

Wastewater management based on the life Cycle Approach

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Statement of the Problems

- Kingdom of Saudi Arabia faces a great challenges of building or rehabilitating of the water & wastewater systems.
- The current systems are based on business as usual approach or like-for-like replacement/ duplicating foreign standard.
- The current local, and regional policies and procedure for planning, construction and operation are not structured to consider the interdependence of all component in the water systems .

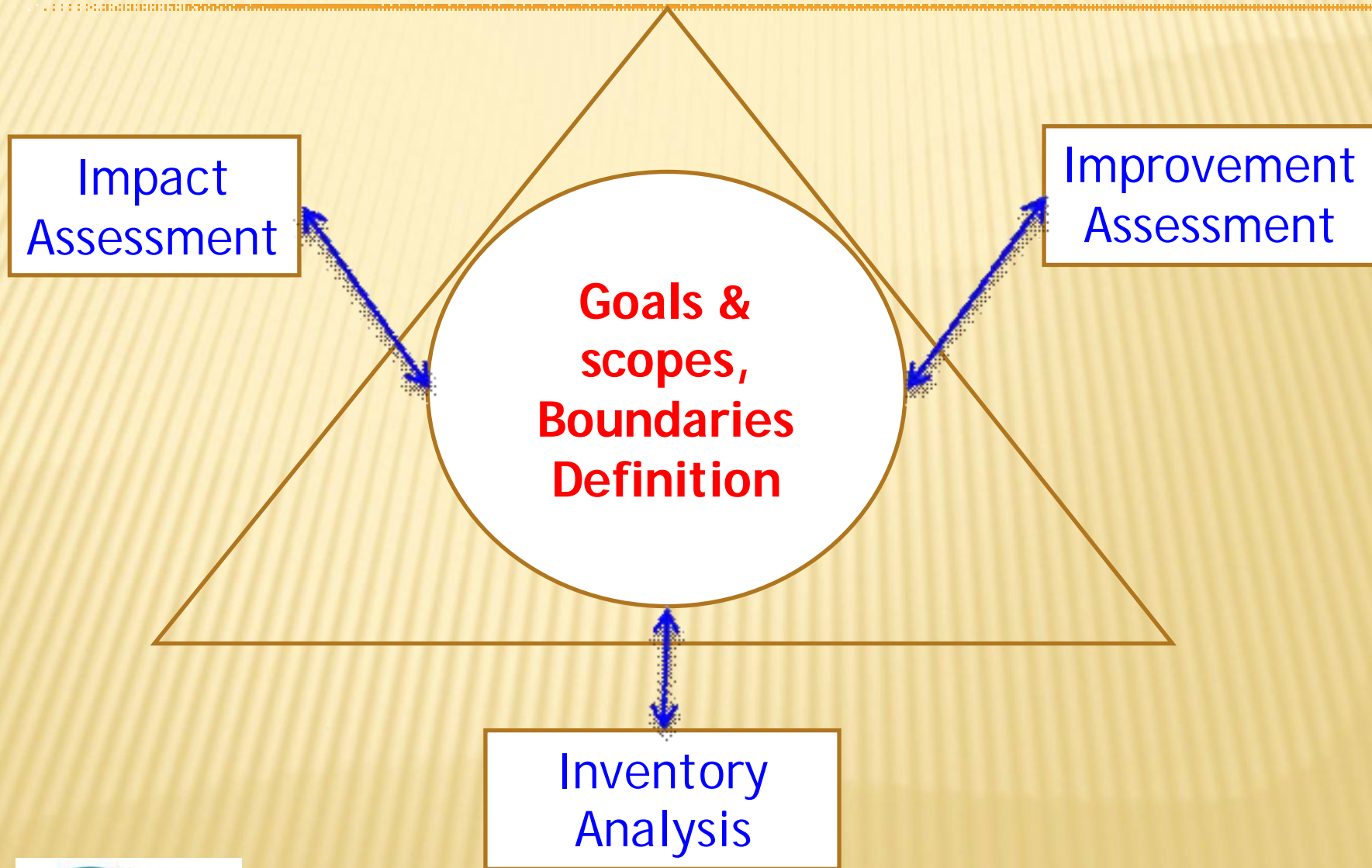
Intelligent Infrastructures of water systems

- Development of **Infrastructure strategies** that focus on providing services (**not structure**), innovative technologies, material selection & process management **is required** .
- These strategies should take in consideration the interdependence of each subsystems to each other and its impact assessment .
- **Planning tools** that allow evaluation of alternative scenarios based on innovation ,material, energy management , environmental impact **are required**.

