



**"GENETT™"  
TECHNOLOGY**

**1**

**GENETT™ Technology - Process Line Family**

**2**

**CO<sub>2</sub> decomposition Process**

**3**

**Laboratory & Industrial Units**

**4**

**Deployments variants**

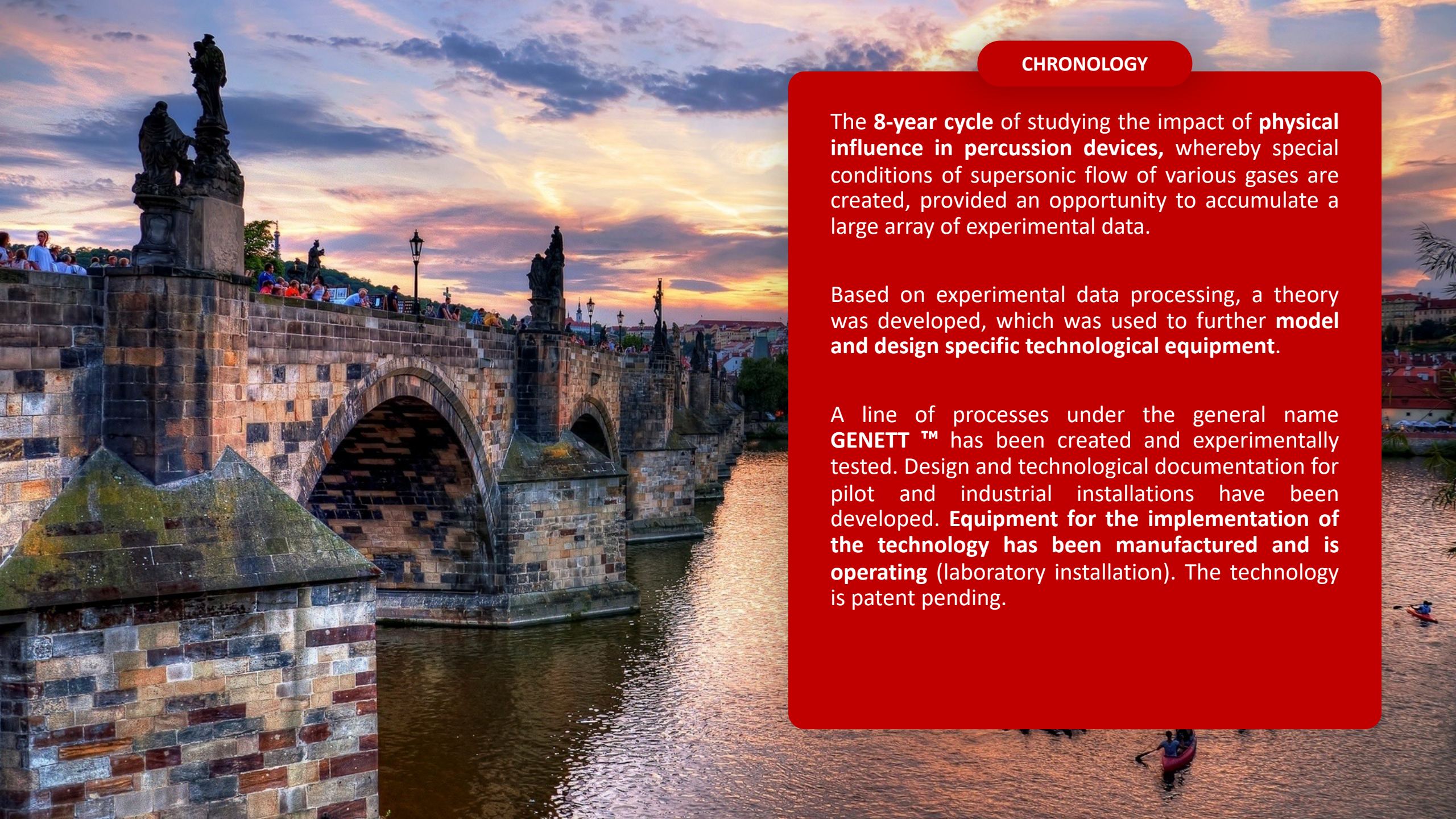
**PART I**

# **GENETT™**

## **TECHNOLOGY**

**Process  
Line  
Family**





## CHRONOLOGY

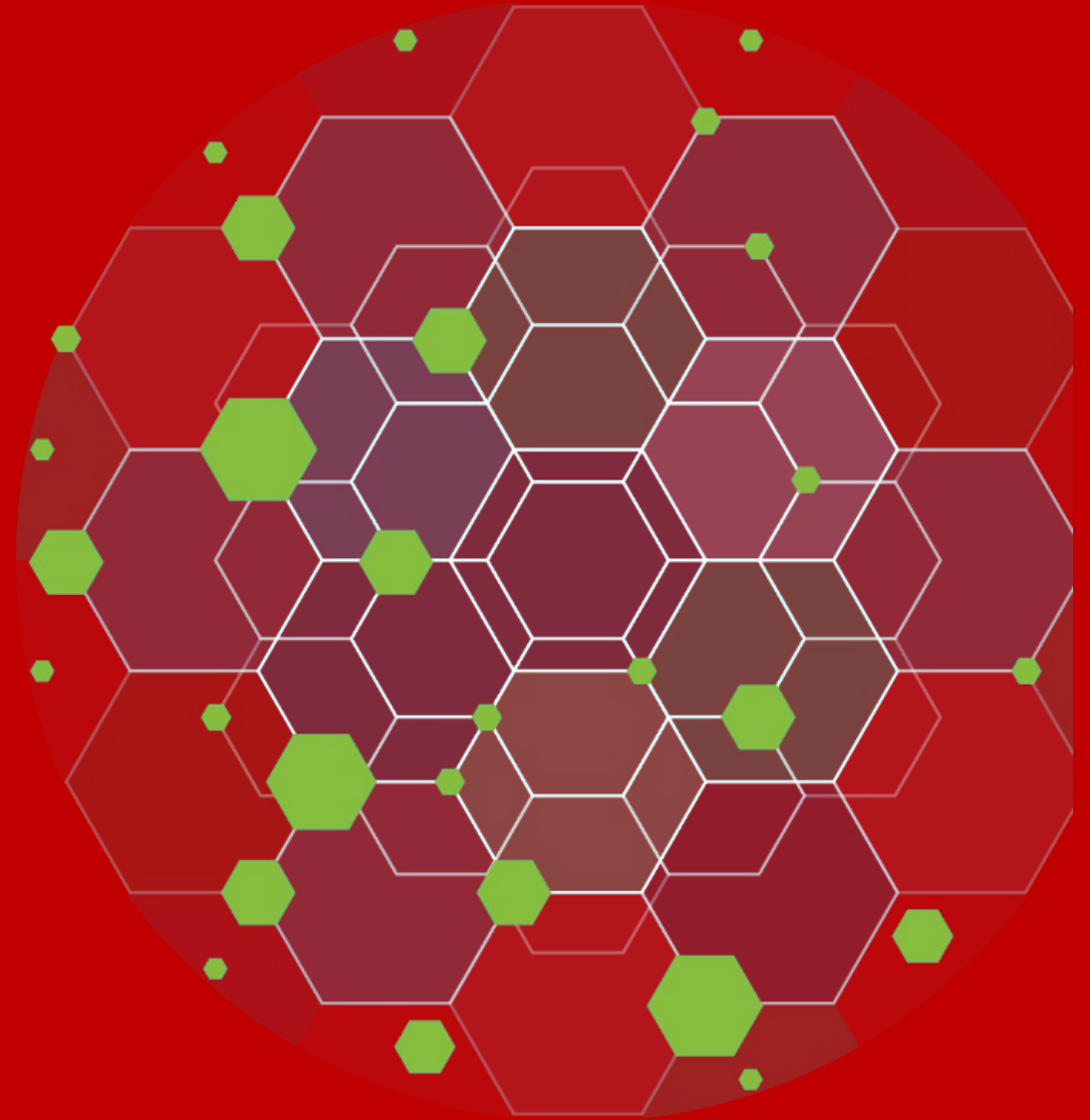
The **8-year cycle** of studying the impact of **physical influence in percussion devices**, whereby special conditions of supersonic flow of various gases are created, provided an opportunity to accumulate a large array of experimental data.

Based on experimental data processing, a theory was developed, which was used to further **model and design specific technological equipment**.

