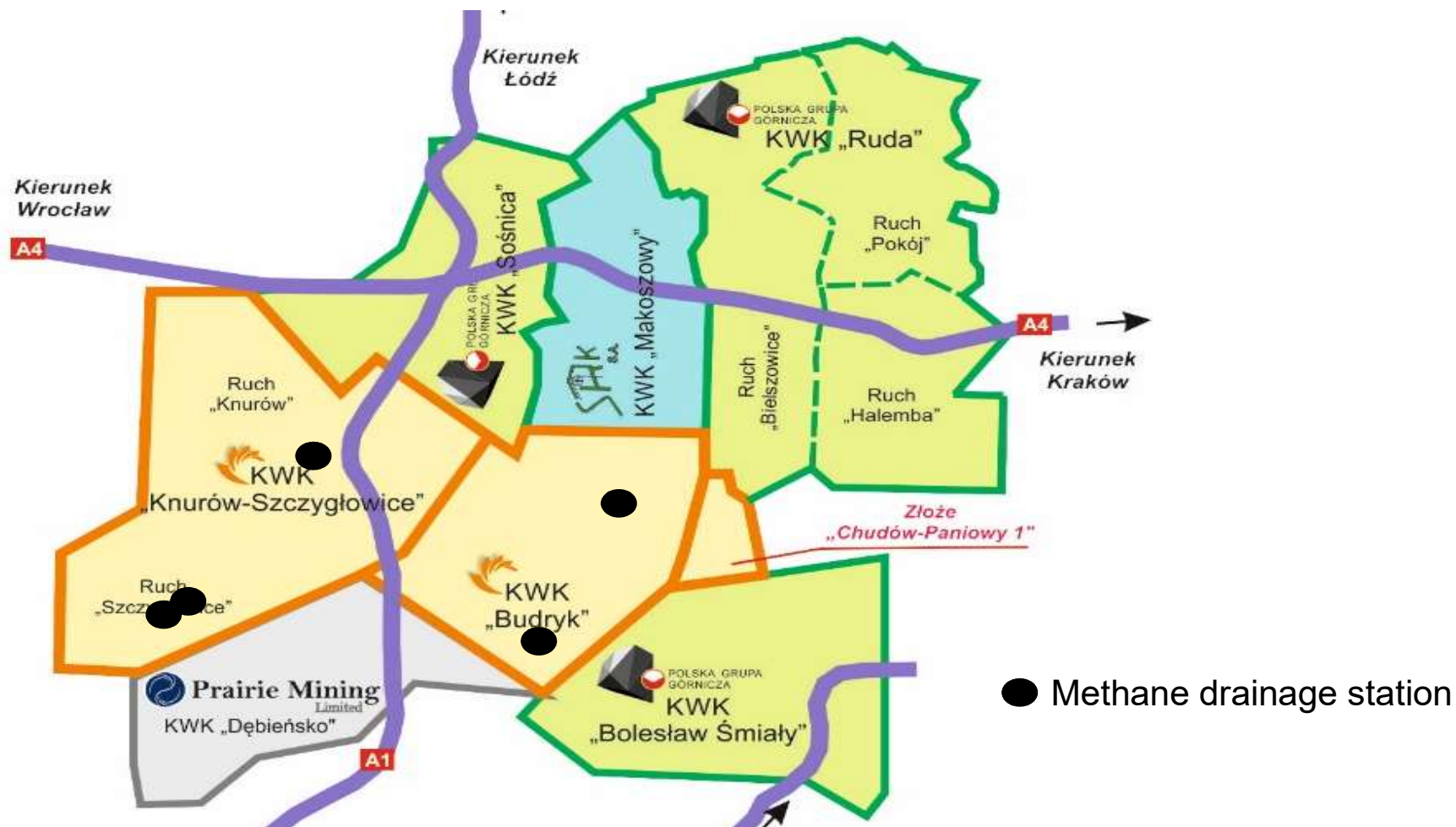
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Jastrzębska Spółka Węglowa

Northern mines



Jastrzębska Spółka Węglowa

Cogeneration



Development of methane engines at JSW by the end of 2025 (installed power)