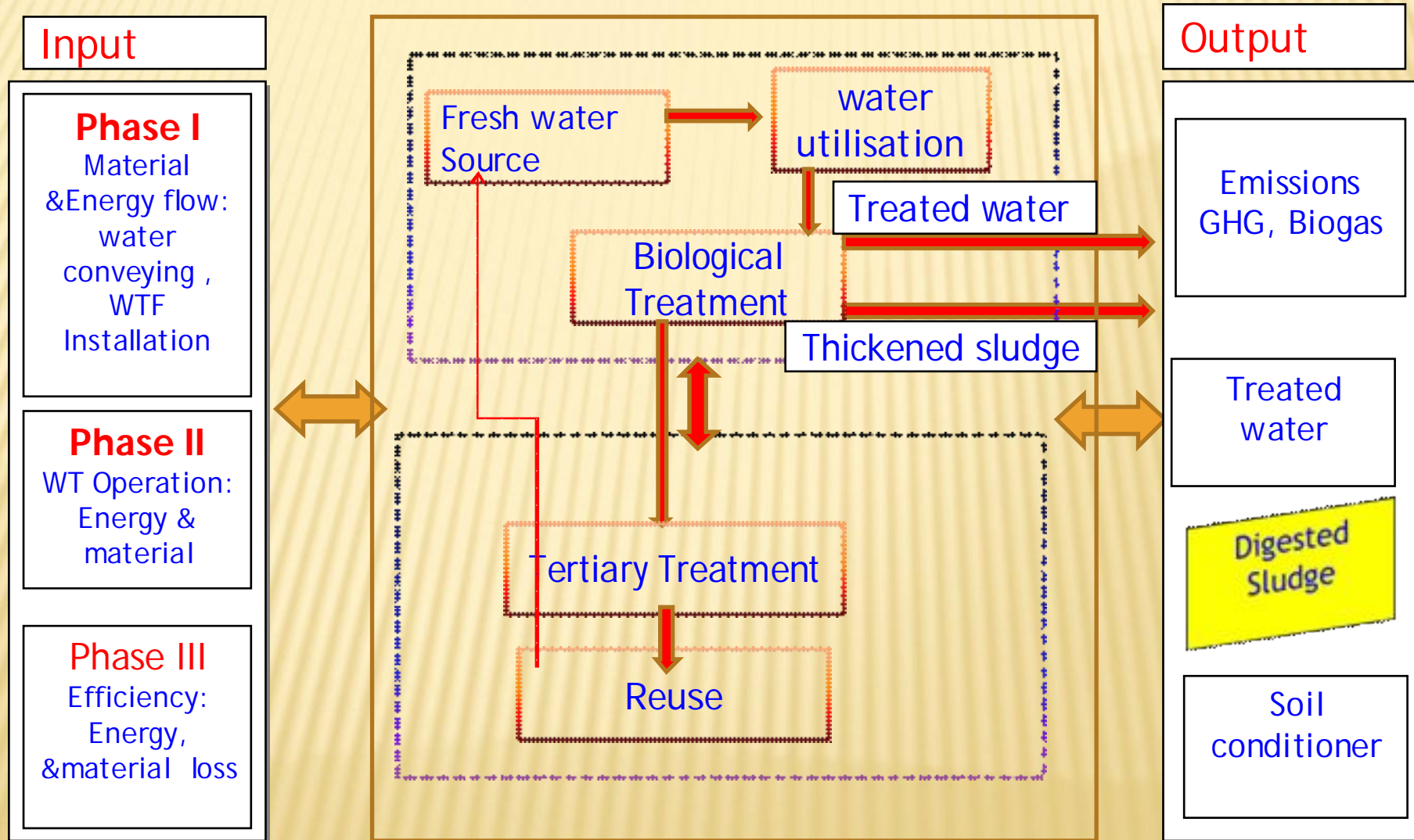
Objectives

- 1. Development of simulation decision making tools for planners that**
 - A. can support new building construction methods , operation practice**
 - B. allow also comparison between alternative technology.**
- 2. Develop cost estimates units to be used in the planning tool for important design alternatives.**
- 3. The results presented here are about evaluation of application of anaerobic digestion on the sewage sludge treatment.**