A line of processes under the general name **GENETT™** has been created and experimentally tested. Design and technological documentation for pilot and industrial installations have been developed. **Equipment for the implementation of the technology has been manufactured and is operating** (laboratory installation). The technology is patent pending.

# Main characteristics of the GENETT™ technology

1. Creation of conditions for the emergence of nonequilibrium plasma in shock wave and tribostatic processes, with local energy centres in the reaction volume.
2. Creating conditions, in these centres, for the occurrence of energy necessary for the initiation of chemical and physicochemical reactions.
3. Technology products arise in nonequilibrium plasma.

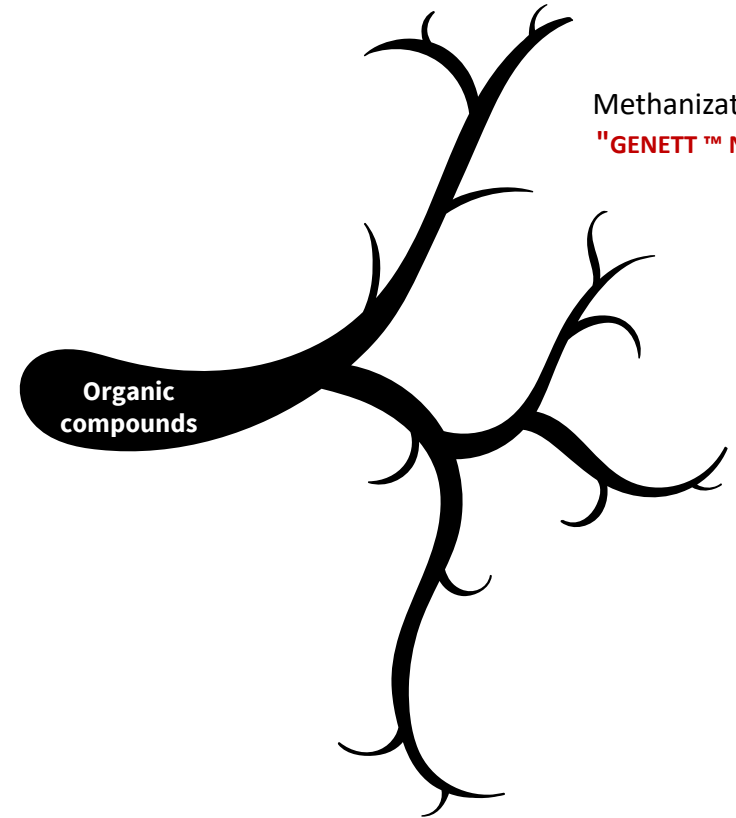
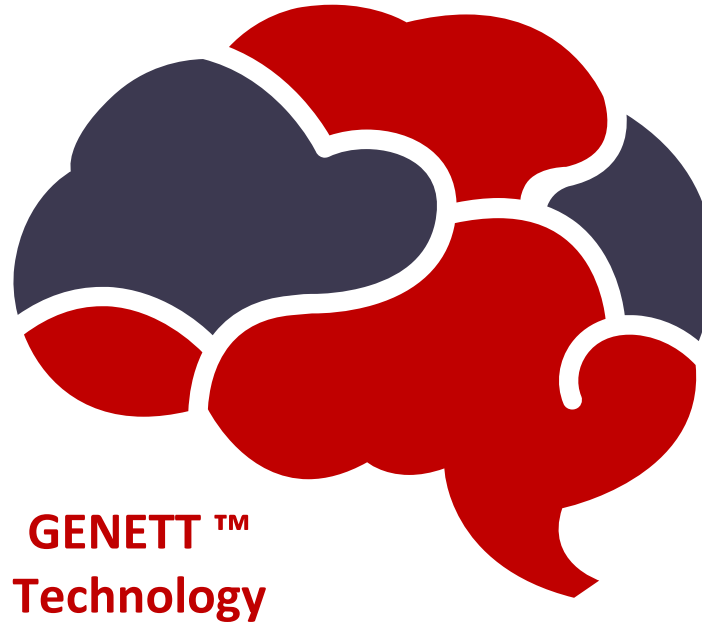
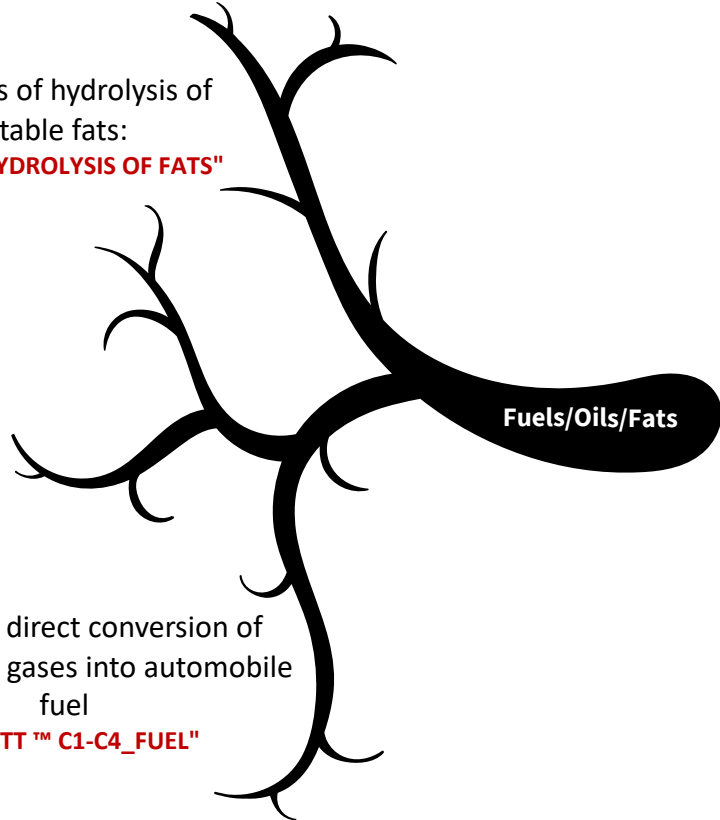


