

Conversion & Utilization of Organic Wastes

The Project.

The facility in question is a co-op which provides products and equipment to 42 widely-varied member companies which comprise the co-op. The co-op exists to help these companies operate efficiently – the resources that it provides are items that would be too expensive for each plant to maintain by itself in a cost-effective manner. The co-op largely deals with all types of organic wastes, including cattle and poultry manure, cotton stalks, and organic wastes from plants (bananas, glucose, grapes, and slaughterhouse waste).

Conversion Technology, Inc. (CTI) was contracted to provide a complete technical and economical solution for waste disposal at the facility – particularly involving methods of converting the facility wastes into useful products and applications, such as energy production, fertilizers, additions to animal feed, disease-suppressing products, and other products for the improvement and preservation of soil structure. CTI's engineers performed a thorough evaluation of all facility processes in order to recommend upgrades that would aid in conserving energy, cutting energy costs, and more efficiently handling and utilizing the waste products.

The Analysis.

Upon performing a comprehensive analysis of the facility, CTI found several processes in place that were in need of improvement:

- The waste collection methods, which were being conducted by private contractors, were found to be inefficient and of low quality.
- The costs of transporting the wastes and products were found to be high.
- Storage space for waste products was becoming a burden for the facility.
- Expensive fuel oil was being used to generate required energy at the co-op.
- Gases and dusts were generated from the process of drying some wastes, requiring the installation of pollution control equipment.

The Solution.

After analyzing the full scope of processes in place at the facility, CTI proposed a new system for the co-op which would efficiently produce 8 major products with approximately the same amount of labor and at a lower cost – especially with regard to energy consumption. The improvements designed and implemented by CTI were:

- Replacing the private contractors used for waste collection with the use of a new piece of equipment that could be used to efficiently collect organic wastes at the member facilities on a regular basis.
- Creating a new system of initial organic waste treatment done on-site at each member facility in order to solve storage problems at the co-op, reduce costs, and allow for more efficient transport of the wastes.
- Designing a Central Organic Waste Treatment System (see Figure 1 below). All organic wastes from the co-op facilities are transported to the central system and centrally processed into various products, largely fertilizers. The materials are cleaned, crushed, sterilized, and also used to produce electricity for the plant itself.
- Routing the gases and dust produced by the drying process into the incinerator in the Central Organic Waste Treatment System, thereby eliminating the need to purchase and operate expensive pollution control equipment.

The Results.

Each of the proposed elements of the new system put forward by CTI was analyzed for economic impact. The final economic evaluation showed substantial economic savings as a result of the system:

- The implementation of the initial organic waste treatment done on-site at each member facility led to a 67% reduction in transportation costs, a reduction in needed storage space, improved product quality, and a 40% reduction in product cost.
- The creation of the Central Organic Waste Treatment Center and its use of facility waste as fuel reduced energy loss at the facility by up to 50% for all processes, drastically reducing the energy costs of the co-op.
- Analyzing the equipment, labor, and modification costs associated with these improvements, CTI determined the payback time for the facility's investment, as well as the potential profit gains:
 - Total investment cost for the system was in the range of \$8 million, but provided a full payback of this investment cost within 4 years.
 - The projected profits after 10 years with this improved system were approximately \$10 million.

The Final Word.

The potential savings incurred by efficiently structuring facility processes and reducing the energy costs at the co-op are impressive. The waste products themselves are used as the primary raw materials in manufacturing revenue-producing products – and used as fuel for the processes themselves, meaning that the facility is using significantly lower amounts of conventional fuels in its processes. CTI's technical and economic analysis work with this project demonstrates the great promise that a number of facilities may have in streamlining processes and creating closed cycles to convert and utilize waste products for energy recovery and other valuable outcomes – leading to financial benefits for the company, and ecological benefits for the environment.

