

Novel industrial process for the concentration of slightly polluted exhaust air



SILICA

Adsorption Technology from Design to Turnkey Plant

LEIPZIGER SYMPOSIUM
on dynamic sorption
2019

1929

Foundation in Berlin as a Subsidiary of the Silica Gel Corporation in Baltimore, USA

**1934**

Acquisition of the German Silica Gel in Berlin by the German Management

**1938**

Begin of Adsorption Unit Manufacturing at Silica's industrial Site in Berlin-Spandau

**1963**

Divestment of the Factory for Silica Gel Adsorbents in Bad Homburg to Grace GmbH

**1991**

Spin-Out of Silica Verfahrenstechnik GmbH with financial participation of Berndorf AG Austria

1995

Move of the Company from Berlin-Spandau to the new Factory Site in Berlin-Reinickendorf







Factory Property of about 7,000 m²





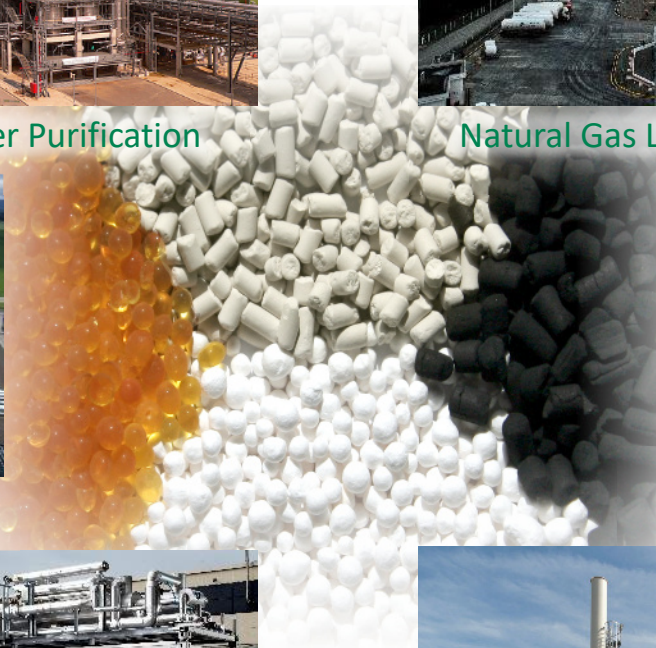
Monomer Purification



