World Academy of Science, Engineering and Technology
International Journal of Energy and Environmental Engineering
Vol:16, No:09, 2022

# Exploration of Industrial Symbiosis Opportunities with an Energy Perspective

**Authors :** Selman Cagman

**Abstract :** A detailed analysis is made within an organized industrial zone (OIZ) that has 1165 production facilities such as manufacturing of furniture, fabricated metal products (machinery and equipment), food products, plastic and rubber products, machinery and equipment, non-metallic mineral products, electrical equipment, textile products, and manufacture of wood and cork products. In this OIZ, a field study is done by choosing some facilities that can represent the whole OIZ sectoral distribution. In this manner, there are 207 facilities included to the site visit, and there is a 17 questioned survey carried out with each of them to assess their inputs, outputs, and waste amounts during manufacturing processes. The survey result identify that MDF/Particleboard and chipboard particles, textile, food, foam rubber, sludge (treatment sludge, phosphate-paint sludge, etc.), plastic, paper and packaging, scrap metal (aluminum shavings, steel shavings, iron scrap, profile scrap, etc.), slag (coal slag), ceramic fracture, ash from the fluidized bed are the wastes come from these facilities. As a result, there are 5 industrial symbiosis projects established with this study. One of the projects is a 2.840 kW capacity Integrated Biomass Based Waste Incineration-Energy Production Facility running on 35.000 tons/year of MDF particles and chipboard waste. Another project is a biogas plant with 225 tons/year whey, 100 tons/year of sesame husk, 40 tons/year of burnt wafer dough, and 2.000 tons/year biscuit waste. These two plants investment costs and operational costs are given in detail. The payback time of the 2.840 kW plant is almost 4 years and the biogas plant is around 6 years.

**Keywords :** industrial symbiosis, energy, biogas, waste to incineration
**Conference Title :** ICEPO 2022 : International Conference on Energy Process and Optimization
**Conference Location :** San Francisco, United States
**Conference Dates :** September 27-28, 2022