# Technology Applications

Processes for production of bio-diesel fuel of the 2nd and 3rd generation (analogue of natural oil fuel):

"GENETT™ VEGETABLE\_FUEL"  
"GENETT™ UCO\_FUEL"

The process of hydrolysis of vegetable fats:  
"GENETT™ HYDROLYSIS OF FATS"



Processes for the synthesis of organic compounds:

"GENETT™ AIR\_H2O\_CHNO"  
"GENETT™ N2\_H2O\_CHNO"  
"GENETT™ CO2\_H2O\_CHNO"  
"GENETT™ AIR\_UCO\_CHNO"  
"GENETT™ N2\_UCO\_CHNO"  
"GENETT™ CO2\_UCO\_CHNO"

Methanization process  
"GENETT™ N2O2\_CnHm"

Process of direct conversion of hydrocarbon gases into automobile fuel  
"GENETT™ C1-C4\_FUEL"

The process of improving the physical and chemical characteristics of natural oil: removing sulfur compounds, reducing the density of oil (increasing the commercial value):  
"GENETT™ IMPROVING THE QUALITY OF OIL"

Process of CO2 utilization  
"GENETT™ CO2\_AIR"

# **GENETT™**

## **TECHNOLOGY**

**CO<sub>2</sub>  
decomposition  
process**



**Change**  
in the architecture of  
CO<sub>2</sub>, N<sub>2</sub> molecules  
H<sub>2</sub>S, H<sub>2</sub>O<sub>2</sub> and other  
iso-electronic  
analogues of molecules

Decay of O<sub>2</sub>, Ar molecules  
occurs in a

**non-equilibrium  
discharge plasma**

created and maintained

**through the shock wave and  
tribostatic discharge**





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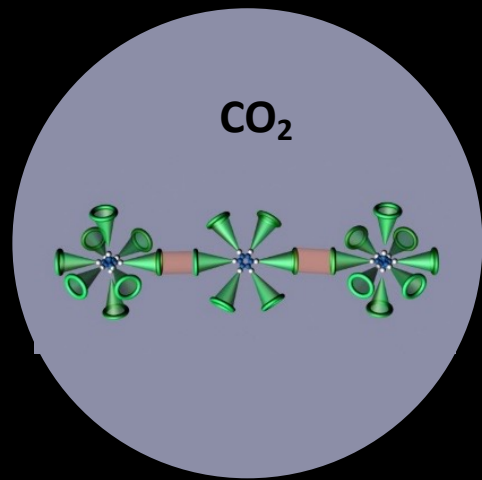
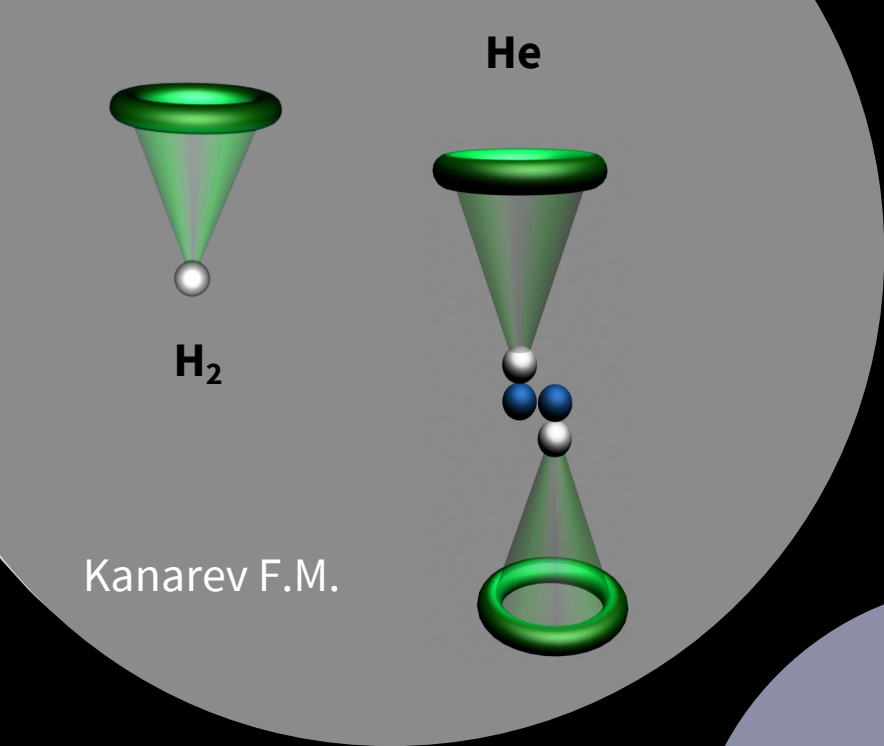
## Whereby the following conditions are created:

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- Hypersonic outflow of a mixture of working and feed gas (air, CO<sub>2</sub>);
- Effective braking of the gas flow/stream, leading to an impact inside the catalytic device and the appearance of a reflected wave, which when meeting the shock wave, leads to an abrupt increase in pressure and temperature in the reflected wave and, as a consequence, the excitation of molecular vibrations, dissociation of molecules, ionization of atoms, and chemical reactions.
- An additional factor for increasing the intensity of processes is the occurrence of a tribostatic effect on the electrodes, which provide maximum coverage of the cross section of the reaction volume;

This mechanism provides for the decomposition process to be carried out at low gas temperatures, which is of higher energy efficiency than thermal dissociation under equilibrium conditions



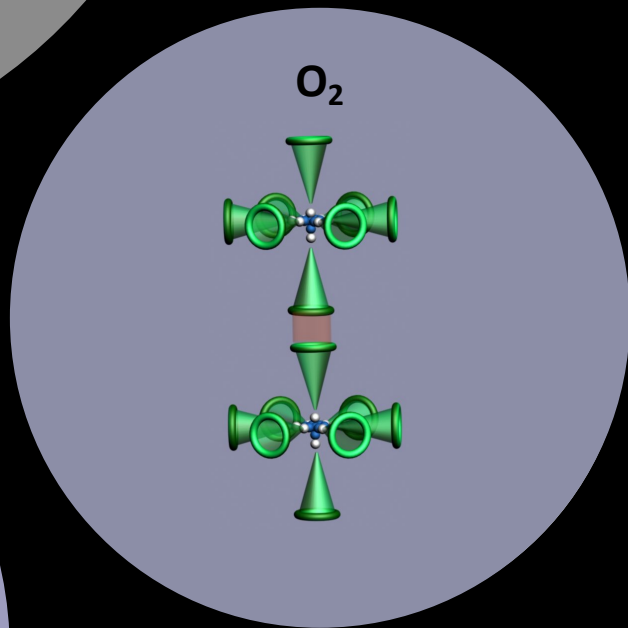
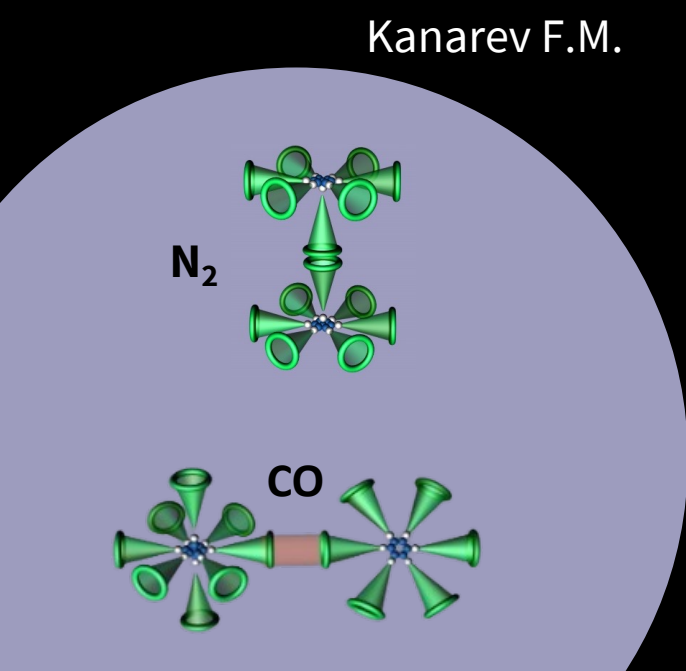