Natural Gas Liquefaction



Natural Gas Conditioning



Dehydration of Organic Liquids



Power-To-Gas



Exhaust Air Purification

Process Exhaust Air

High solvent concentration
Recycling of the solvent

1 - 20 g/m³ for economic operation

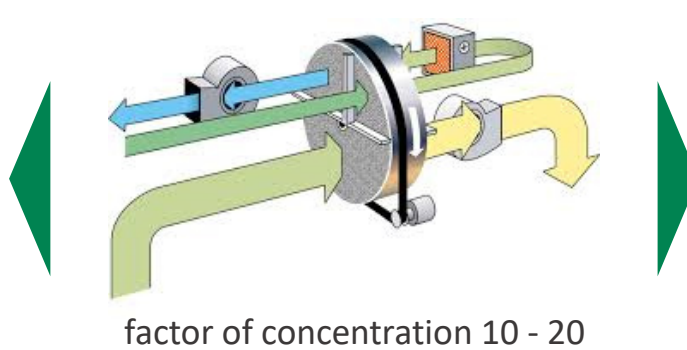


Solvent Recycling
with Activated Carbon

Diffuse Losses

Low solvent concentration
e.g. room or purging air

typically 0.05 – 0.1 g/m³



Adsorption Wheel

Process Exhaust Air

High solvent concentration
Recycling not economic

2 - 3 g/m³ for autothermic operation

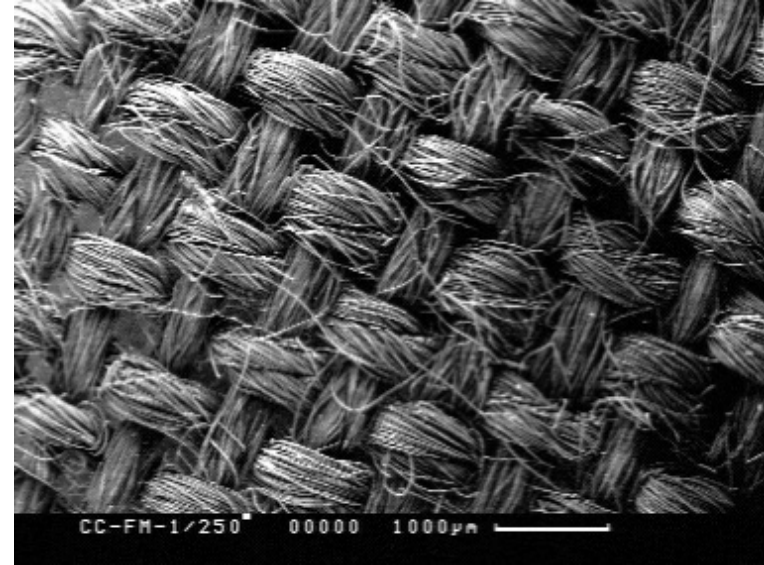


Thermic or Catalytic
Combustion



Activated Carbon Pellets

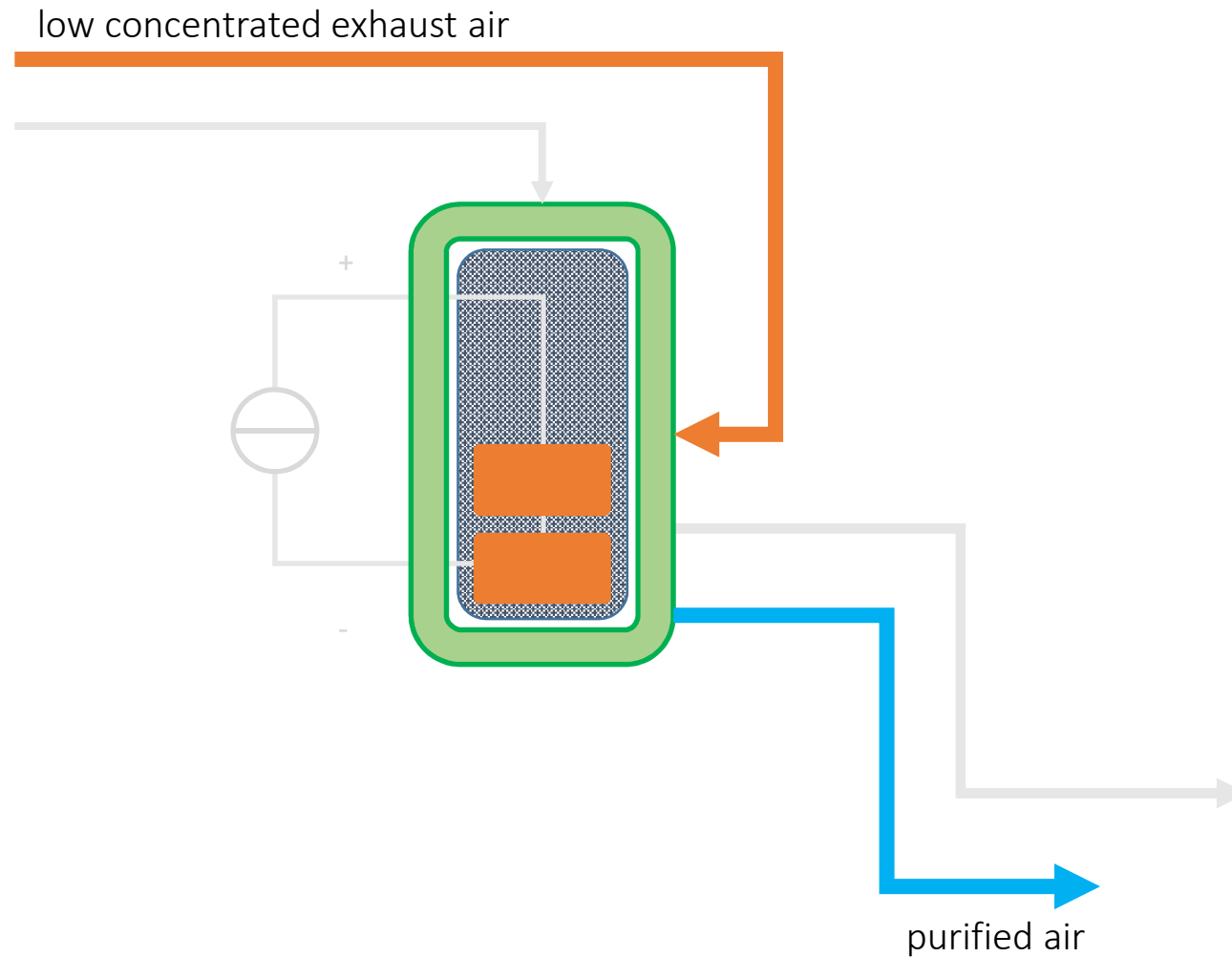
- ⊕ High adsorption capacity
- ⊕ High availability – low costs
- ⊖ Not suitable for low solvent concentrations
- ⊖ Regeneration with steam or hot gas