26 MWe
2020 r.

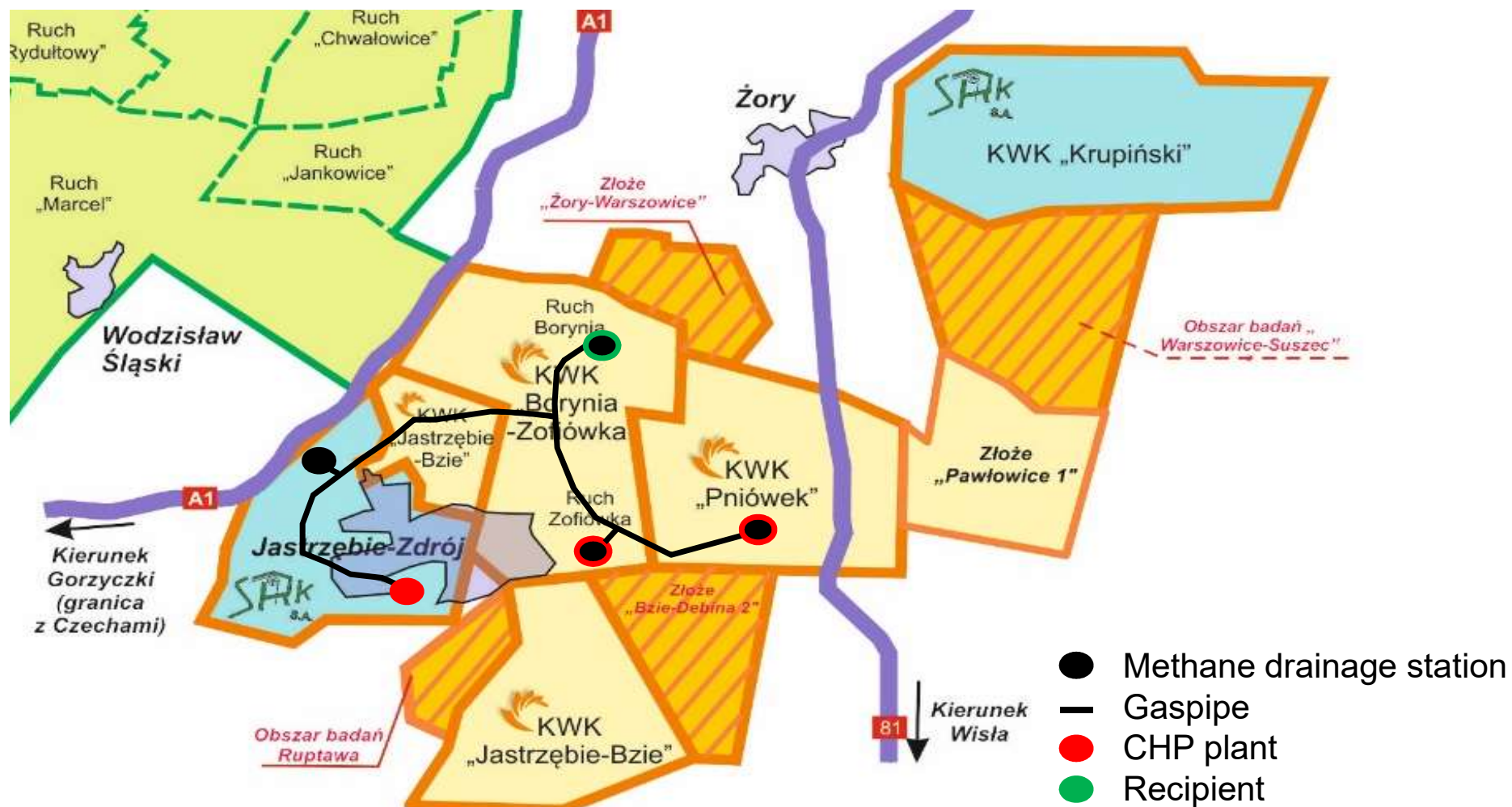


36 MWe – at the end of 2022 r.

44 MWe – at the end of 2023 r.

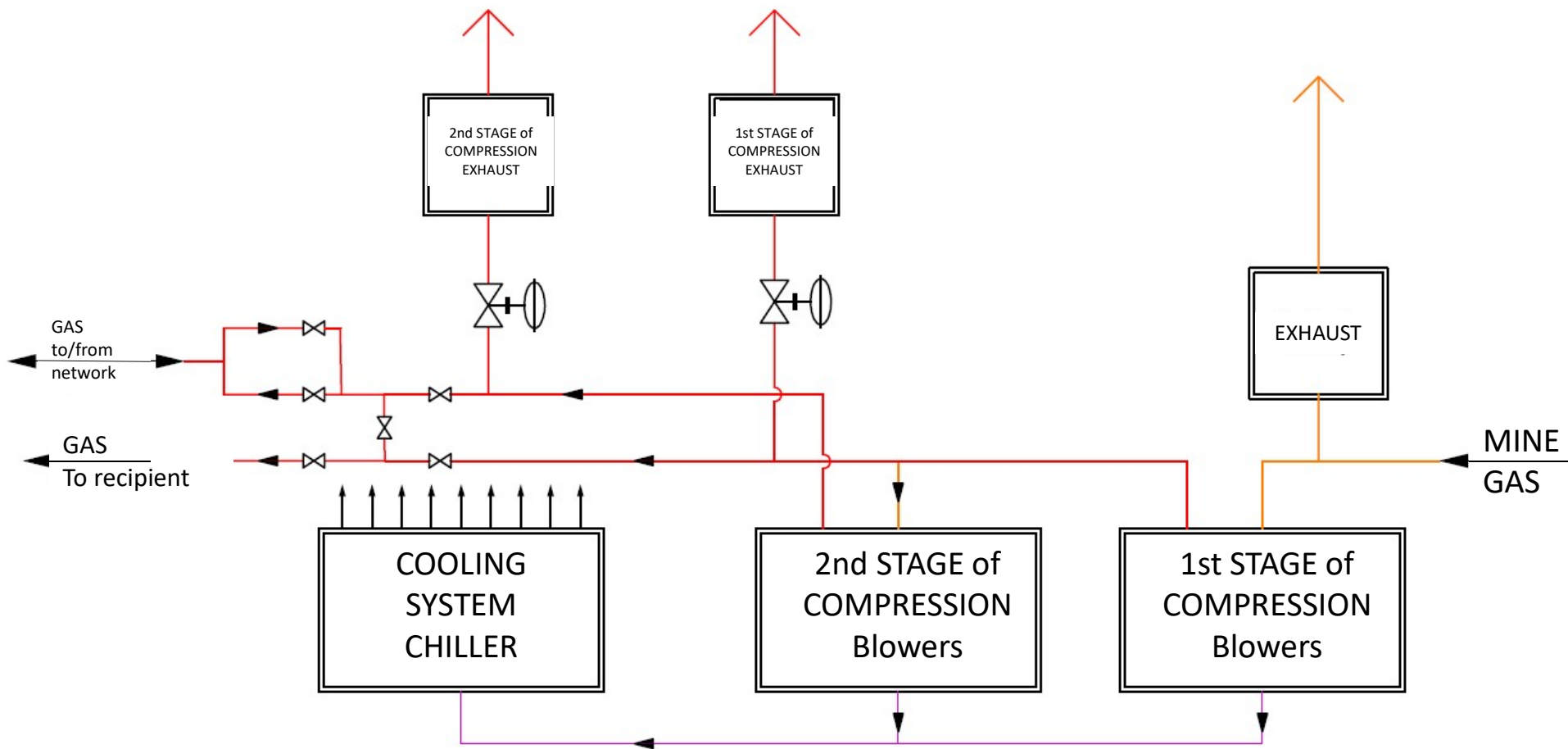
60 MWe – at the end of 2025 r.

CMM projects, for the collection of total methane in one location would become economically viable if they were exempted from the need to purchase emission allowances under the EU Emissions Trading Scheme (ETS) Directive (2003/87 / EC) for CO₂ emitted after CMM combustion. Some other plants are already excluded - biomass plants