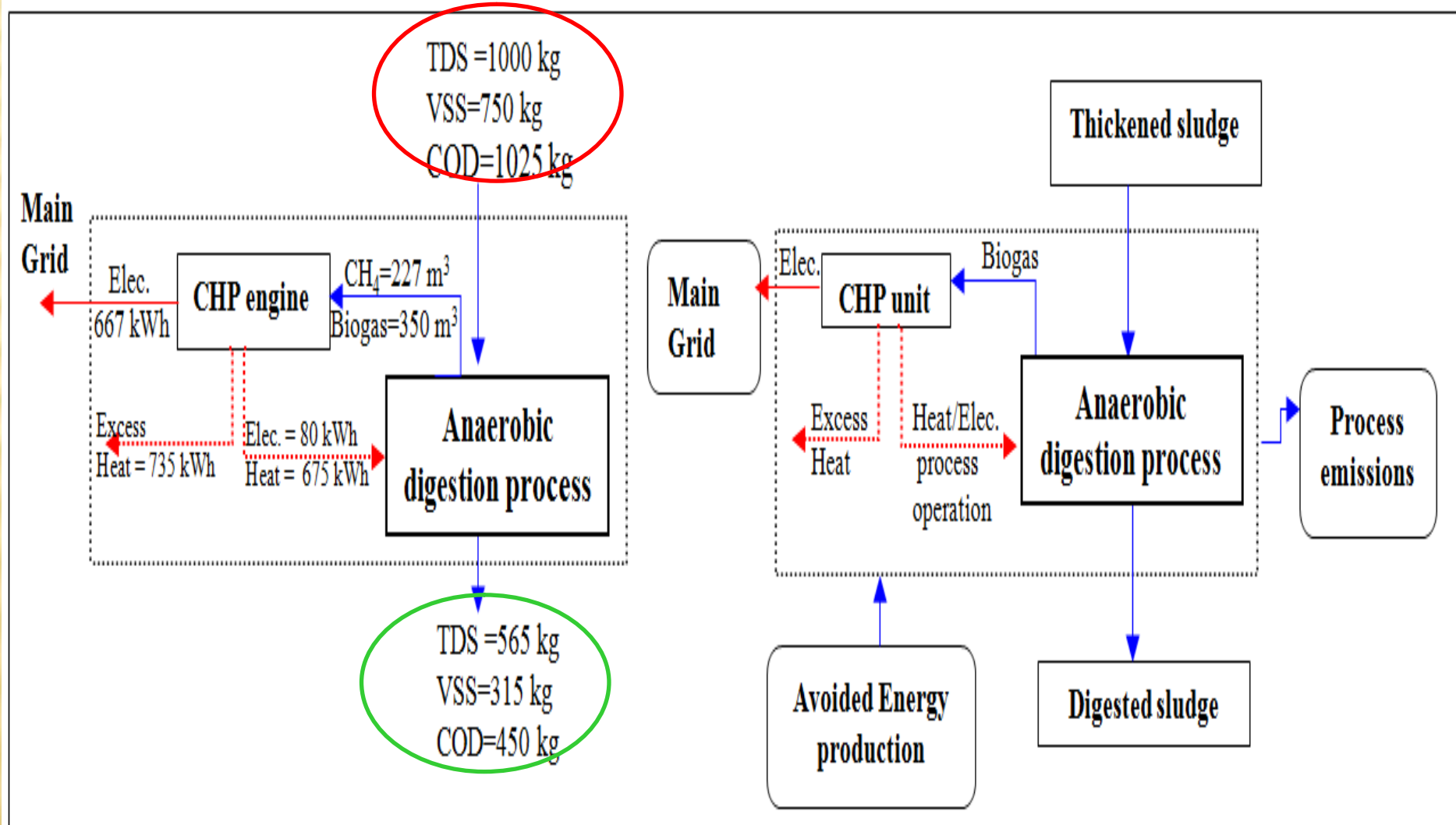
Life Cycle Approach (LCA)