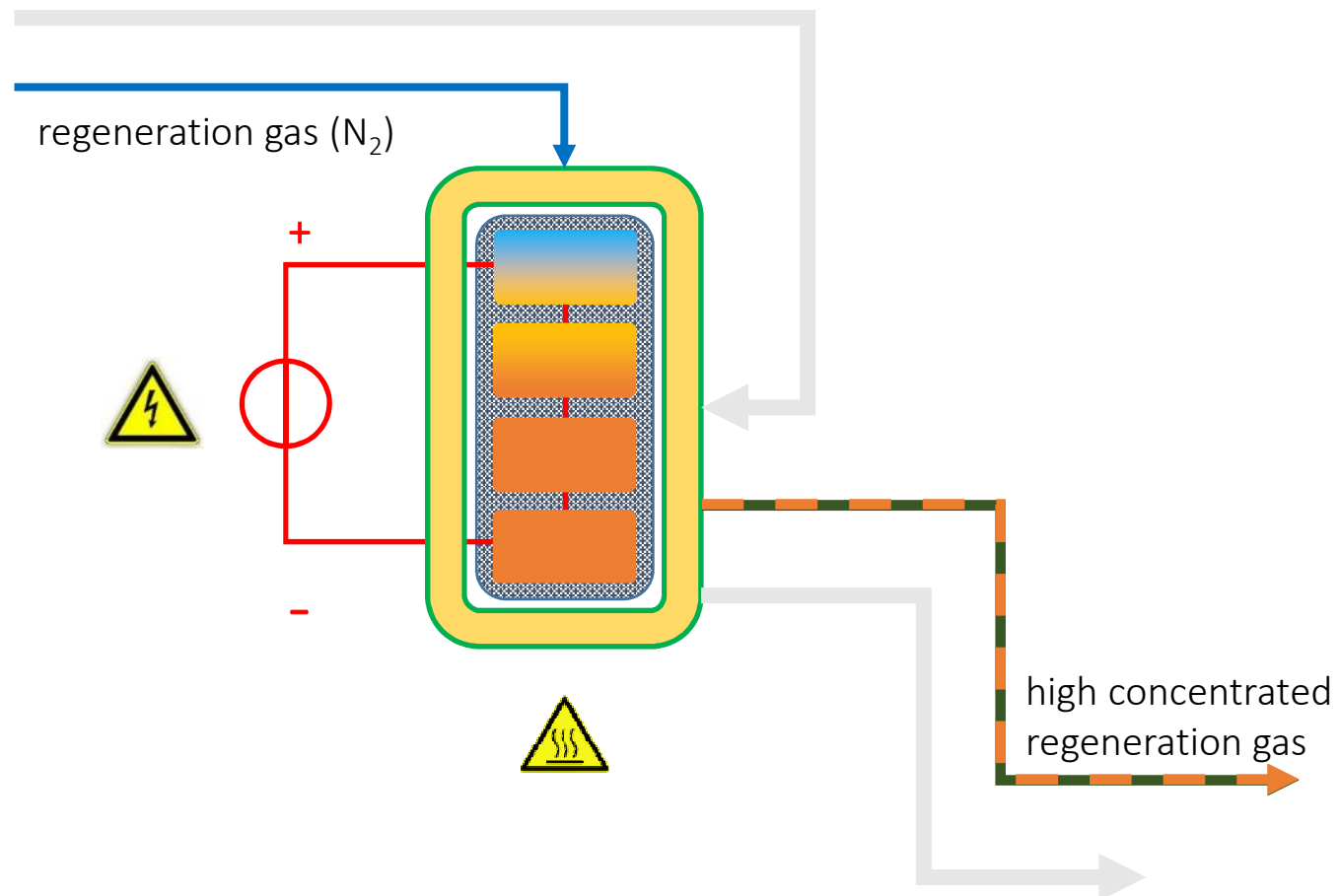
Activated Fibre Cloth

- ⊕ Very large specific surface area
- ⊕ Very high adsorption kinetics
- ⊕ Electrical regeneration possible
- ⊖ Lower absolute adsorption capacity

