• Member of business group LUKA & BRAMER GROUP, a. s. located in Brno

• Focus
  • supply of technologies for utilization and waste processing
  • supply and service of technologies within the energy sector
  • supply and service of technological units for energy savings in households and industry
  • research and development of depolymerisation and gasification technologies

• Provides
  • experienced team of engineers with years of experience in the field
  • unique solution for each technological unit
What makes us exceptional

• we offer technological systems which in its scope cover all the energy needs of the client
• own unique technologies in the energy market
• own research and development
• integrity of solutions
• synergetic effect with sister companies within the LBG holding
  ELVOSOLAR a.s. www.elvosolar.sk
  WIZACO NDT, s.r.o. www.wizaco.eu
  PR Krajné, s.r.o. www.stered.sk
• highly qualified team of international experts
• dialogue, creativity, frankness and courage to chose new solution
Supply of technologies and systems

- Municipal waste sorting technology
- Gasification technology for municipal waste and biomass processing
- Cleaning and cooling of biogas
- Depolymerisation technology for waste plastics processing
- ORC technology for waste heat utilization
- Cooling absorption systems
- Technology for energy savings
- Air protection technologies
- Cogeneration unit, biomass boilers, air-conditioning units
Municipal waste sorting technology

• Cutting edge technology
• Maximum automation of the entire process
• High efficiency rate in sorting process
• Minimal number of employees
• Modern automatic separators
• High capacity and low operating costs
For your projects we offer:

- analysis of your energy needs
- expert consultancy
- technical and economical studies
- financing assistance
- complete project works
- turnkey delivery of technological units
- operator training
- service and maintenance
Municipal waste sorting technology

- Using of many valuable resources of waste
- Quality materials suitable for recycling
- Reducing the burden on landfills and waste incineration facilities
- Economically self – sufficient technology
- Preparation of input material for depolymerisation and gasification
- Solutions for 10,000 tons, as well as for 250,000 tons of MMW / year
Municipal waste sorting technology
Gasification technology for municipal waste

• We offer **unique solution** resulting in a maximum utilization of municipal waste and energy evaluation of non-recyclable residue, which ends today at the landfill or incineration plant.

• We **supply technology** where burning does not occur. The whole system is closed from the dosage of waste to the final product - the synthetic gas.

• We offer solutions for cities, municipalities or industrial companies.

• We supply modular solutions from 20,000 tons / year at very attractive economic **return of the project**.
Gasification of municipal waste

- With our partners we dispose with a unique concept for the treatment of mixed municipal waste (MMW).

- One of the results of the sorting process is a homogenized mixture that does not contain undesirable components that are not suitable for the gasification process (inert materials, glass, iron, etc.).

- Sorted homogeneous part of municipal waste is dried and enters into the gasification reactor where is transformed into a gaseous fuel - a synthetic gas suitable for further energy recovery, e.g. for the production of electricity and heat.

- Gasification is a process for conversion of organic material into a combustible gas, which is mainly composed of carbon monoxide (CO), hydrogen (H₂), and methane (CH₄).
Gasification of municipal solid waste

As compared with conventional incineration:
• No combustion process
• No damage to the environment
• Half investment costs
• Half operating costs
• Reaching up to triple electricity production
Gasification technology

• Technology for the utilization of excess (waste) materials from agricultural production and wood processing industries.

• Conversion of solid organic material – biomass, into fuel gas by means of heat and a gasification agent.

• The gas can be used in a cogeneration unit to produce heat and electricity, possibly as a combustion medium to the boiler.

• Supply of units rating from 30 kW to 2000 kW.

• Energy independency, production of own electricity and heating for the needs of used
Gasification technology

Gasifiers are divided into three basic groups:

- **Counterflow**
- **Flow supported**
- **Cross flow**
Depolymerisation technology

- Technology works on the principle of depolymerisation (pyrolysis) of the polymer to hydrocarbon products.
- Final products are synthetic oil, synthetic gas, and a solid residue - carbon.
- Pyrolysis is the thermal decomposition of organic carbon-containing materials without oxygen access.
- Burning does not occur and harmful emissions are not produced.
- Without negative impact on the environment.
- The catalyst lowers the transformation reaction temperature from approximately 800 °C to temperatures in the range of 400 ° - 500 °C.
We offer material and energy evaluation of plastic waste that can not be achieved by any other available technologies.

