Competence Centre :

The use of production waste materials for energetic purposes

Energy efficiency,
use of biofuels in engines and power generation

in the 7th Thematic Area :
Energy and Cogeneration Technologies of Energy efficiency

Coordinator:

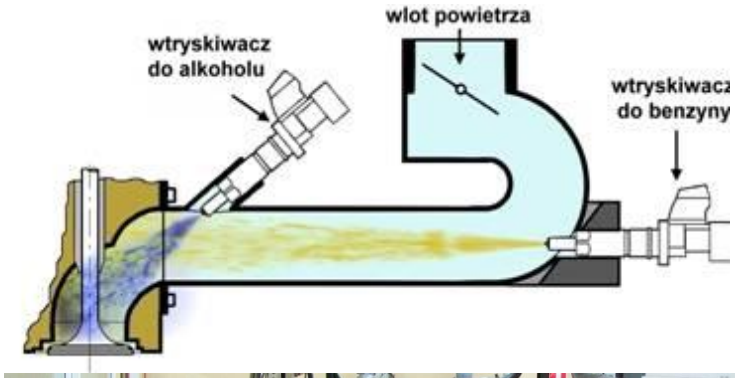
University of Bielsko-Biala

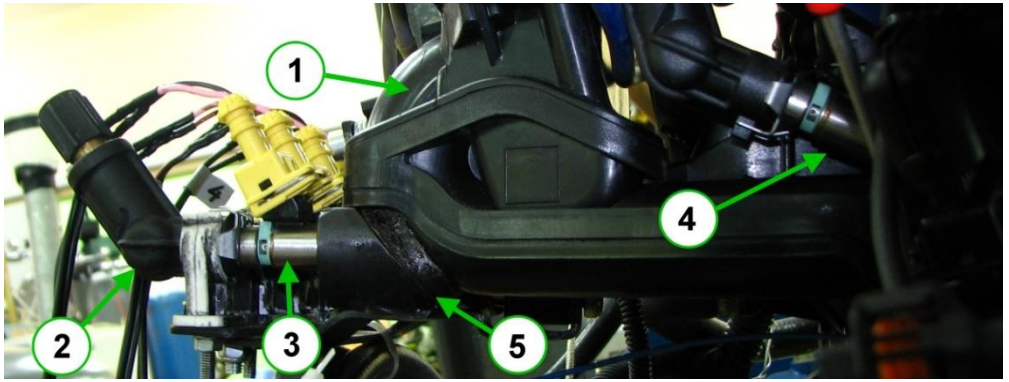
prof. dr hab. inż. Zdzisław Stelmasiak

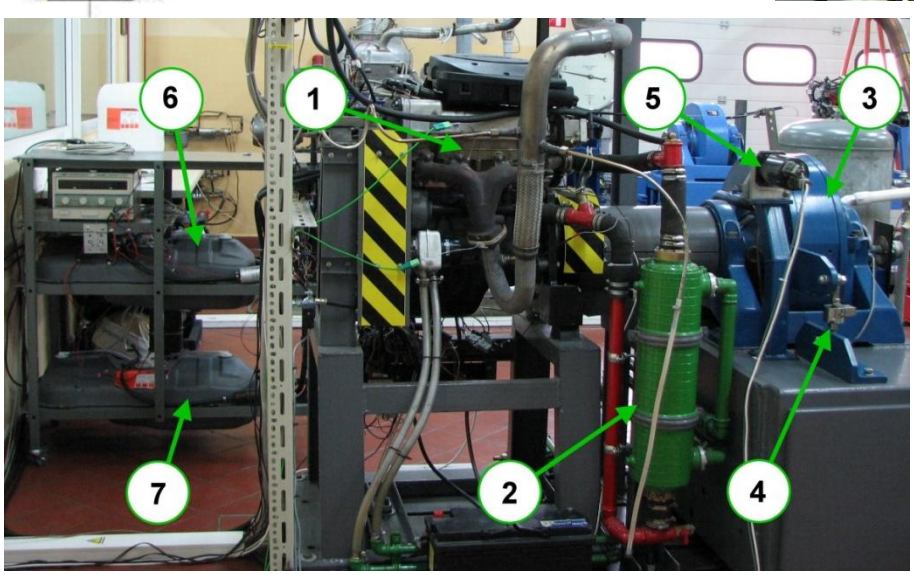
Key competences resulting from realized works and present research projects