and waste incinerators. There is therefore a precedent for making such exclusions where there are clear environmental benefits.



Jastrzębska Spółka Węglowa

Methane drainage station scheme



Call for changes to Proposal for a regulation of the European Parliament and of the Council on methane emissions reduction in the Energy sector

Article 22

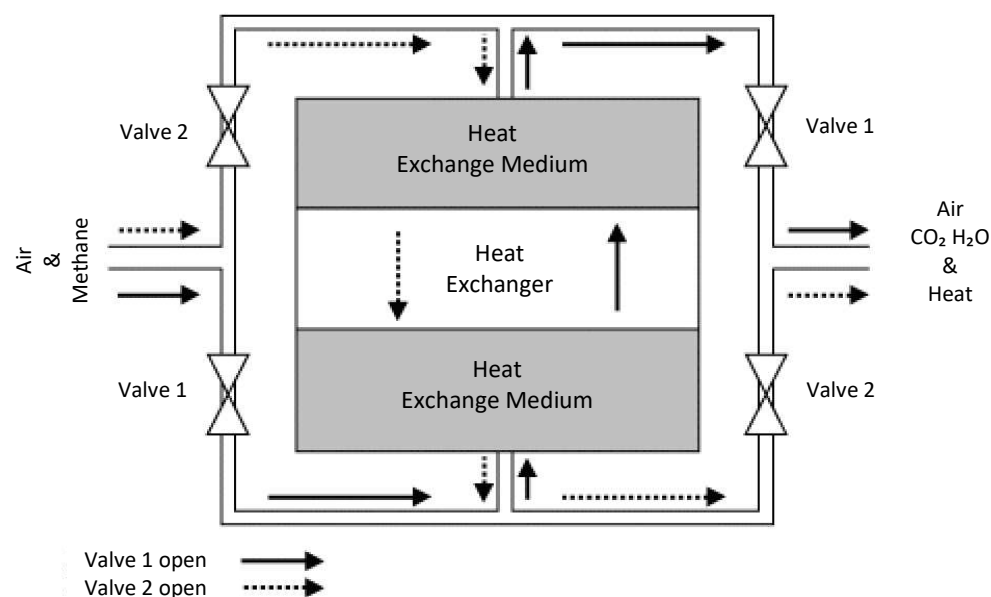
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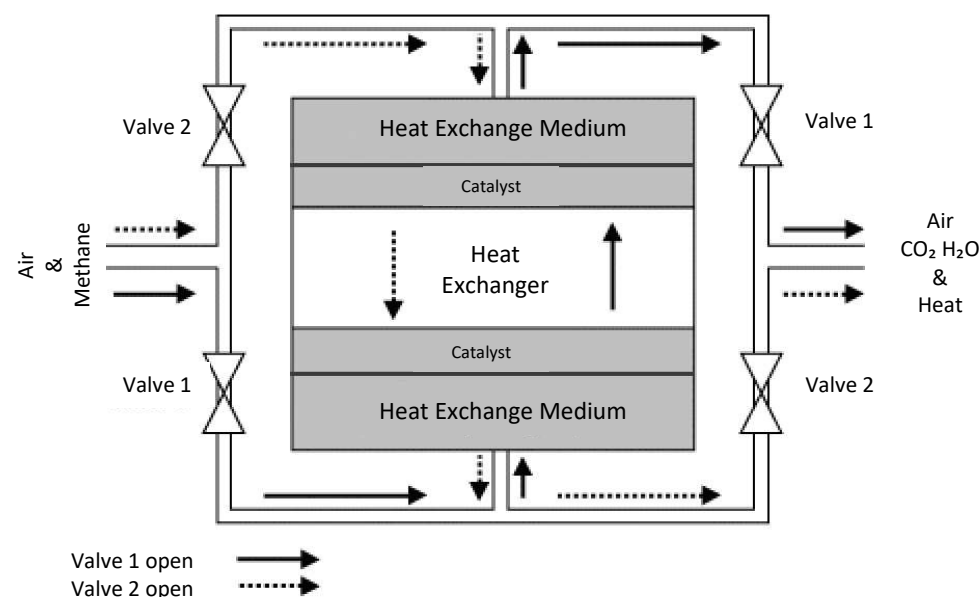
TFRR - Thermal Flow Reversal Reactor