New Adsorption Module with Activated Fibre Cloth - Adsorption

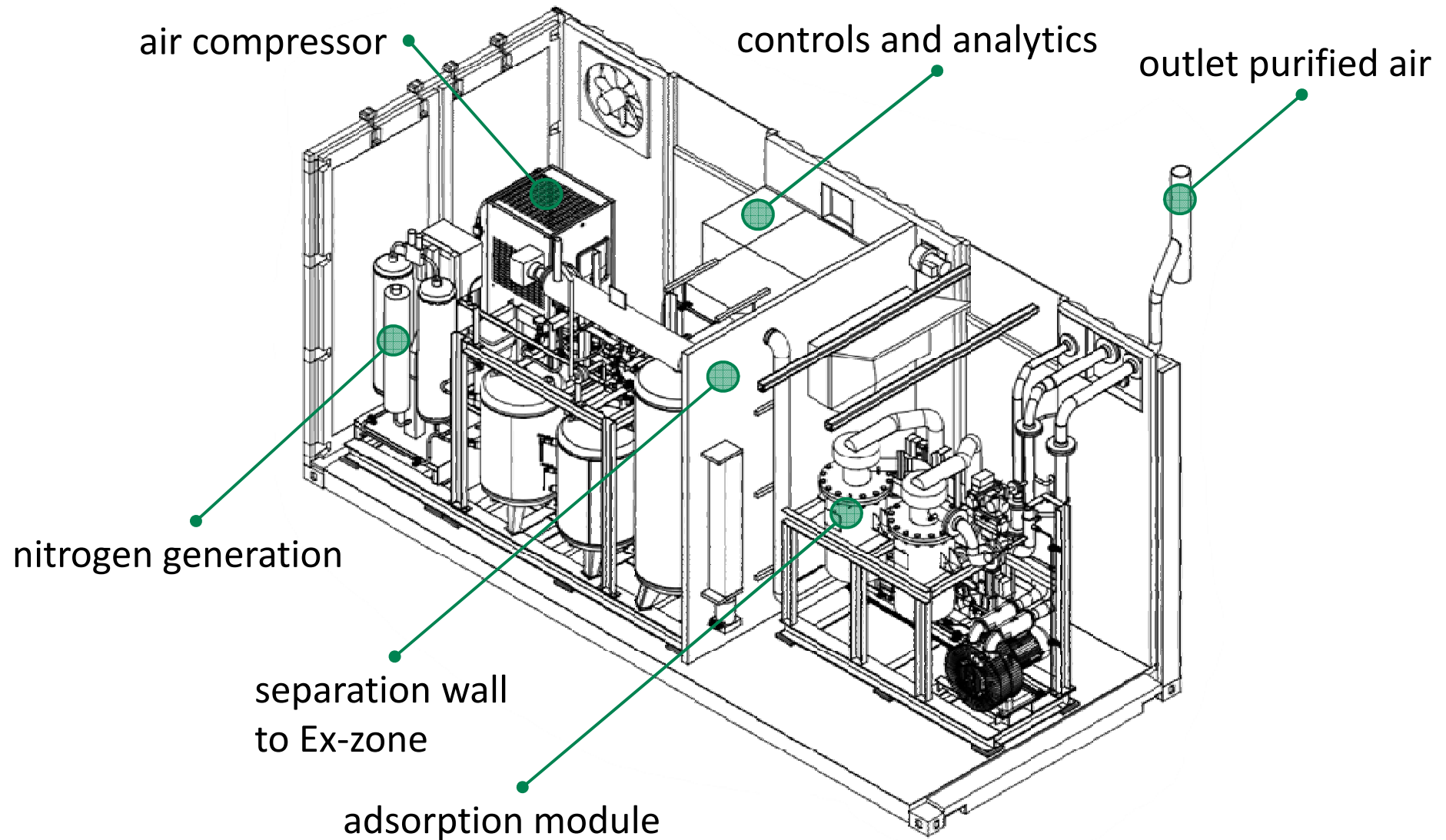


