

CTBB Bioreactors in the fight for clean air



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Ekoinwentyka Ltd. and Compact Trickle Bed Bioreactors (CTBB)

- Air pollution treatment and own, innovative technology of air biopurification in CTBB.
- For all industry sectors with Volatile Organic Compounds (VOCs) and Odors (H_2S , NH_3) emission problem.



**Every year „dirty air” kills
over 2,5 mln people on a world**



VOCs and Odors are dangerous

- Precursor of photochemical smog,
- Carcinogenic,
- harmful to health:
 - cause eye, nose, and throat irritation, damage to liver and kidney,
 - neurological damage



**Air pollution costs the global economy
more than \$5 trillion annually
according to a new World Bank report.**

Industry MUST meet Strict Environmental Regulations

Big Penalties for Noncompliance

1. Up to 500k EUR/ year Penalty

If regulations are NOT met...

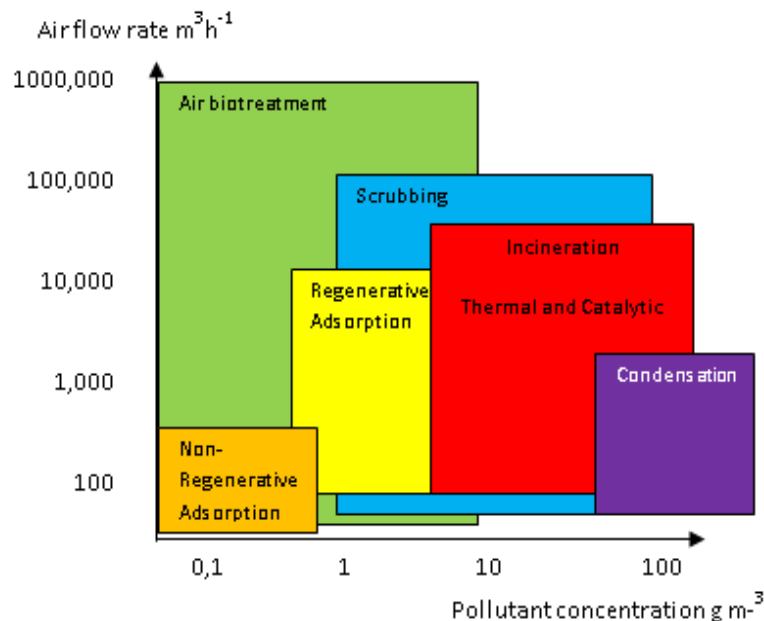
2. Forced Plant Shutdown



Why Compact Trickle Bed Bioreactor (CTBB) ???

Advantages of CTBB to classical technology:

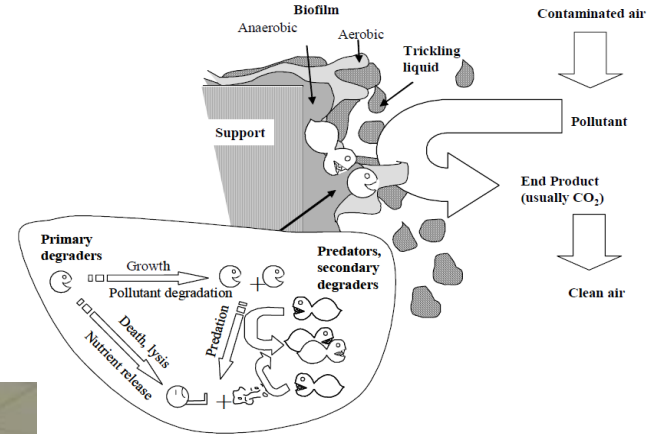
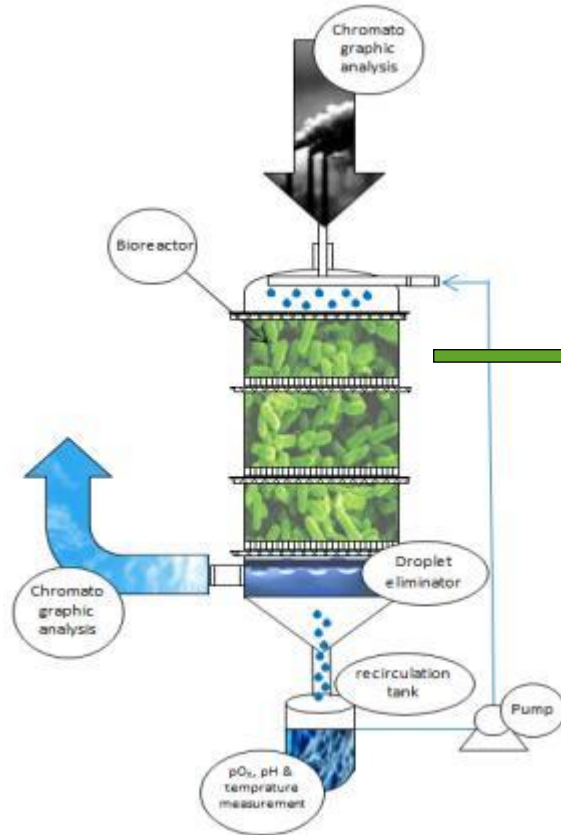
- 1. Low investment and operating costs**
 - low energy consumption
 - no need to use catalysts
- 2. Ecological purity, absence of secondary contaminants**
 - lack of NO_x and CO₂ emission
- 3. It does not shift the pollution problem to water or soil**
- 4. Lack of explosion risks**
- 5. High degree of pollution reduction**