- Temperature to 1000°C,
- Dust and moisture resistant,
- Bed made of silica gravel or ceramic,
- Possibility of superheated (dry) steam generation and electricity production in steam circuits,
- Optimal effective methane concentration above 1%.



CFRR - Catalytic Flow Reversal Reactor

- Lower temperature around 400°C,
- Low dust and moisture resistance,
- Costly catalyst,
- Possibility of electricity production only in ORC systems,
- Methane concentration as low as 0.15%,
- No need for methane concentration.

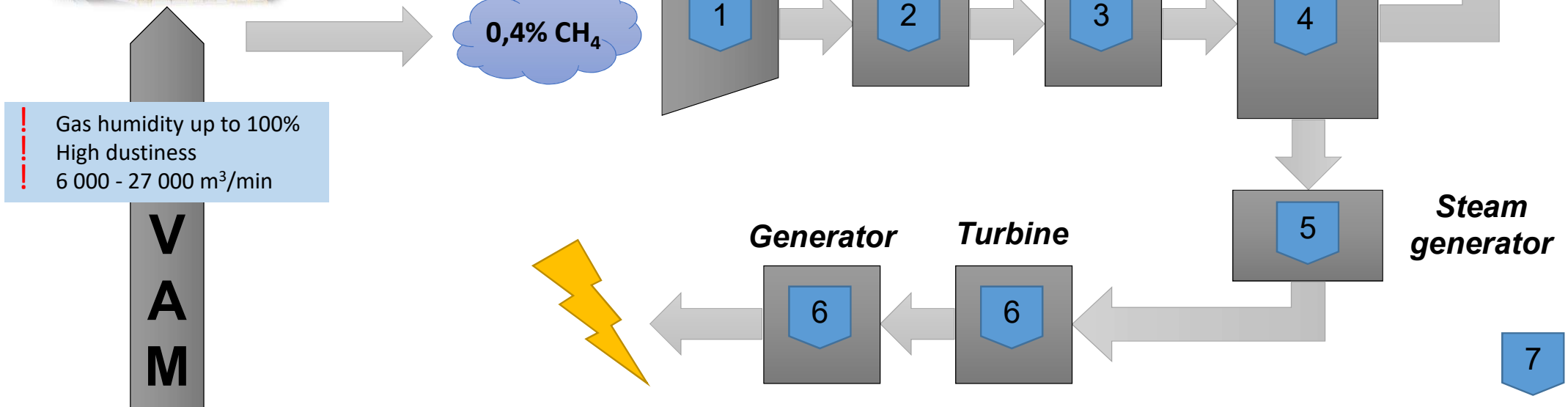


<i>Exhaust ventilation shafts</i>									
<i>Plant</i>	<i>NAME</i>	<i>Average airflow [m³/min]</i>				<i>Average methane concentration [%]</i>			
		<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>
<i>Ruch "Borynia"</i>	Shaft III	25 028	24 927	25 886	25 660	0,07%	0,08%	0,07%	0,06%
	Shaft VI	13 079	12 544	12 458	11 712	0,09%	0,08%	0,10%	0,23%