$$2\text{CO}_2 = 2\text{CO} + \text{O}_2$$

$$2\text{CO} = 2\text{N}_2$$

$$m\text{O}_2 = m\text{N}_2 + m\text{He}$$

$$2\text{CO}_2 = (2+m)\text{N}_2 + (1-m)\text{O}_2 + m\text{He}$$



$$\text{CO}_2 = \text{N}_2\text{O}$$

$$2\text{N}_2\text{O} = 2\text{N}_2 + \text{O}_2$$

$$m\text{O}_2 = m\text{N}_2 + m\text{He}$$

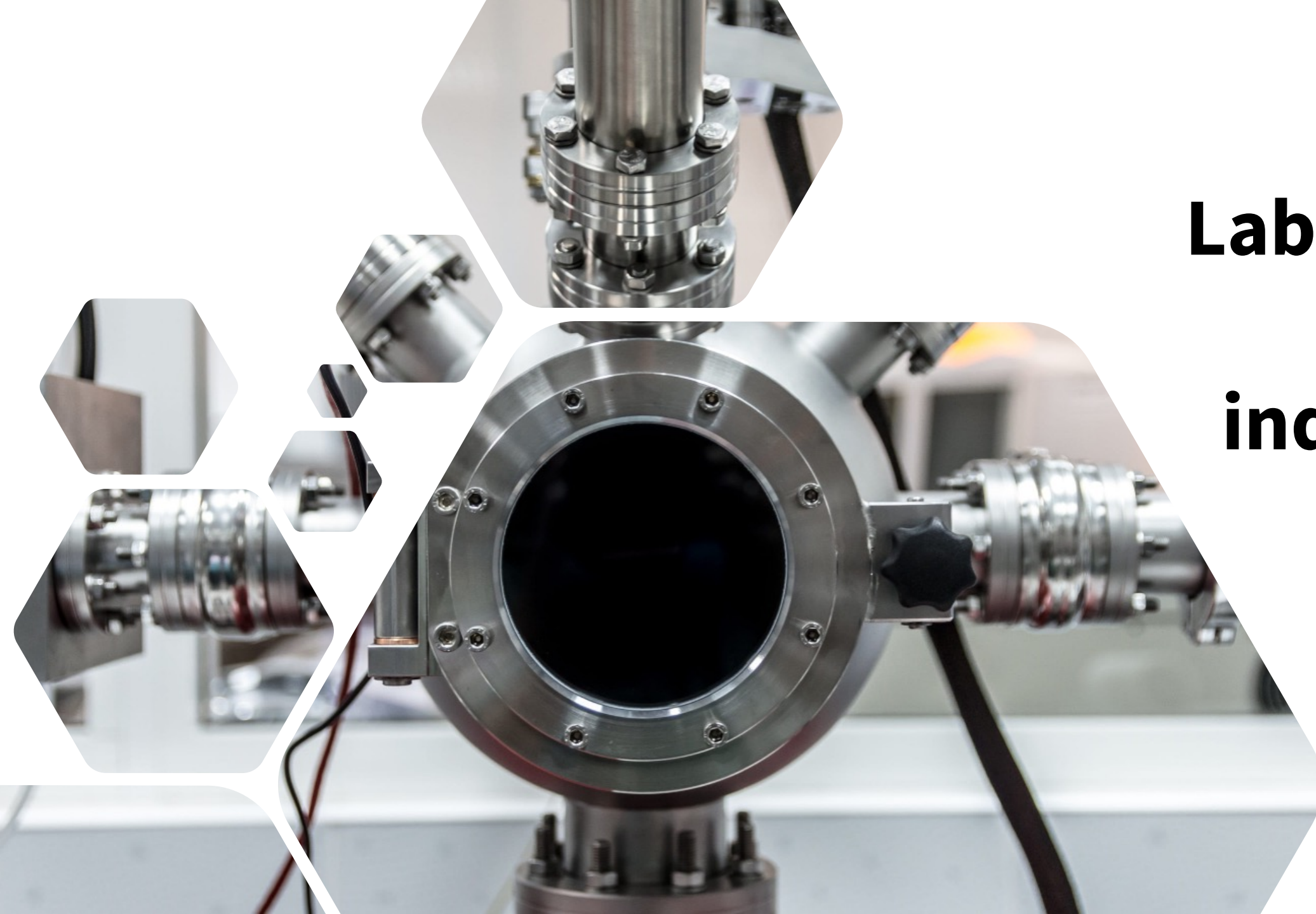
$$2\text{CO}_2 = (2+m)\text{N}_2 + (1-m)\text{O}_2 + m\text{He}$$