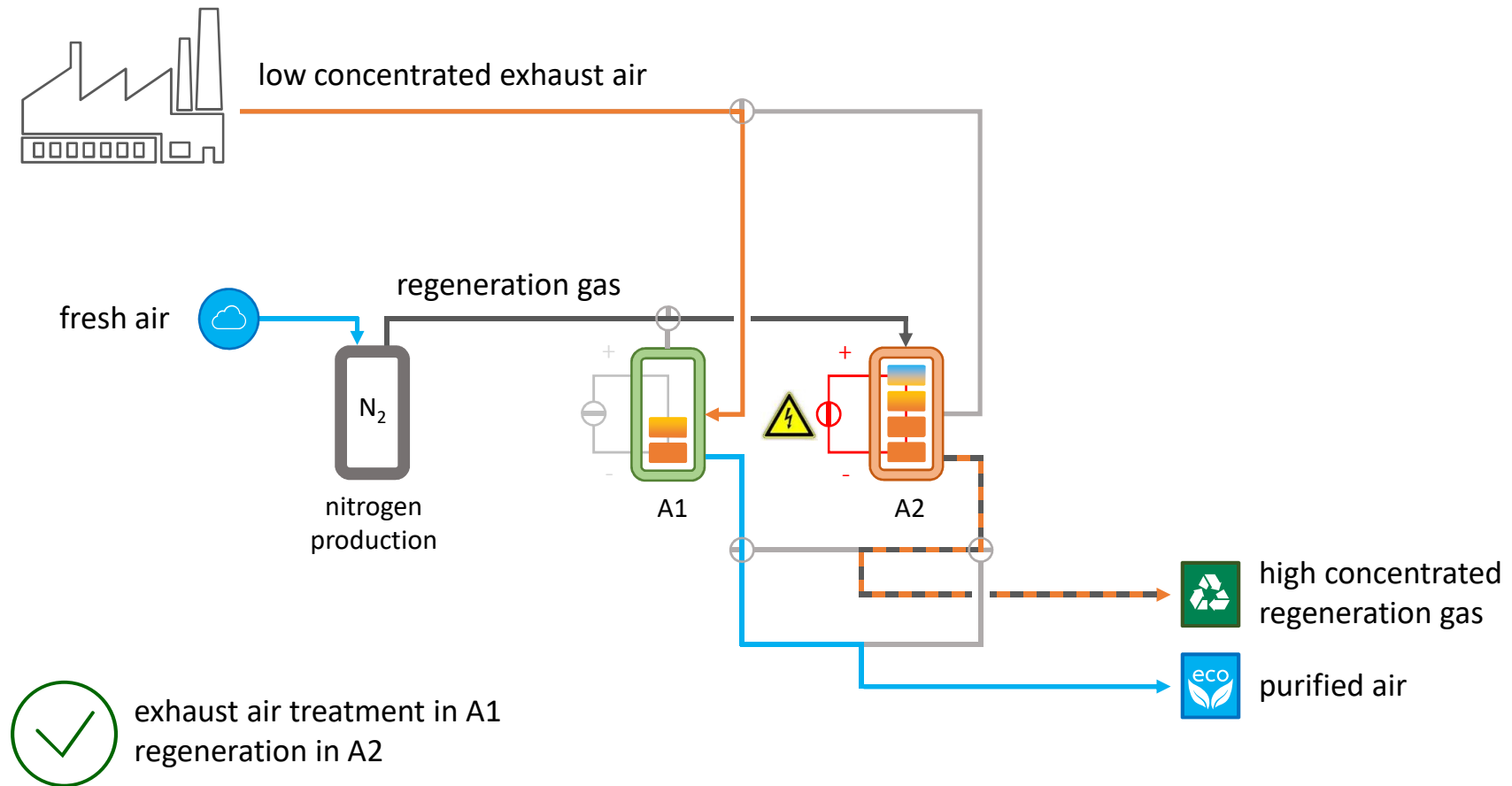
New Adsorption Module with Activated Fibre Cloth - Desorption