<i>KWK "Budryk"</i>	Shaft II	20 439	19 938	20 005	19 780	0,38%	0,39%	0,19%	0,29%
	Shaft V	14 690	14 092	14 451	16 190	0,67%	0,45%	0,23%	0,25%
<i>Ruch Knurów</i>	"Aniolki"	6 300	6 317	6 717	7 741	0,13%	0,11%	0,11%	0,08%
	Shaft V	14 738	14 329	13 204	12 393	0,03%	0,02%	0,04%	0,02%
<i>KWK "Pniówek"</i>	Shaft III	19 130	18 943	20 373	19 921	0,16%	0,18%	0,17%	0,12%
	Shaft IV	9 332	10 728	10 571	10 758	0,41%	0,45%	0,41%	0,34%
	Shaft V	14 871	14 615	14 793	14 845	0,41%	0,41%	0,40%	0,32%
<i>Ruch Szczygłowice</i>	Shaft IV	12 500	12 900	13 250	13 950	0,19%	0,18%	0,36%	0,31%
	Szyb VI	19 867	20 458	20 513	19 900	0,25%	0,22%	0,29%	0,36%
<i>Ruch "Zofiówka"</i>	Szyb IVz	21 592	20 749	15 545	11 920	0,16%	0,13%	0,08%	0,08%
	Szyb Vz	18 335	23 221	27 572	29 810	0,15%	0,11%	0,09%	0,11%

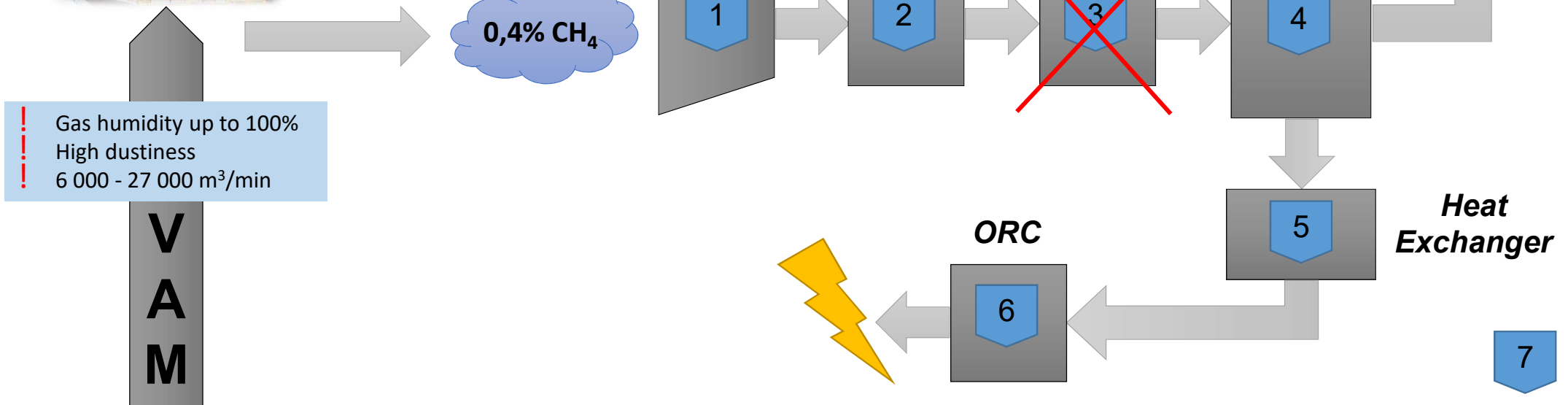
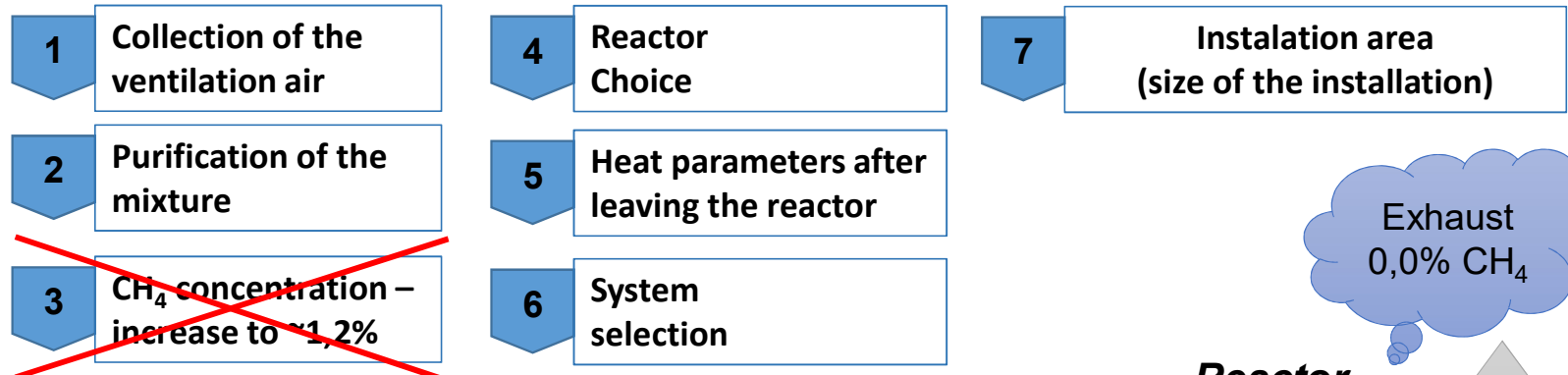
TFRR

