ADICOMP: ADVANCED GAS COMPRESSION AND TREATMENT SOLUTIONS

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1) ADICOMP – WHO WE ARE

Adicomp is an Italian leader company into the renewable energy sector, specialized in gas compression and biogas treatment systems for the biogas upgrading

Founded into 1998 in Italy, currently has more than **8500 compression packages installed all over the world**

From 2013 Adicomp belongs to **Termomeccanica** Group

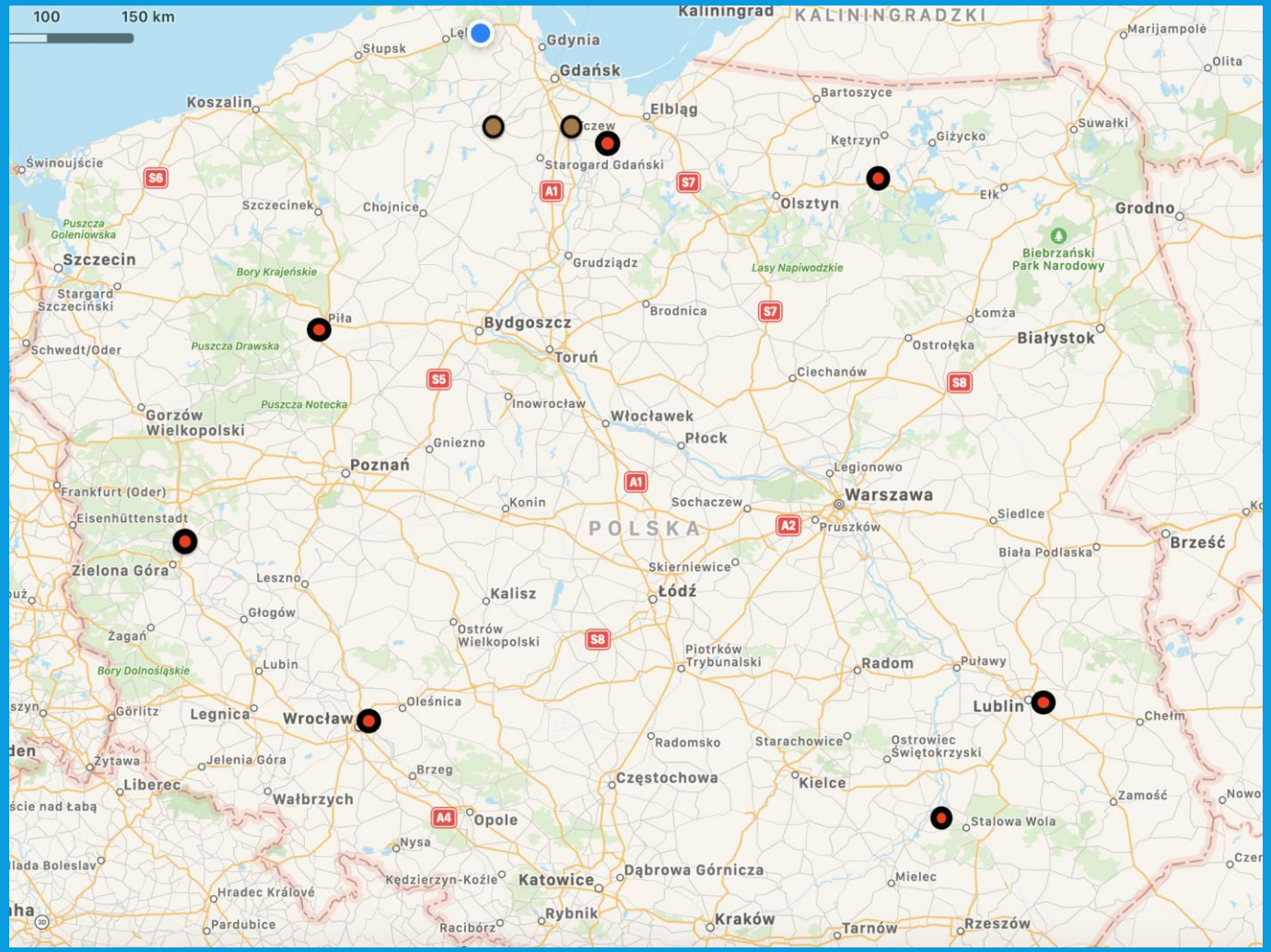
2) APPLICATIONS

- Power generation: Compressors feeding engines and turbines with natural gas, biogas and landfill gas
- Biogas upgrading and purification
- Biomethane: Gas grid injection
- LFG - LandFill Gas
- Coal Mine gas
- Compressors for carbon dioxide (CO_2), Syngas, Hydrogen (H_2)
- Compressors for Well Head Gas (WHG)
- Compressors for Oil&Gas – Instruments air