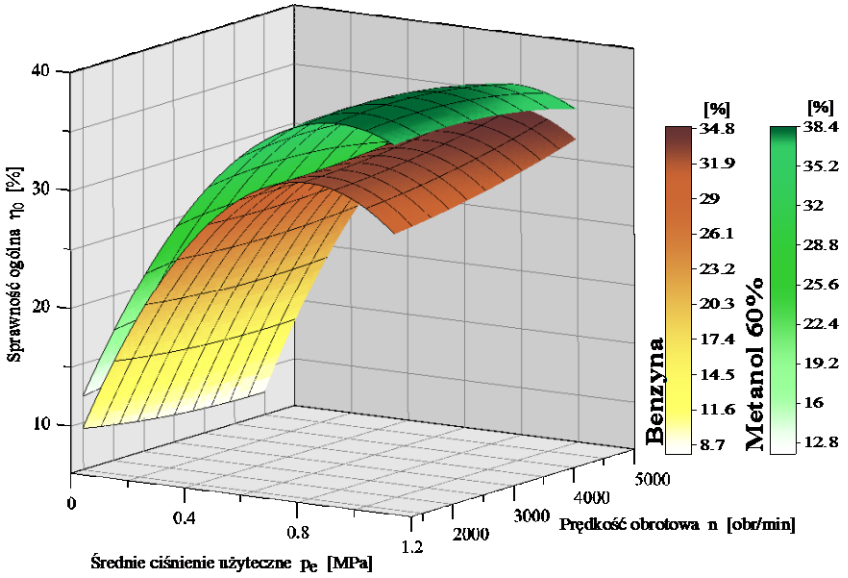
- Rationalisation of the combustion process in engines and power generation boilers
- The use of waste materials to supply spark ignition engines and dual fueled diesel engines
- dual fuel power of engines with spark ignition and compression ignition
- Cogeneration of power and heat
- Supervision of investment, startup and operation of cogeneration power units
- Rationalisation of power transmission
- Heat exchangers