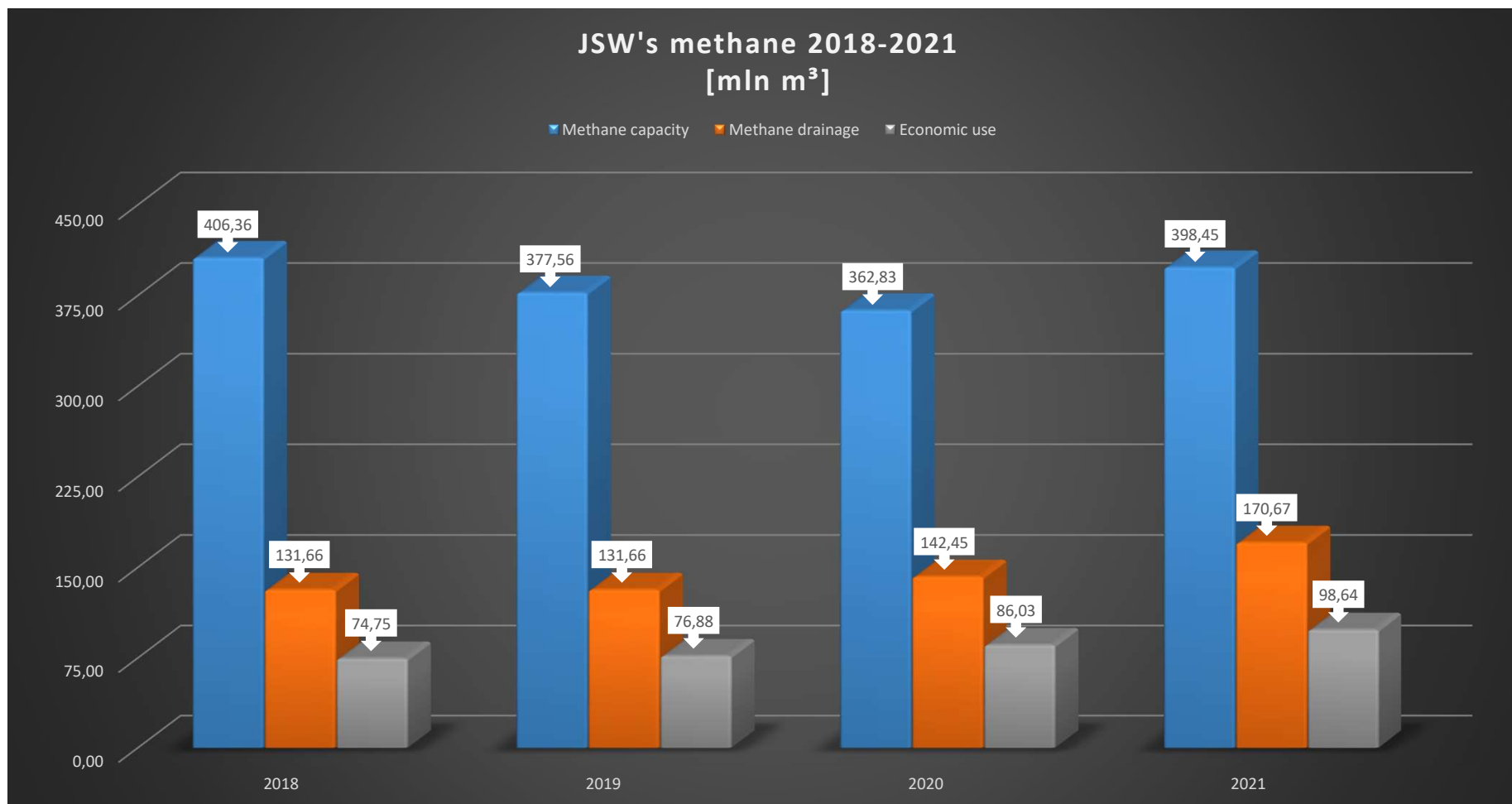


- 1 Collection of the ventilation air
- 2 Purification of the mixture
- 3 CH₄ concentration – increase to ~1,2%
- 4 Reactor Choice
- 5 Heat parameters after leaving the reactor
- 6 Turbine and generator selection
- 7 Installation area (size of the installation)