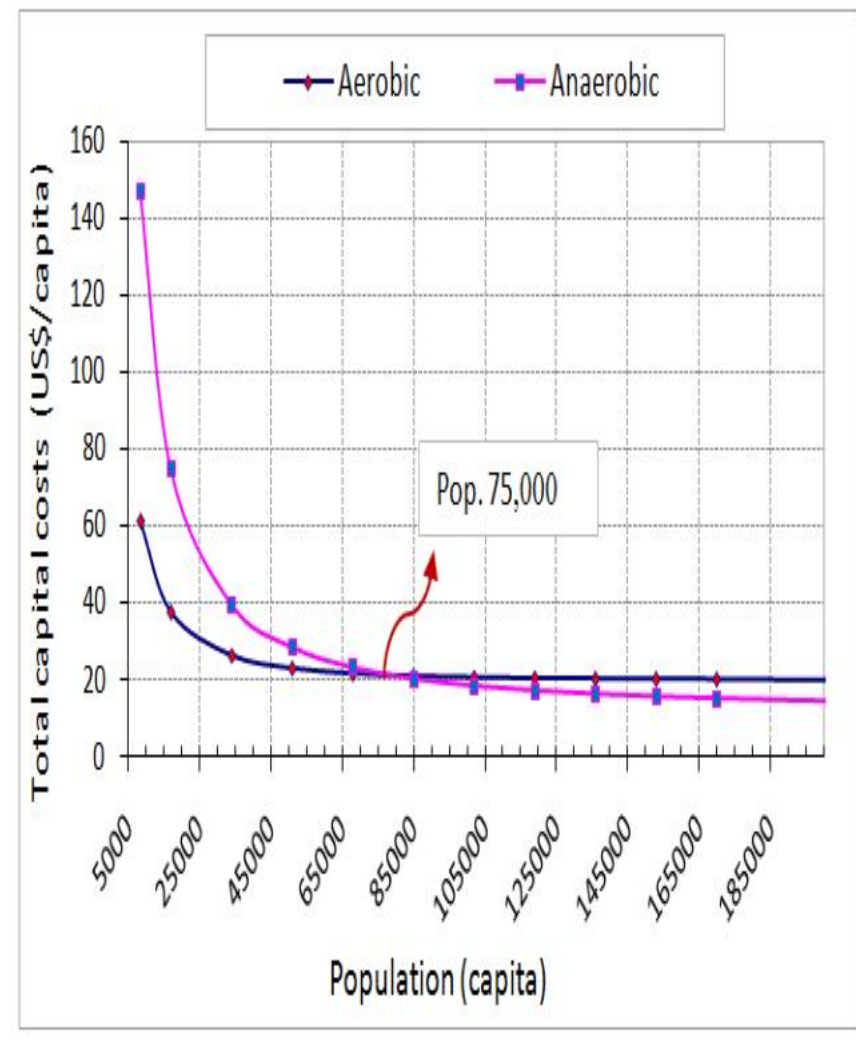
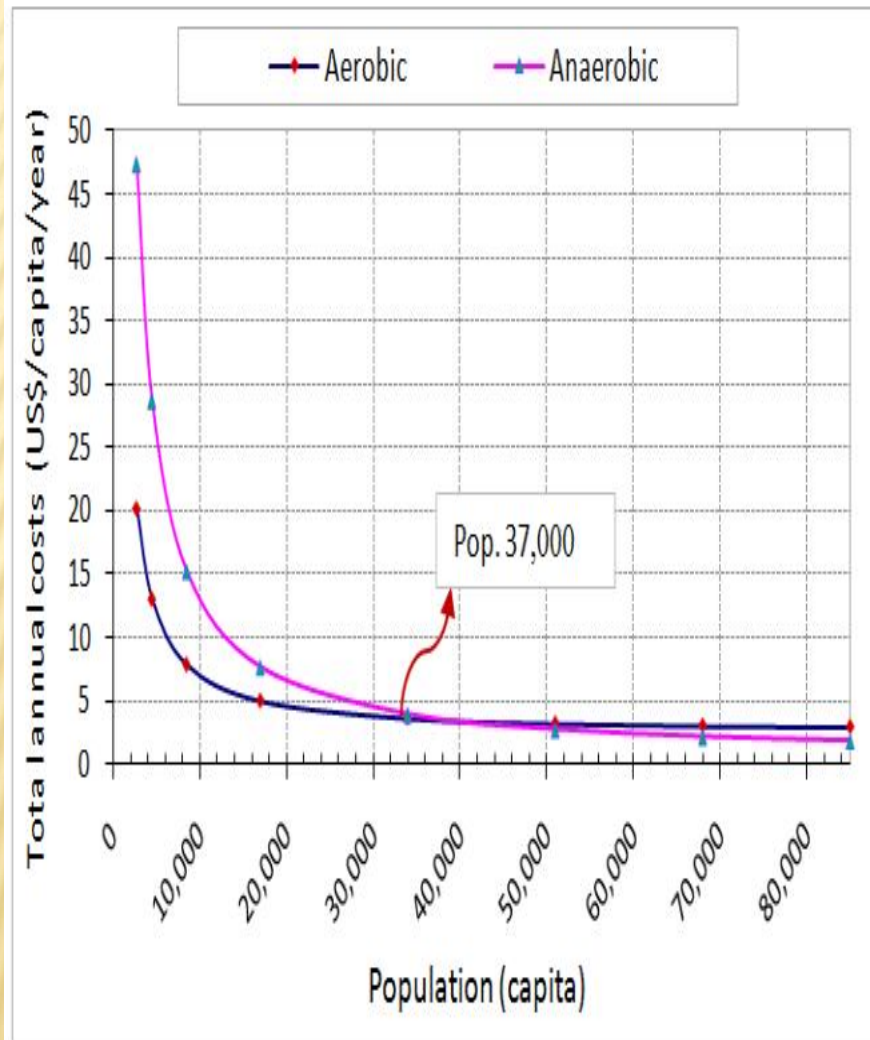
Framework of water system analysis