# MAIN TECHNICAL PARAMETERS

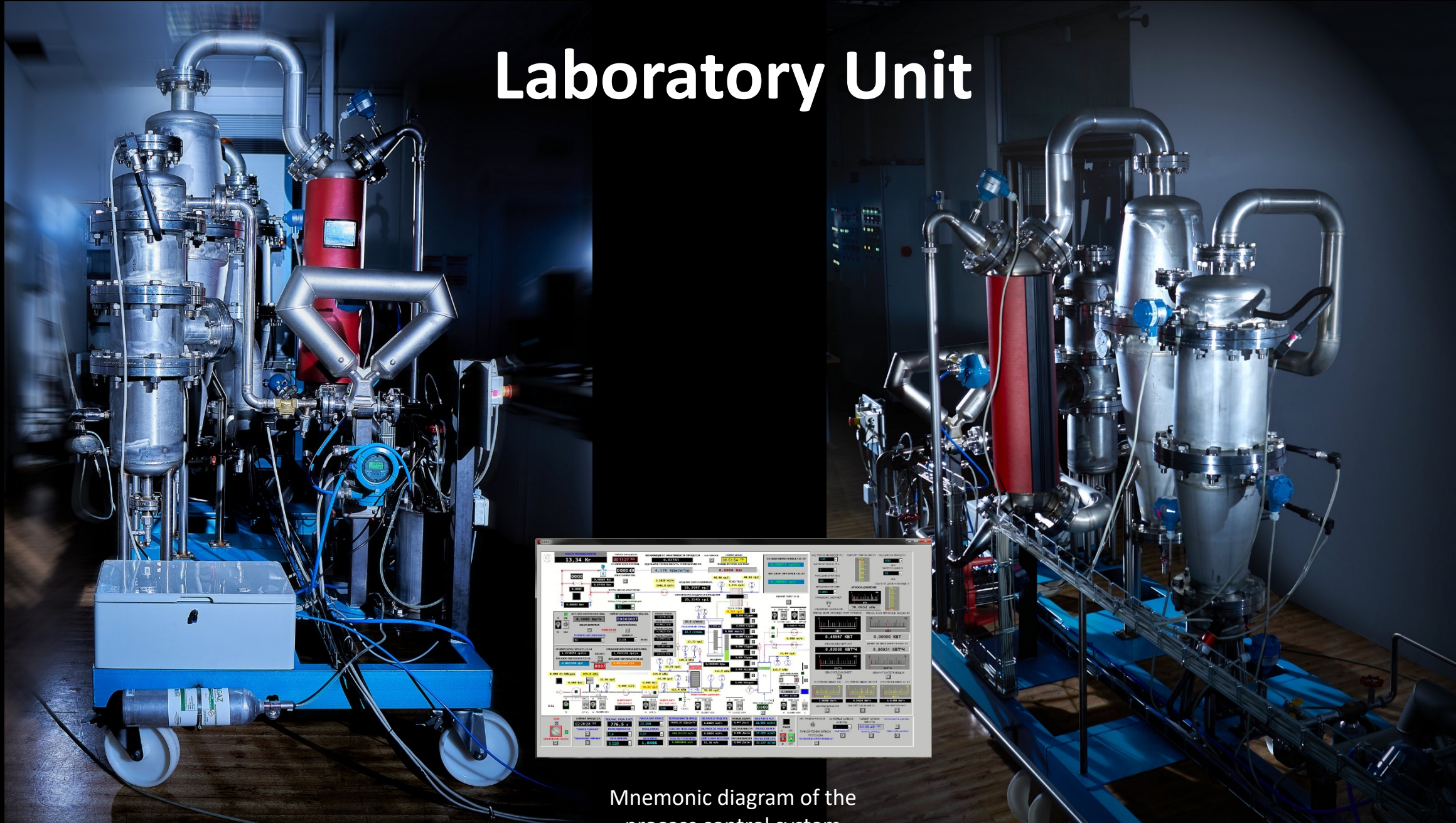
OF UPGRADED LABORATORY UNIT

	Content of CO <sub>2</sub>	El. energy consumption per 1t of CO <sub>2</sub>	Conversion rate (%)
<b>Air</b>	450 ppm	...	...
<b>Flue gas</b> (direct connection)	3% - 15%	2680 – 5394 kW (calculated) 268-540 (actual)	100 %
<b>Carbon Capture Equipment</b> (indirect connection)	>15% - 50%	657 – 1818 kW (calculated) 66-182 (actual)	100 %

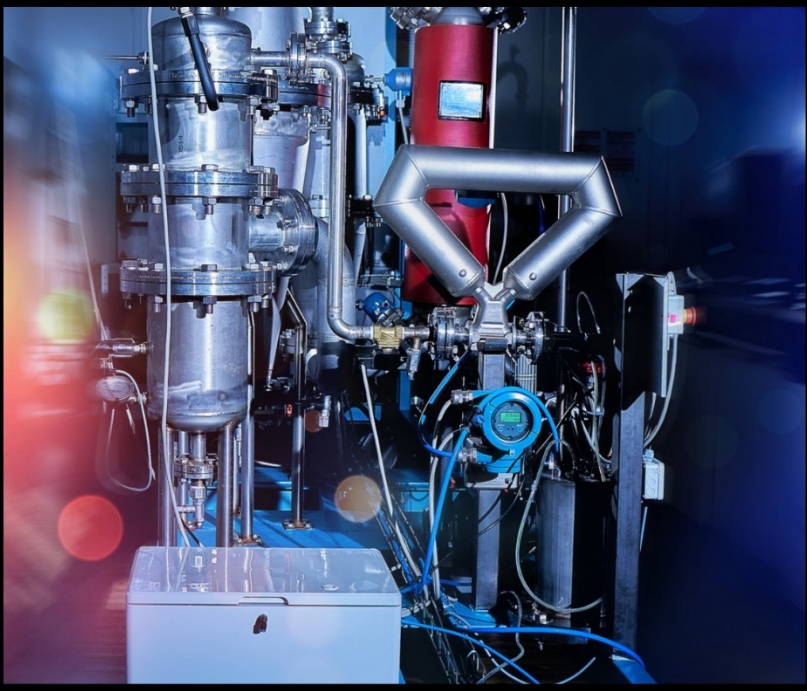
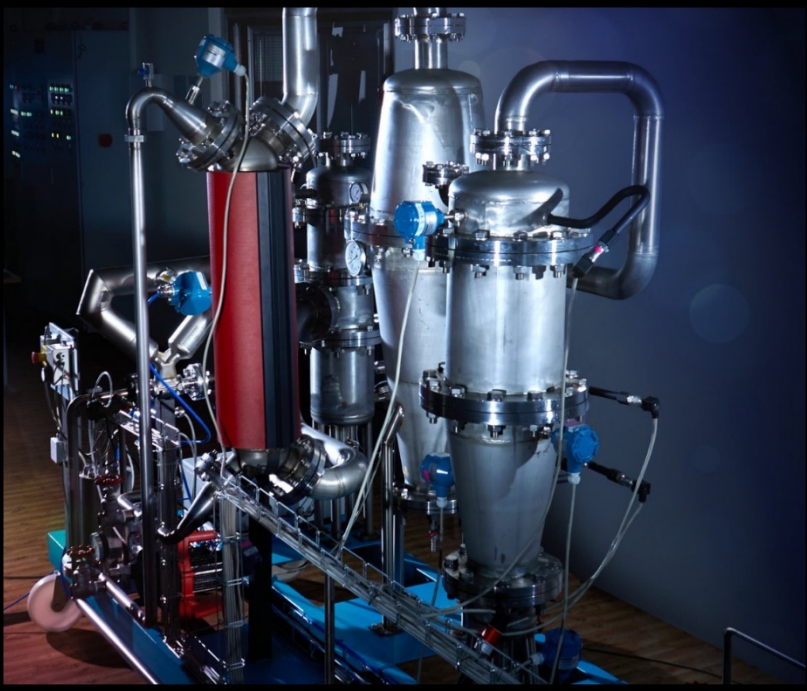
# **Laboratory & industrial Unit**