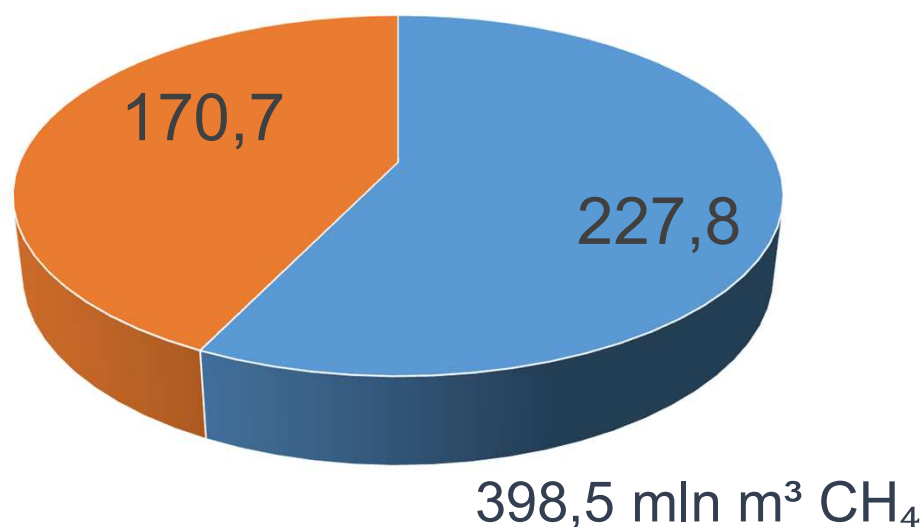
CFRR





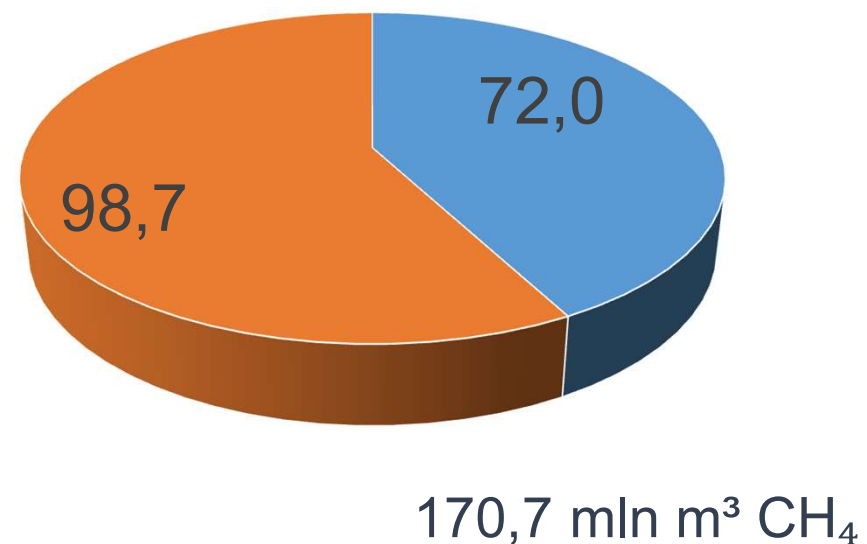
Jastrzębska Spółka Węglowa – methane emission

Total amount of methane released in the coal mining process in JSW S.A. mines for 2021 [mln m³ CH₄]



- The amount of methane emitted to the atmosphere through ventilation [mln m³ CH₄]
- The amount of methane captured by methane drainage stations [mln m³ CH₄]