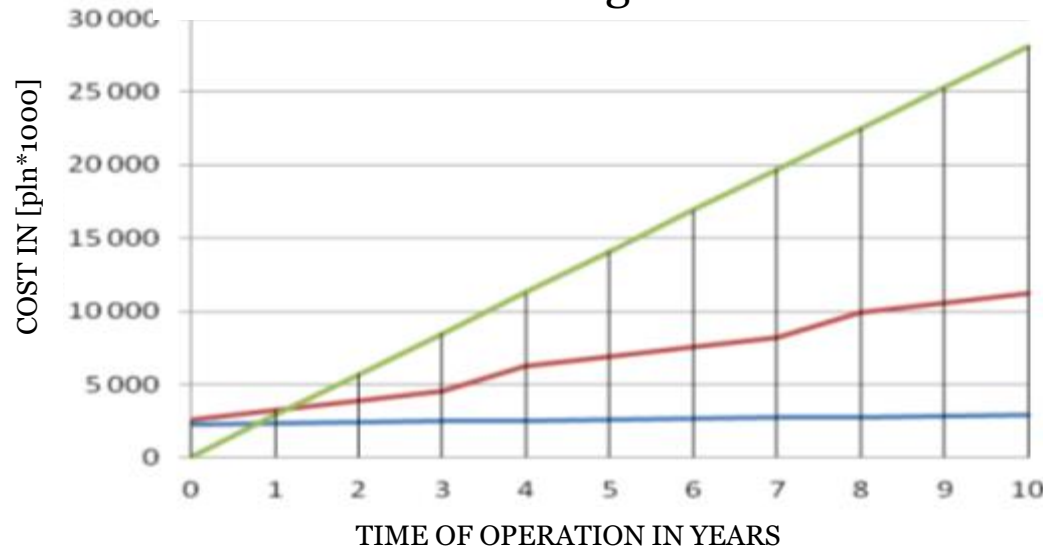
Suitability of various air pollution control technologies.
(after Deshusses, M.A., 2003/04)

We have the most effective system to meet the requirements of Directive 1999/13/EC and possible new laws that will apply in the future.

SIMPLIFIED SCHEME OF THE BIOREACTOR



Comparison of operating costs for different technologies of air treatment



— biotreatment
— combustion, incineration
— adsorption

Data for:

$V_g = 20\,000\text{ m}^3/\text{h}$

$C_g = 1\text{ g}/\text{m}^3$

Feature	OUR SOLUTION (Biopurification)	Current Alternatives
Risk for Explosion	✓ SOLVED	X HIGH RISK
Emission charges (NOX, CO ₂)	✓ SOLVED	X EXPENSIVE
ENERGY INTENSIVE	✓ 30 °C	400 – 800 °C (e.g. Combustion)
EXPENSIVE COMPONENTS	✓ ECONOMIC SOLUTION (microorganism)	Platinum Pt Active Carbon
Industrial Waste by Products	✓ SOLVED	X HIGH RISK
control of all process parameters	✓ SOLVED	X NO (old biofilters)
Acidification & oxidation of bed	✓ SOLVED	X NO (old biofilters)

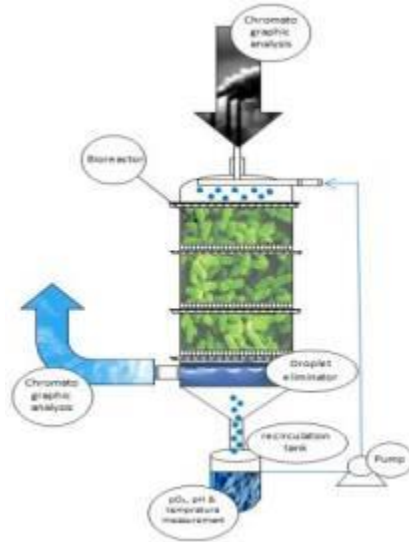
Biopurification save energy, money & environment