Dual fuel engine with spark ignition

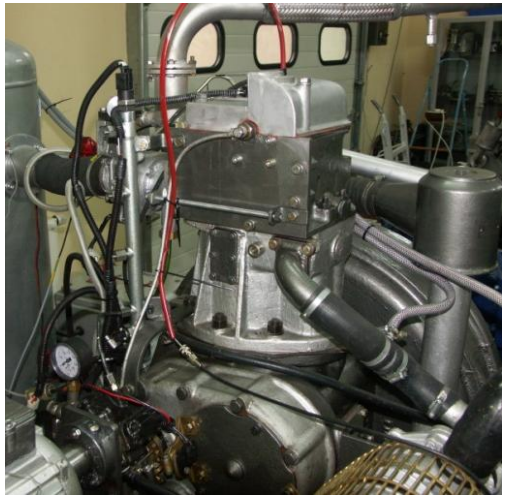


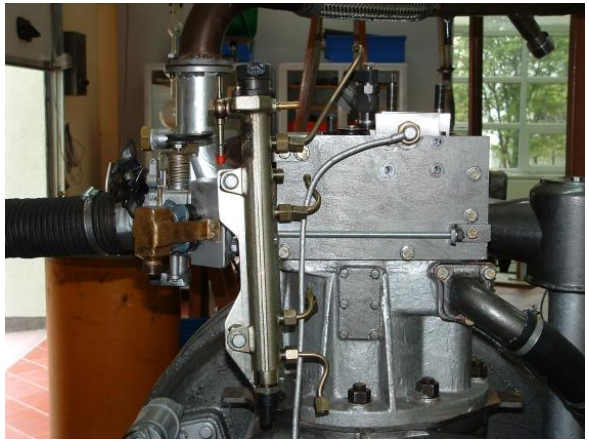


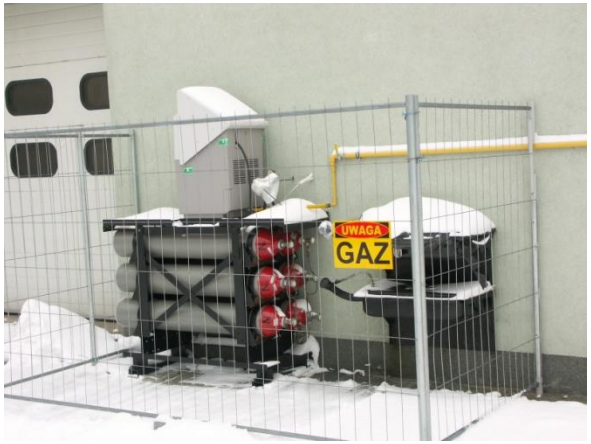


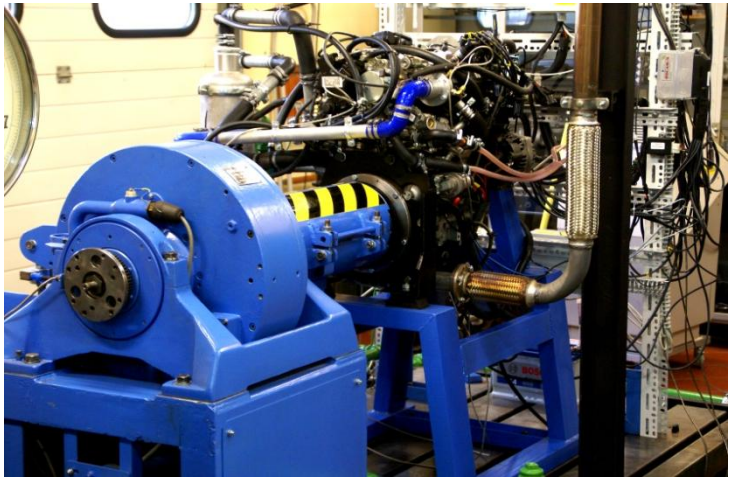


Dual fuel diesel engine





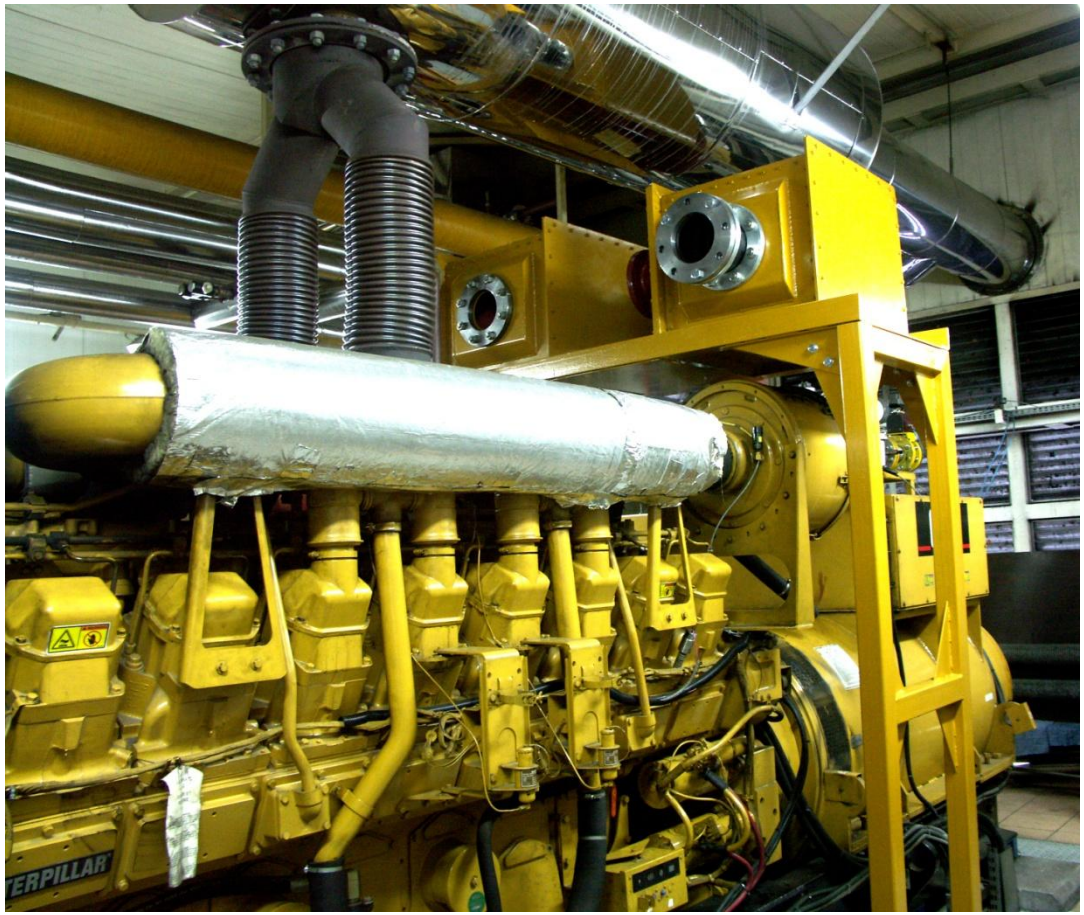


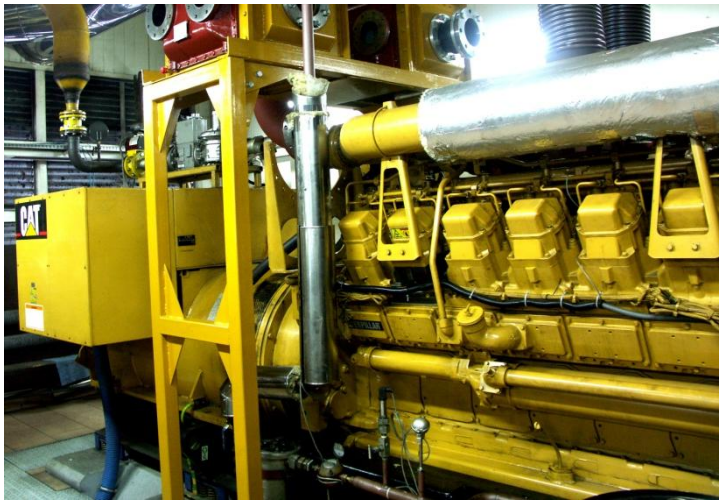


Within the cooperation the Centre proposes to participate in the following areas

- Dual fuel supply of spark ignition engines with hydrated ethyl alcohol,
- Power of generator engines with natural-, mine-, fermentation-, landfill-, industrial-gases – SI systems and dual fuel CI systems,
- The use of glycerol as waste in the production of bio-fuels to power of diesel engines and heating boilers,
- Smoke opacity limit in dual fuel CI engines fueled mainly by gas,
- Modelling of heat transfer in power equipment (e.g. exchangers freon-water used as a heat source of the heat pump),
- Optimization of the combustion process in engines running on the alternative fuels of a low calorific values.

Stationary dual fuel diesel engine, powered by diesel oil and mining gas





Caterpillar 3516 DF
D = 170 mm
S = 190 mm
ε = 13
Ne = 1.500 kW

Stationary spark ignition engine, powered by mining gas

Engine MWM Deutz TBG 632 V16

- n = 1000 rpm
- power Ne = 3,9 MW
- cogeneration efficiency– 87%