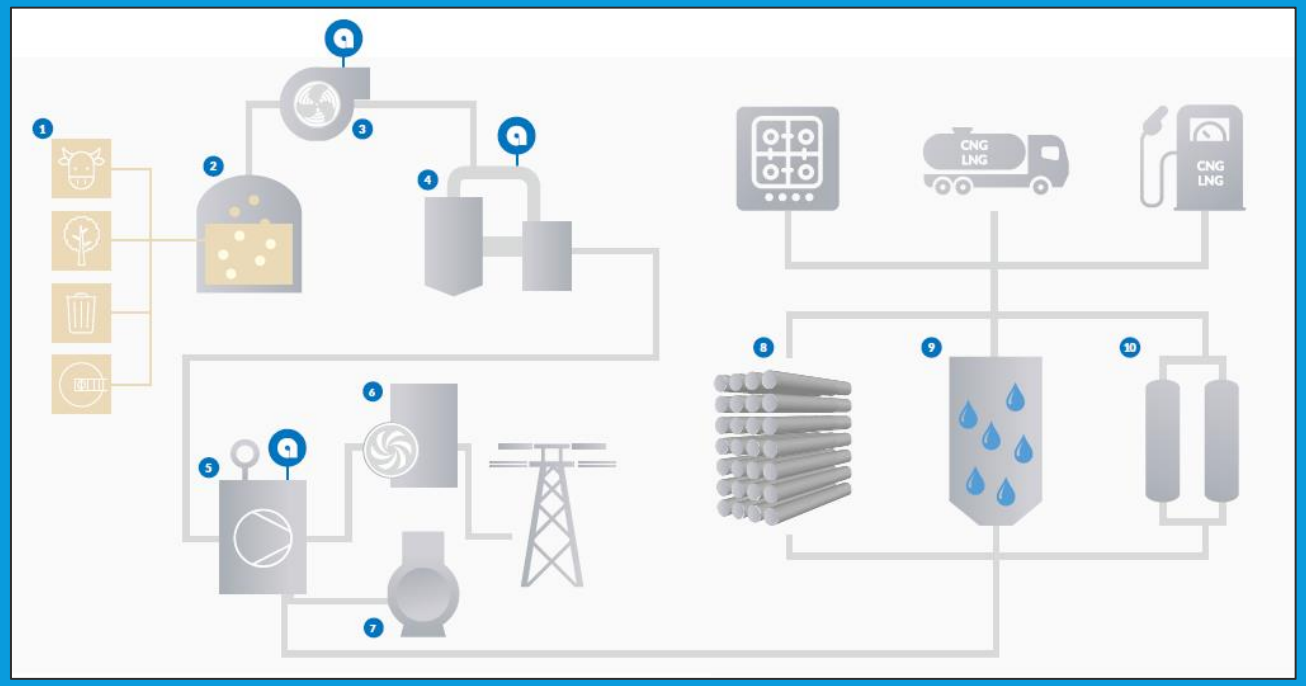
3) REFERENCES

- More than 8500 installations around the world
- About 400 compression packages manufactured per year
- More than 500 customers
- More than 22 years of history
- Over 15 years of experience in biogas
- Tailor made solutions: Different gases, applications, operating and climate conditions, various norms and standard (like for U.S., CAN, Russia, British Standards, Japan, NZA, etc..)
- For installation in safe area, Atex Zone 2 , Atex Zone 1, BGR104, Class 1 Division 2 (USA), Class 1 Zone 2 (Canada)
- With electric motor, with gas motor (i.e. for WHG applications in accordance with BGR104)

4) INSTALLATIONS IN POLAND



5) BIOGAS FROM THE ORIGIN



- **BIOGAS** is a natural gas coming from the anaerobic digestion of various biomass of different origin.