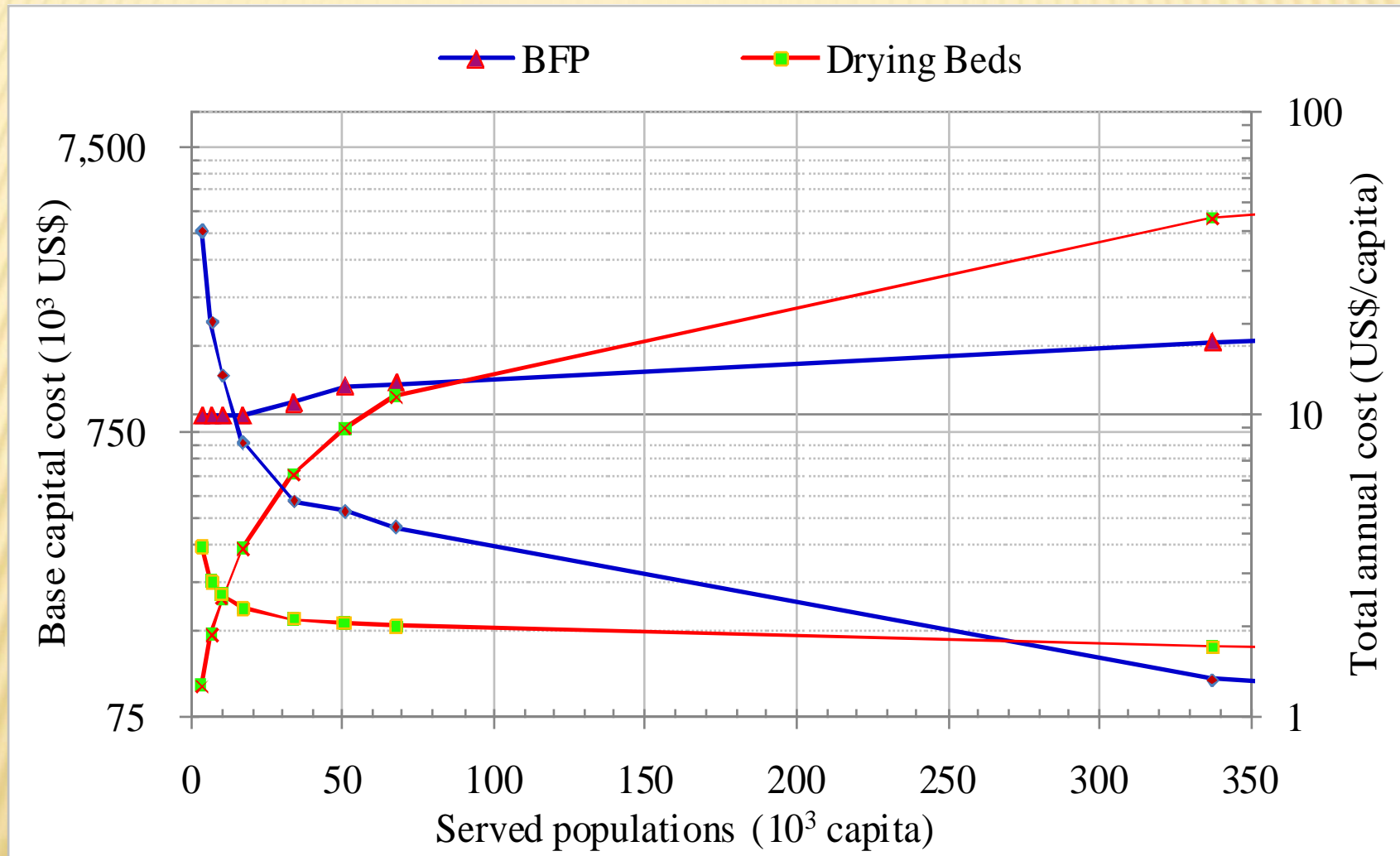
System boundaries & material balance of AD