# Laboratory Unit



Mnemonic diagram of the process control system



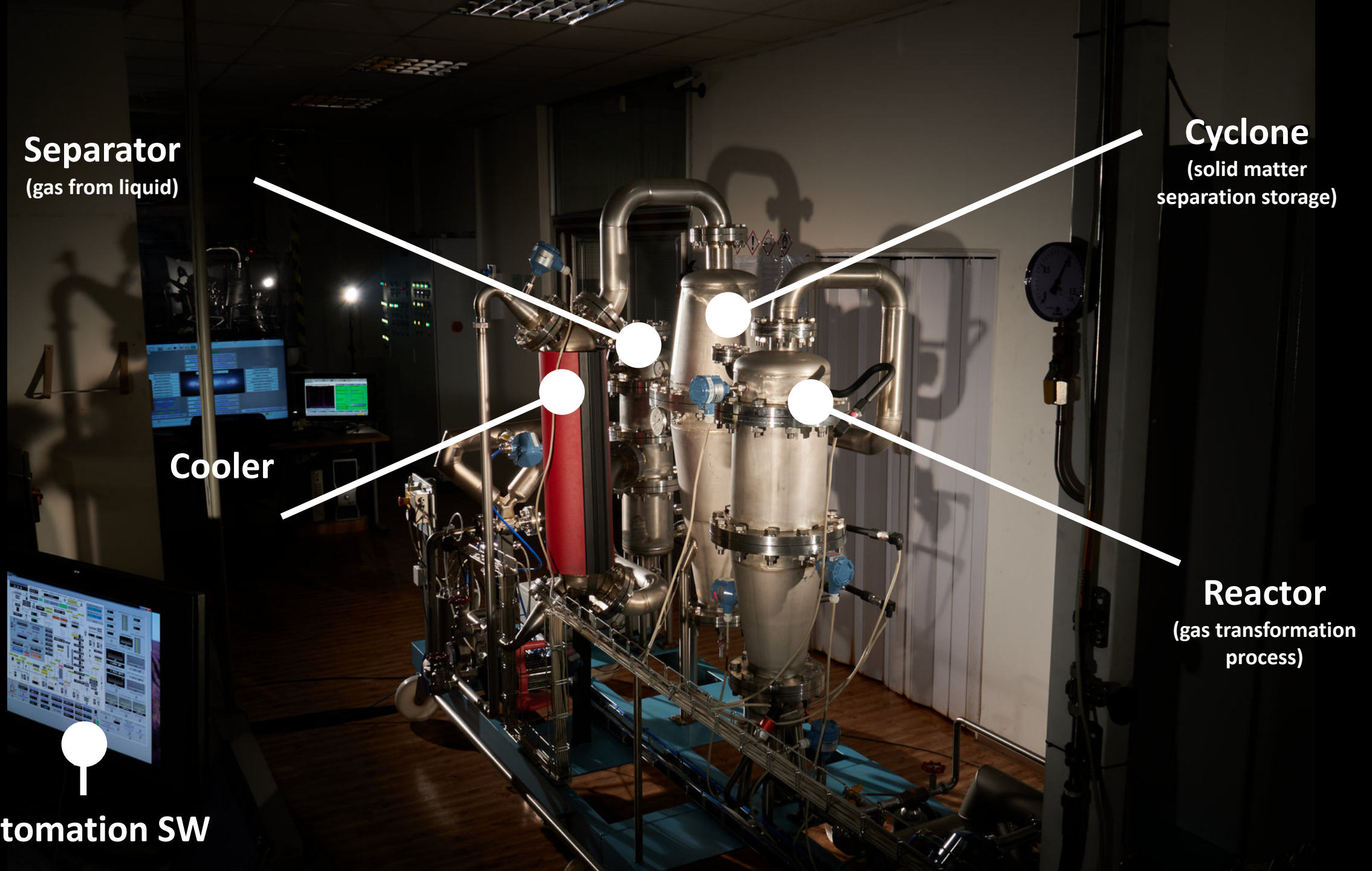
**Separator**  
(gas from liquid)

**Cyclone**  
(solid matter  
separation storage)

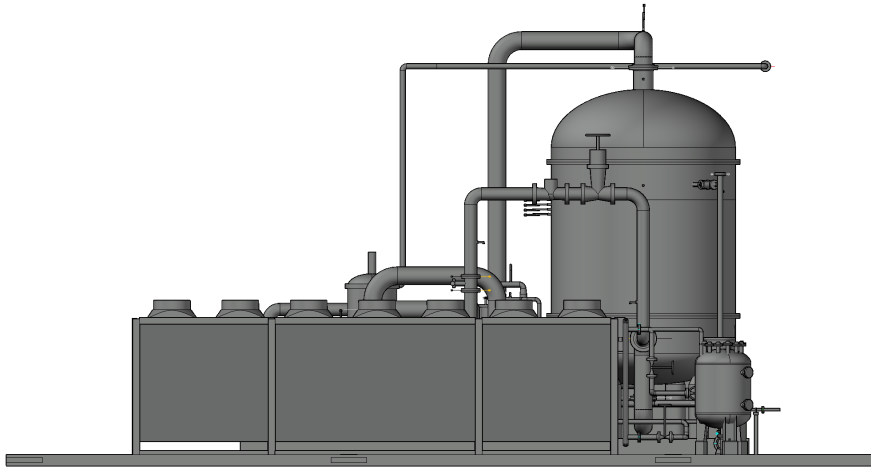
**Cooler**

**Reactor**  
(gas transformation  
process)

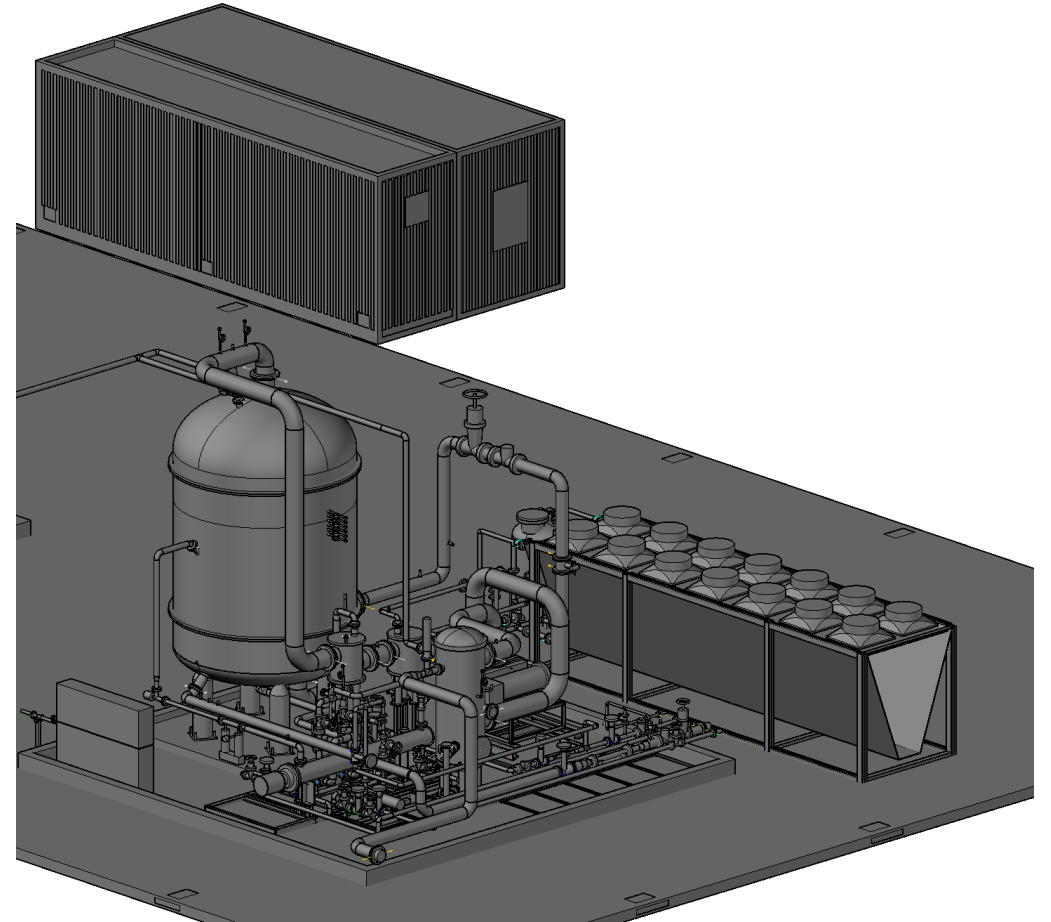
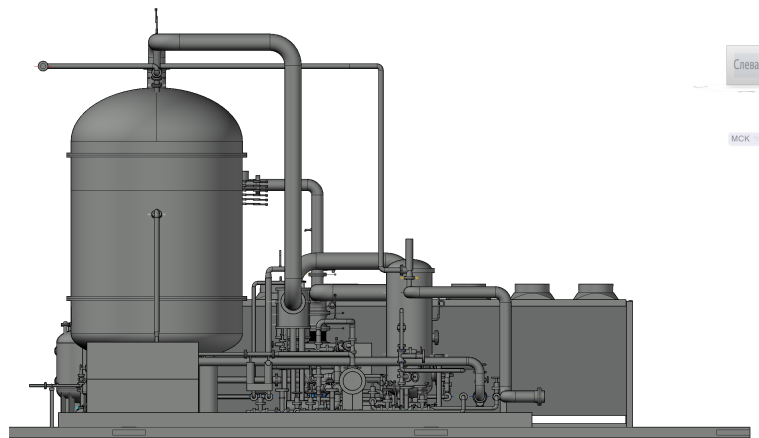
**Automation SW**