CASE STUDY

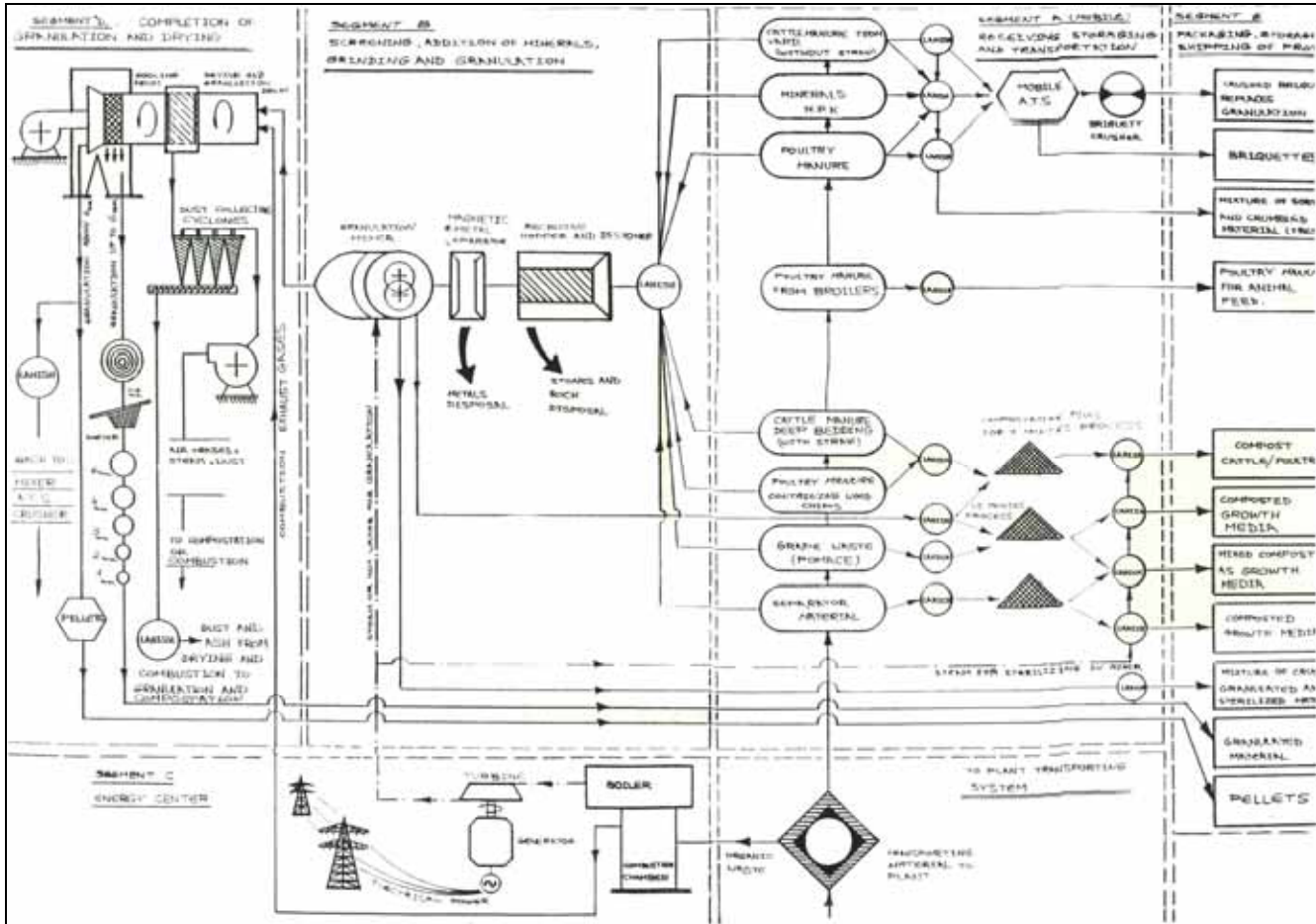


Figure 1: Schematic of Central Organic Waste Treatment System for converting waste products into fuel, reducing energy loss at the facility by up to 50%.