Operation Costs for air cleaning from VOCS/Odor

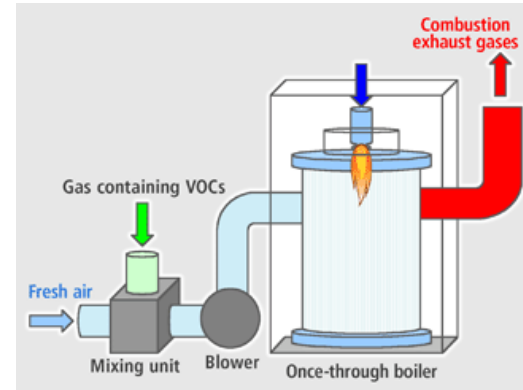
Biotreatment

vs

Combustion of exhaust gases



- ✓ 10 300 € / year
- ✓ no emissions



- 2.000.000 € / year
- NO_x & CO₂ Emissions

(CTBB) – our implementations and references



biopurification of air in a copper-ore mine
at a depth of 1000 m underground



biopurification of air in sewage
treatment plant



biopurification of air in industry
sewage treatment plant



biopurification of air in
waste management plant



project for 300 000 m³/h of
exhaust air purification



biopurification of air in
paint industry



Prizes and awards:
Innovator of Silesia
2012 and 2014,



Ekoinwentyka Sp. z o.o.

Built by help of Government Grant POIR 1.1.1.

KBT Laboratoryjna skala TRL IV

KBT skala techniczna

KBT – skala przemysłowa
Podczas budowy

KBT – skala przemysłowa





Innovative technology of CTBB
working in paint industry (2019)



From Science to business

IHE Delft Institute for Water Education -IMETE Internship



Main R&D Projects:

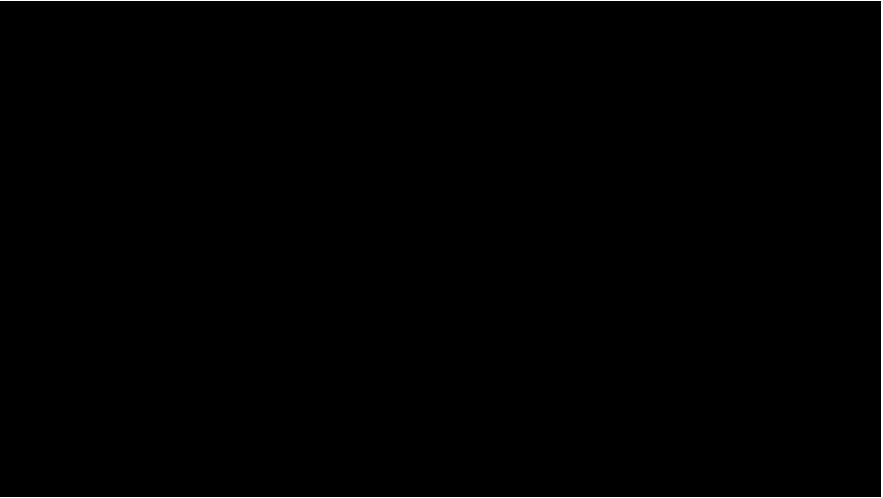
1. Government Grant – POIR 2014-2020, działanie 2.4 ; Seal of Excellence of EU, poddziałanie 2.4.1,
Project cost: 300 000 PLN, 2017
2. Government Grant POIR 2014-2020 EFRR, Project cost: 1 243 938,17 PLN
3. Government Grant - „Innowacyjny Śląski Klaster Czystych Technologii Węglowych”, - projekt ZPORR 2 – przygotowanie jako asystent posła do Parlamentu p. J.Buzka oraz realizacja jako konsultant – asystent IIC PAN w tematyce CCS (wychwytywanie i składowanie dwutlenku węgla CO₂ Capture and Storage). Całkowita wartość projektu 1.626.990,60 PLN , 2005 r. rola: asystent/konsultant
4. SANEPAR (WODOCIĄGI BRAZYLIA) + UNESCO-IHE Department of Environmental Engineering and Water Technology (NL) PROJECT TITLE: SANEPAR ODOR CONTROL Project no: 104997; 08.2016 – 2017, - rola: wykonawca



We look for:

- Cooperation on adaptation of our technology to the new branches of industry and gain new EU /world market.
(Enduser, Experts, Scientists, R&D units)

We offer:

- ✓ Excellent product
 - ✓ Excellent experienced team
 - ✓ Excellent experience how join science and business
 - ✓ **Be part of excellent future**
- 



**Biotechnology
Makes a Difference!**

consulting
designing
accomplishment
technical support

**Thank you
for your attention
dr inż. Damian Kasperczyk**

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