RIGHT VIEW



LEFT VIEW



3D VIEW



Reactor



Vacuum Pumps



Separator



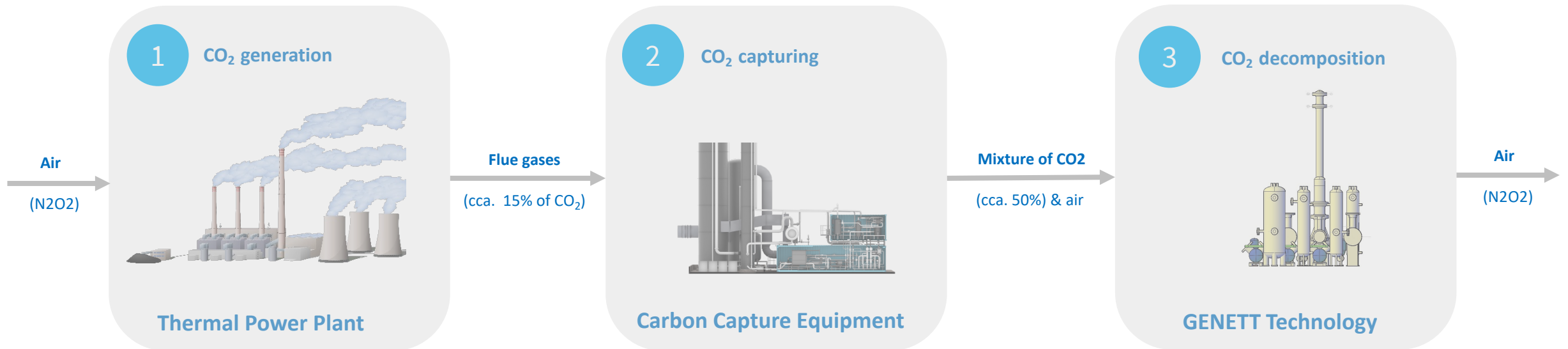
Standard Pumps

# Deployment

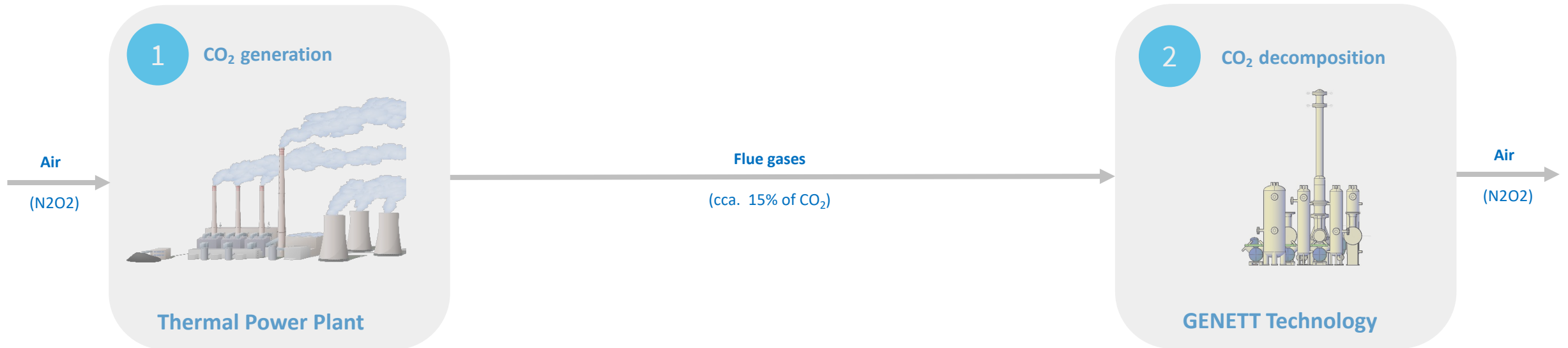
# Variants



# GENETT deployment possibility after Carbon Capture equipment



# GENETT deployment possibility without Carbon Capture equipment



# Carbon pricing

EU ETS (European Union Emissions Trading System ) carbon prices

EUA (EU ETS) Futures Prices

