

***VPSA Process for Production of Oxygen
from Atmospheric Air***

Title slide



„BLACHOWNIA”
INSTITUTE OF HEAVY ORGANIC SYNTHESIS



**innovation
& development**



Slide 1: Overview

VP SA Process for Production of Oxygen from Atmospheric Air

- **TWO TO FIVE HIGH LEVEL BULLETS**
- **REFER TO KEY POINTS TO KEEP ATTENTION FOR THE REST OF THE PRESENTATION (YOUR SHORT PITCH)**
- **IF YOU DON'T GET THEIR ATTENTION HERE, YOU WON'T GET THEIR CHECK LATER**

Slide 2: The Problem

Low level of productivity at the fishery farm

Grow of productivity = grow level of oxygen

Pain: Oxygenum price is to high (0,5 – 1 € per kg)

- **BEST TO INCLUDE VALIDATING QUOTES**
- **PROBLEM MUST SUGGEST A LARGE MARKET**

Slide 3: The Solution

TO BUILD OXYGEN GENERATOR

- ✓ YOU HAVE OXYGEN BY 10 TIMES LOWER COST
- ✓ 3 TIMES HIGHER GROW OF FARM PRODUCTIVITY
- ✓ THE OTHER BENEFITS: LOWER CONSUMPTION OF FODDER
- ✓ LOW COSTS WORK OF INSTALLATION – 0,5 kW/h for m3
- ✓ TECHNOLOGY IS INNOVATION AT WORLD SCALE

WHERE IS THE BUSINESS?

- ✓ You can build installation on fishery farm
- ✓ We give you license on installation
- ✓ You commercialize innovation technology

Slide 4: Opportunity and Market

■ MARKET DETAILS

- ✓ Prosper for oxygen generators
- ✓ Many ways of practical applications
- ✓ Need some investors
- ✓ Size and growth rate for five years

■ COMPETITORS

- ✓ Airsep, Praksair, etc.
- ✓ Supplies oxygen generators in higher prices
- ✓ Higher using costs (0,7 kW/h for m³)

Slide 5: Technology

- **Process description**

- The process comprises adsorption of air under increased pressure followed by desorption under vacuum. This is operated in cycles and involves 2÷3 vessels filled with zeolite molecular sieve CaX. The process is automated and computer controlled.

- **Process advantages**

- The plant needs no operators. The initial investment and operating costs are low. Oxygen produced is dry (its dew point is -70C) and its concentration reaches 90-94% with the impurities being nitrogen and argon.

Slide 6: Financial Roadmap

BENEFITS IN NUMBERS:

ASSUMPTIONS:

- ✓ 100 m³ farm
- ✓ Installation cost: 300 k€
- ✓ For good productivity is needing 1kg oxygen for 1m³ per hour
- ✓ Cost of works: 0,5 kW per hour for 1m³
- ✓ Alternative installations: 0,7 kW per hour for 1m³
- ✓ Energy cost: 15 € per hour

Benefits to farmer:

- ✓ 3 € per hour for farm/ 72 € per day/25632 € per year/
- ✓ almost **130k € in five years** + lower cost of installation

Slide 7: Alternative apply

- Metallurgy and metallurgical industry – iron-making, sintering, oxidative smelting of metals, metallurgy of copper, nickel and zinc
- Glass-making industry and ceramic industry: thermal treatment of glass, concrete, magnesite, glaze, high-performance ceramic lining, etc
- Environmental protection: oxidative purification of waste water, potable water treatment, incineration of wastes, treatment of cellulose waste water
- Biochemistry: bio-fermentation processes
- Bleaching of cellulose, substitute for chlorine

Slide 8: Current Status

- Ready to use technology
- Europe non exclusive licence have GenerTech (Spain)
- First installation is using in Spain
- Technology is protected by polish patent application
- Property: INSTITUTE OF HEAVY ORGANIC SYNTHESIS „BLACHOWNIA"
- Next step:
 - To reach new markets (Polish, West Europe, Afrika, South America)
 - Find commercialization partner

Slide 9: The Team

INSTITUTE OF HEAVY ORGANIC SYNTHESIS „BLACHOWNIA"

Foundation year 1952

- implemented **840** technologies to the industry,
- has gained **1431** patents including **56** abroad,
- published **1887** works in chemical and technical magazines in Poland and abroad,
- ICSO specialists gave **1342** lectures,
- signed **11** international contracts for technology transfer and **3** for their improvement

dr inż. Zbigniew Budner – TECHNOLOGY AUTHOR

- Manager of the GAS TECHNOLOGY DEPARTMENT
- Specialize in gas separation processes, hydrogen production processes, hydrogenation processes, and other pressure processes

Slide 10: Summary

- ✓ Our VPSA process technology raising efficiency of fishery farm
- ✓ VPSA process technology characterized by low initiative expenditures and low operation costs
- ✓ VPSA processes have many of alternative apply form in many branch of industry