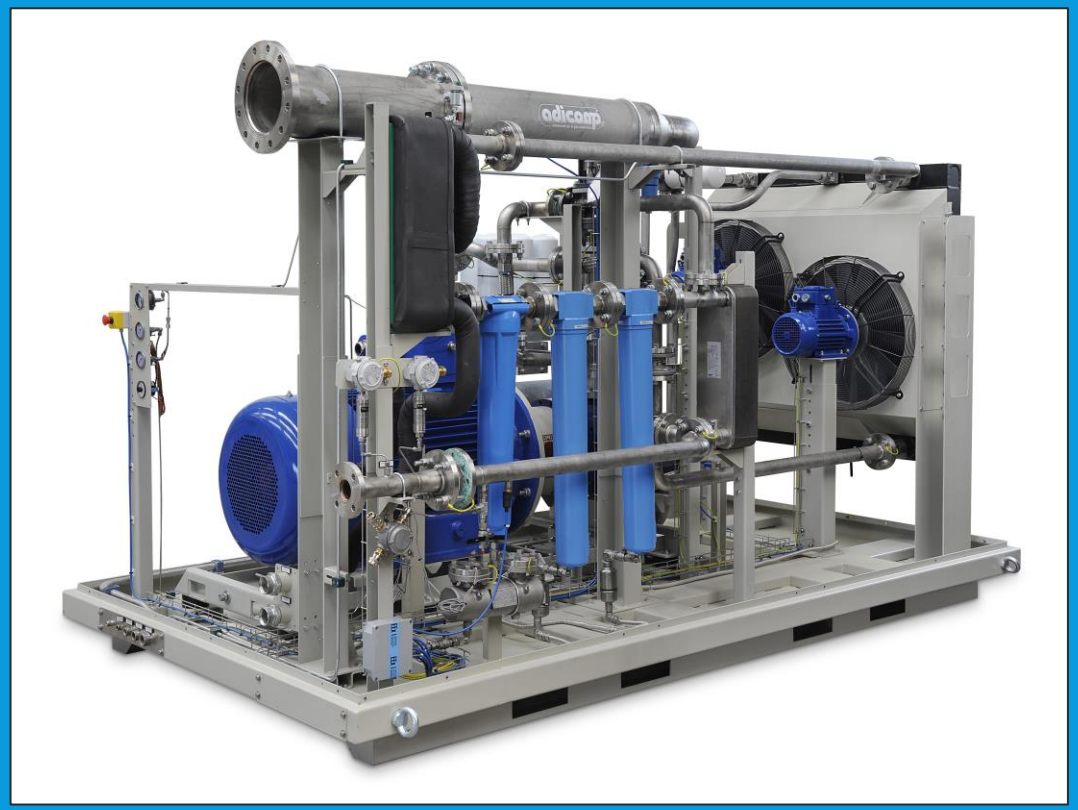
- **The biogas sources can come from:**
  - Manure
  - Zootechnical industry
  - Agro-industrial
  - Agricultural
  - Organic fraction of municipal solid waste
  - Landfill
  - Dedicated farming
  - Waste Water Treatment

6) BIOGAS UPGRADING

- Why wasting wastes? Producing renewable natural gas, called biomethane, can be profitable and can be done also at production sites where no gas grid infrastructure is available
- Anyhow the produced biogas after the anaerobic digestion doesn't have the desired methane content and quality -> the biogas needs an **upgrade and purification**
- The main **biogas upgrading systems** are:
  - Membranes
  - PSA – Pressure Swing Adsorption
  - Cryogenic
  - Water Scrubbing
  - Scrubbing with ammines

These upgrading systems operate in pressure -> **a compression package is needed**

7) COMPRESSION AND TREATMENT SOLUTIONS



After pre-treatment the biogas can be compressed to a variable pressure related to the upgrading technology used.

There are two main compression technologies:

- **Rotary screw compressors**
- **Reciprocating compressors**

7) COMPRESSION AND TREATMENT SOLUTIONS

SCREW BLOCK

The most common and efficient technology used for biogas upgrading applications is **rotary screw compression**

The main advantages of this technology are:

lower running costs and maintenance costs

-> LOWER OPEX COSTS

the possibility to recover from the hot lubricating oil about 80% of the absorbed electrical shaft power as thermal power

-> HEAT RECOVERY

7) COMPRESSION AND TREATMENT SOLUTIONS

- The compressed gas to enter the membrane, PSA and Cryogenic upgrading units has to be further **dried** (3-5°C pressure dew point) and **cleaned**.

- In any case the residual oil content should be lower than 0,01mg/Nm^3. So it's necessary to adopt a filtration through **coalescent filters** and if necessary a further filtration as an **activated carbon column.**

- The gas should be further **re-heated** in order to avoid condensation.

All these operations are **integrated in Adicomp's compressor packages** for biogas upgrading, which provide the gas at the right quality required by the process.

7) COMPRESSION AND TREATMENT SOLUTIONS

8) PISTON OIL FREE BOOSTER FOR BIOMETHANE GAS GRID INJECTION

- Oil-free piston compressor
- **The compressed biomethane is not contaminated as there is no oil in the cylinder heads**
- **No need of filtration after the compressor**
- Multiform solutions: 1, 2 or 3 cylinders
- Versatile: **single-double-triple stage**
- Designed for **continuous operation**
- **Application limits: suction up to 80 bar, discharge up to 100 bar**

8) PISTON OIL FREE BOOSTER FOR BIOMETHANE GAS GRID INJECTION

9) CUSTOMIZED SOLUTIONS

10) CONCLUSIONS

The plant's **reliability and efficiency** are affected by the correct selection of the biogas compression and treatment, according to the selected biogas upgrading technology

Compression and treatment are strictly connected and the best solution is a **complete package** which integrates both stages

Rotary screw compressors are recognised as the most reliable and efficient technology feeding **biogas upgrading** systems

Oil-free reciprocating compressors are the most suitable solution for **biomethane gas grid injection**

ADICOMP CAN SUPPLY TAILOR MADE SOLUTIONS FOR BIOGAS AND BIOMETHANE.

DZIĘKUJĘ BARDZO!

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