Product output from the depolymerisation process:

- **pyrolysis oil** - liquid product is a valuable raw material for further use in the petrochemical and energy industries, as a component in the fuels production.
- **pyrolysis gas** - may be utilized in the process of heating the input materials as a fuel, or used for electricity generation in CHP.
- **solid residue** - carbon may be used in petrochemical industry or as a fuel.
Depolymerisation technology

Equipment flowchart:

- Input
  - Pyrolysis Technology
    - Gas management
      - Gas output
    - Oil output
      - Oil management
        - Network
          - KGJ 1 MW
  - Carbon output
  - Gas entering the technology
ORC technology

• Electricity generation from low potential (waste) heat.
• Uses the heat in the range of 80°C - 150°C in the form of hot water, steam, thermal oil and flue gas.
• No fuel requirements – using waste or process heat only.
• Zero emissions, environmentally friendly and reduces CO₂ production.
• Attractive return on investment.
• Improvement of efficiency of electricity production, saving costs for cooling and reducing heat waste.
• Low maintenance costs.
• Projected lifespan of 20 years.
ORC technology

**ORC E-Rational type 1000** for utilization up to 1 MW of thermal energy.
- Generator performance series 55 – 132 kW
- Indoor or outdoor design

**ORC E-Rational type 2000** for utilization up to 2 MW of thermal energy.
- Generator performance series 160 – 220 kW
- Indoor or outdoor design

**ORC E-Rational type 4000** for utilization up to 4 MW of thermal energy.
- Generator performance series 250 – 500 kW
- Outdoor design

**ORC E-Rational type 7000** for utilization up to 7 MW of thermal energy.
- Generator performance series up to 1000 kW
- Outdoor design
ORC technology

Suitable applications

• Cogeneration units: diesel, gas, biogas...
• Low pressure steam: turbines, process heat...
• Industrial installation: chemical plants, metal works, smelting plants...
• Burners/boilers, incinerators/furnaces, power plants, cement plants...
• Geothermal and solar heat sources
Energy Saver technology

• Improves and optimizes power quality for the needs of specific appliance.
• Improves individual components of electrical energy, thereby reduces energy consumption and extends life of the appliances.
• Each unit is always designed and constructed based on detailed analysis of the network.
• Each unit is designed and manufactured to measure directly for specific appliance.
• The basis of Energy Saver is a patented, hand-wound transformer, with multiple branching. These branching are switched through thyristor control.
• Output from the device is kept constantly at the same voltage, in the range of +/- 1 % for each phase.
• Due to the separate transformer for each of the three phases being uniformed phase asymmetry
• Reactive power compensation and harmonic distortion filter, the range of 5-20 ms.
• Technology also includes a network analyzer and power surge protection.
Technologie Energy Saver

Adverse effects on electrical energy and their elimination
• Power surges in the electrical network
• Phase voltage asymmetry
Adverse effects on electrical energy and their elimination

• Low power factor
• Harmonic distortion
• Transient Phenomena in the power network
Energy Saver technology

The electricity savings after installing **Energy Saver** technology

- motor load: 6 – 12 %
- combined load: 8 – 18 %
- lighting load: 10 – 22 %

The lifespan and design of **Energy Saver** has been proven with more than 20 years experience.
Usage possibilities

• **Lighting** - production halls, sports halls, stadiums, car parks, public/street lighting, airports
• **Industrial sector** - industrial concerns, manufacturing plants, food companies, chemical plants
• **Public sector** - government buildings, town halls, schools, cultural and sports centers, hospitals
• **Travel & tourism** - hotels, guest houses, restaurants, cafés, shops
• **Agriculture** - biogas stations, fading co-operatives, pig stays, stables, poultry barns
• **Commercial areas** - wellness centers, aqua parks, shopping centers
• **Households** - houses, flats/apartments, development projects
The working principle of absorption coolers

• Absorption cooling systems use thermal energy to produce a cooling effect, meaning that unused (waste) heat is used for a cold production.

• In these systems, the refrigerant, i.e. water, absorbs heat at a lower temperature and lower pressure during evaporation, and releases heat at a higher temperature and a higher pressure during condensation.

• The diluted solution which contains absorption cooling steam is heated to a higher pressure. This leads to the evaporation of the refrigerant, and so the solution retains its original concentration.

• The refrigerant passes through a series of processes for the complete refrigeration cycle. These include evaporation, absorption, the pressure process, condensation, expansion and choking.

• During this cycle, the refrigerant absorbs heat from the low temperature heat source, release it at a high temperature, and subsequently drops.
Absorption systems

Main advantages of absorption coolers

• **The main source of energy** - hot water, steam, flue exhaust gas, waste gas, or waste heat.

• **Uses for its operation only 5%** of electricity, compared with conventional compressor coolers, because only the circulation pumps are powered by electricity.

• **Very quiet operation**, system design is highly reliable and maintenance free.

• **The equipment is environmentally friendly** – it has negligible power consumption.

• **The equipment has a high efficiency** heat recovery for further heating.
Thank you for your time

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