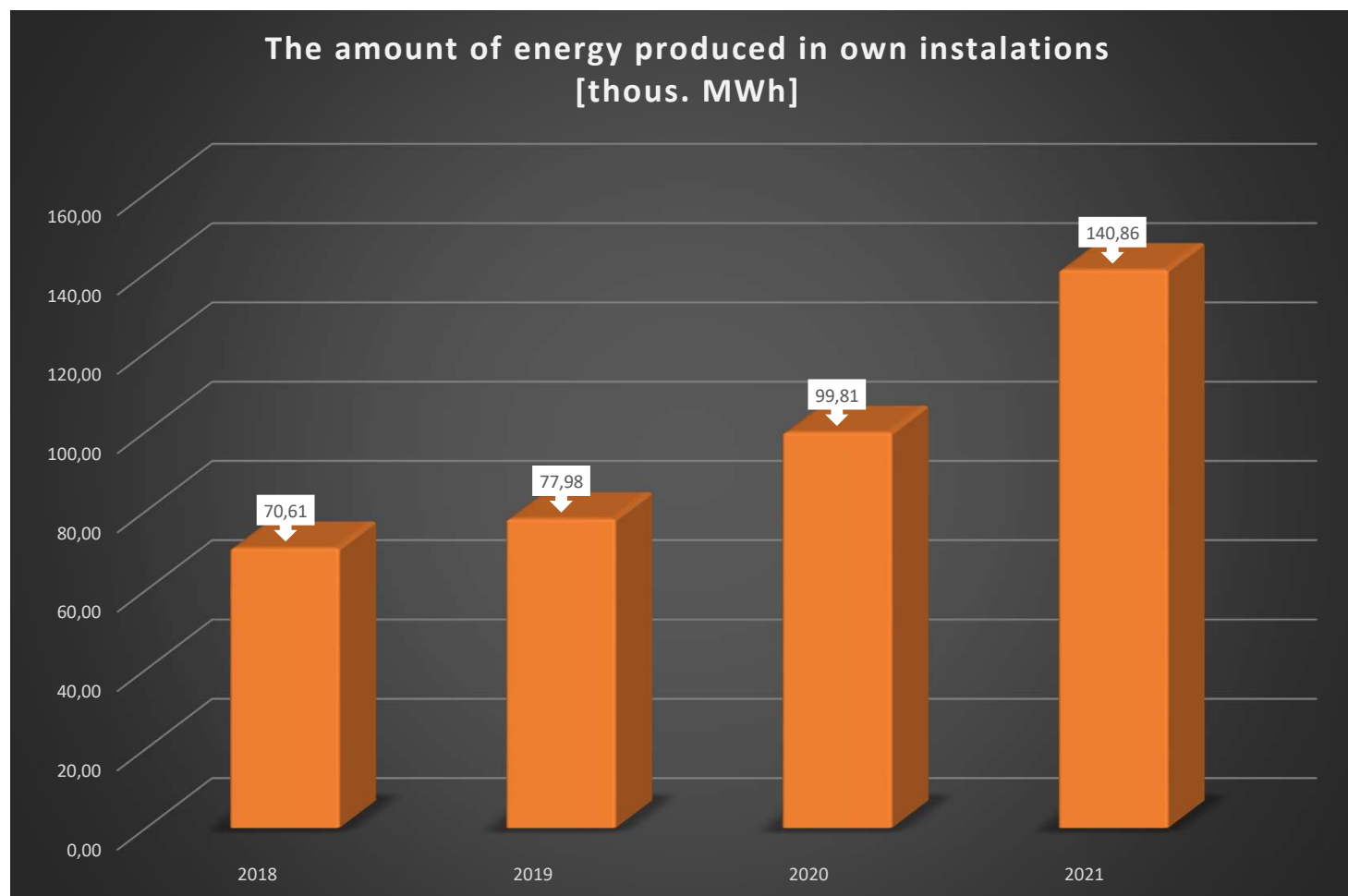
Utilization of managed methane for 2021 [mln m³ CH₄]



- The amount of methane captured in surface methane drainage stations used for own needs [mln m³ CH₄]
- The amount of methane captured in surface methane drainage stations sold to industrial customers [mln m³ CH₄]

Jastrzębska Spółka Węglowa

Self-production of energy of methane



Environment strategy for Jastrzębska Spółka Węglowa S.A.

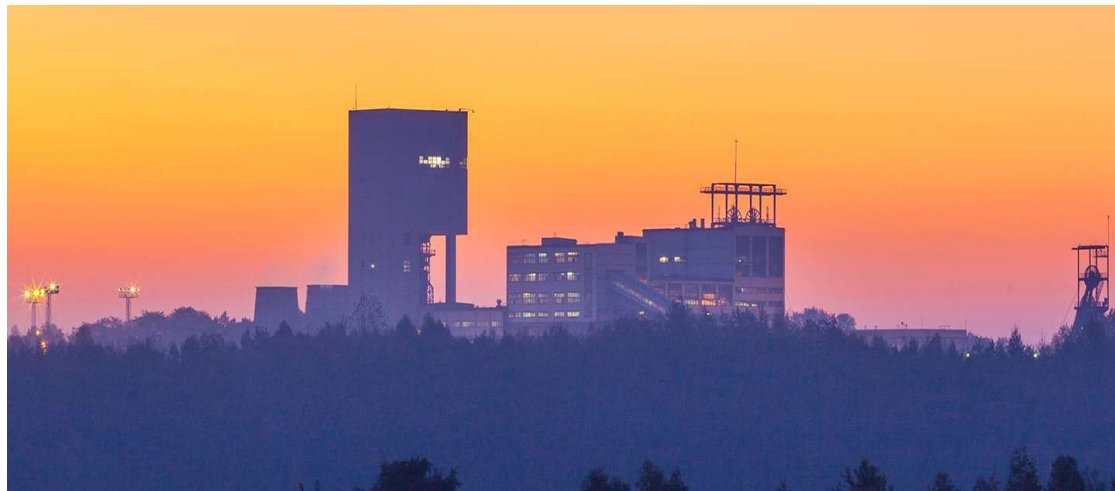


Reduction of the JSW Group's carbon footprint by 30% by 2030 compared to 2018

The carbon footprint at the JSW Group is largely related to methane emissions to the atmosphere. Therefore, projects related to the reduction of methane emissions to the atmosphere and its economic use are currently underway.

Jastrzębska Spółka Węglowa has launched the Methane Emission Reduction Program, the fundamental assumptions of the program are:

- ☐ Increasing methane drainage effectiveness to 50%.
- ☐ Economic use of captured methane to over 95%.



Thank You

Please visit us www.cmm-energy.eu to get more information

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