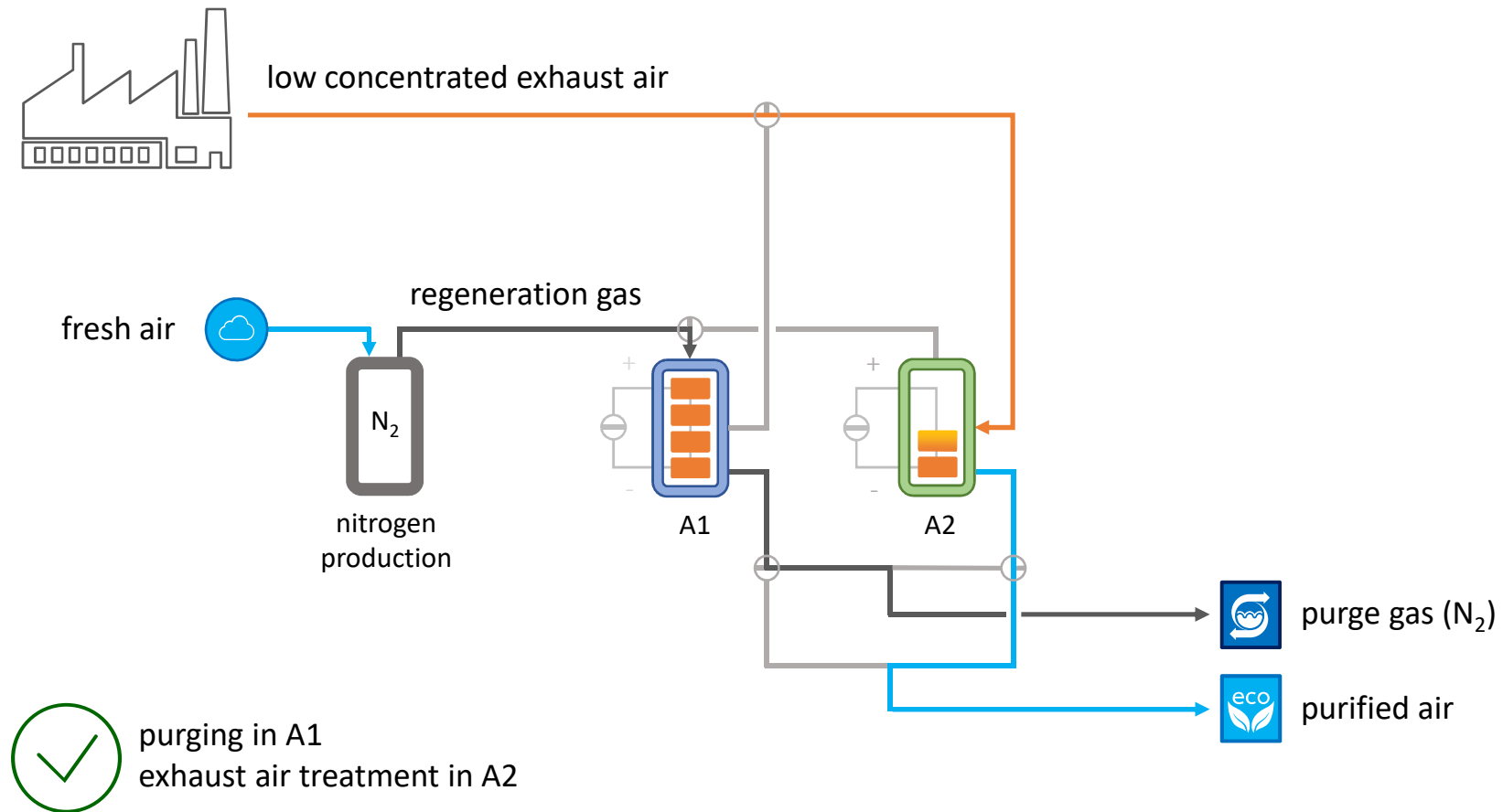


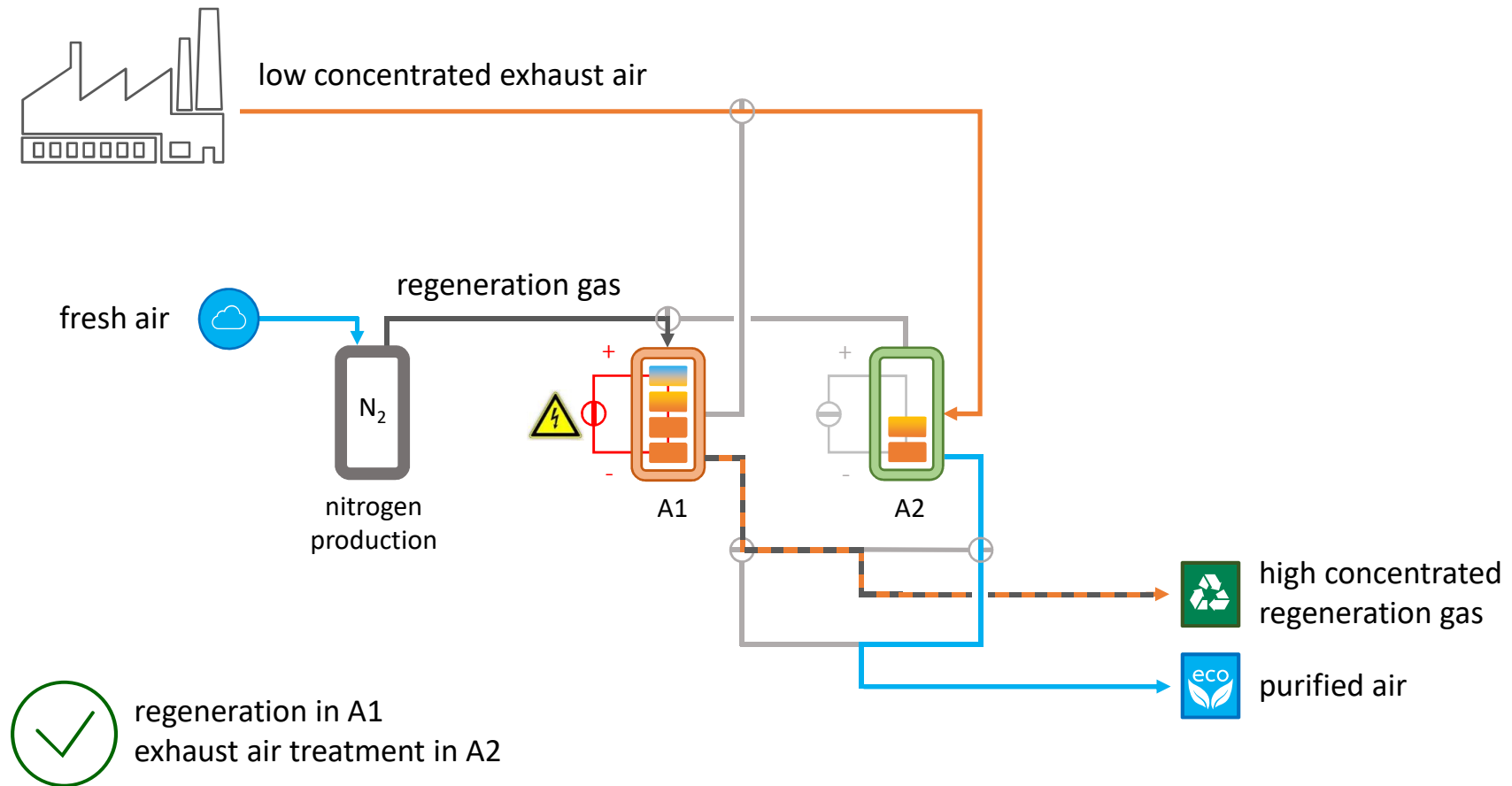


- volume flows up to 500 m³/h
- solvent concentrations of 100...1000 mg/m³
- electrical regeneration
 - direct heating of the adsorption module
 - temperature control by electrical power
 - low regeneration gas flow only for transportation
- online-Analysis of in- and outlet concentrations by FIDs















Concentration of Solvents



Solvent Recycling with
Activated Carbon



Exhaust Air Treatment with
Catalytic Combustion



Solvent Recycling with
Cryo-Condensation



- The adsorption module can adsorb even the lowest solvent concentrations
- Exhaust air treatment to comply with TA-Luft, MAK regulations
- High concentrated solvent-vapour in regeneration gas
- Smaller downstream units lead to decreased use of utilities
 - Saving of resources by recycling of solvents
 - Solvent recycling with activated carbon unit
 - Cryo-condensation
 - Thermal or catalytic combustion without supporting flame



Chemical Industries / Pharmacy



Paint Shops



Flavourings / Essential Oils



Production of Adhesive Tapes



Thank you!