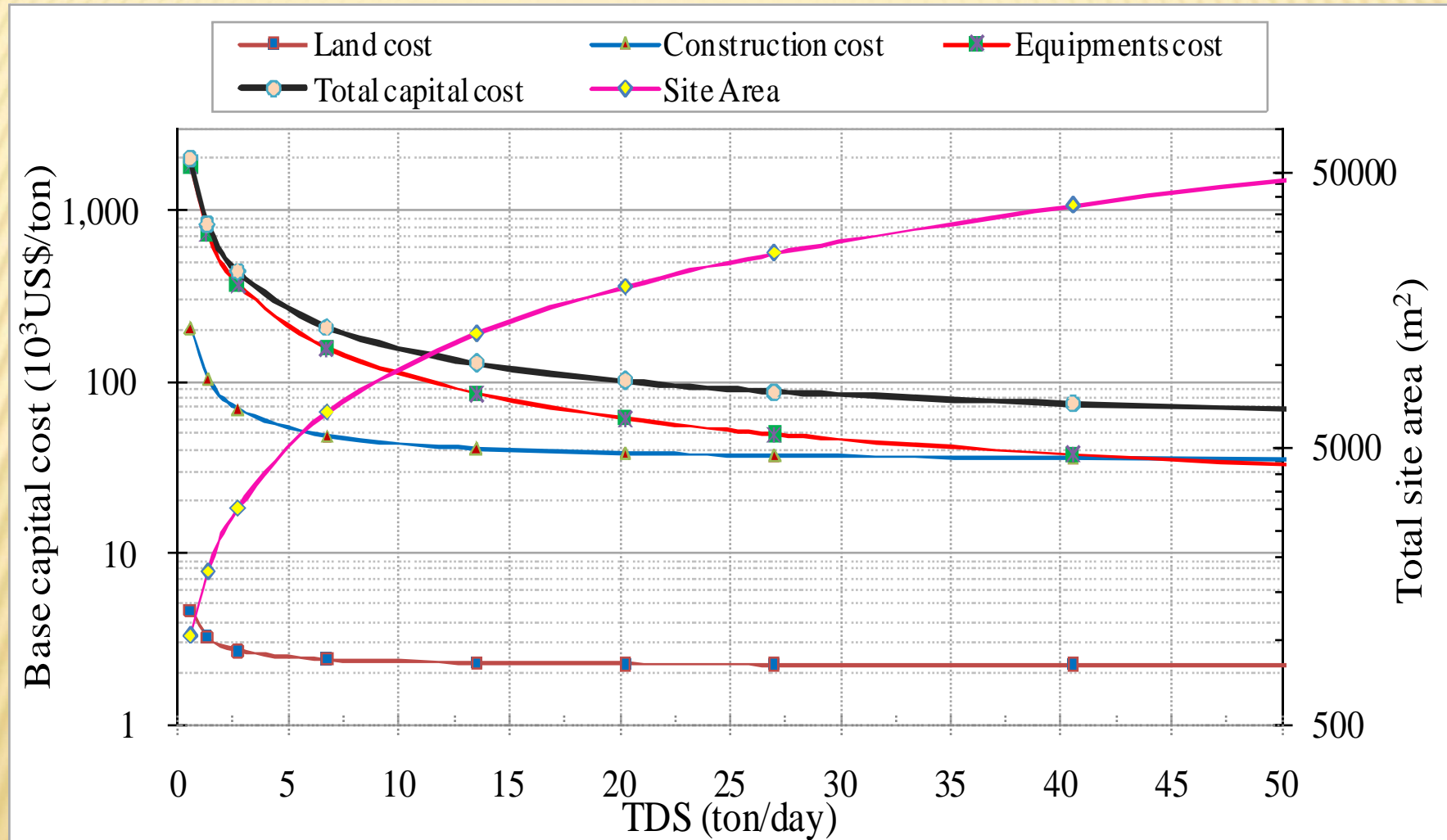
Estimation of anaerobic digestion as a function of population growth



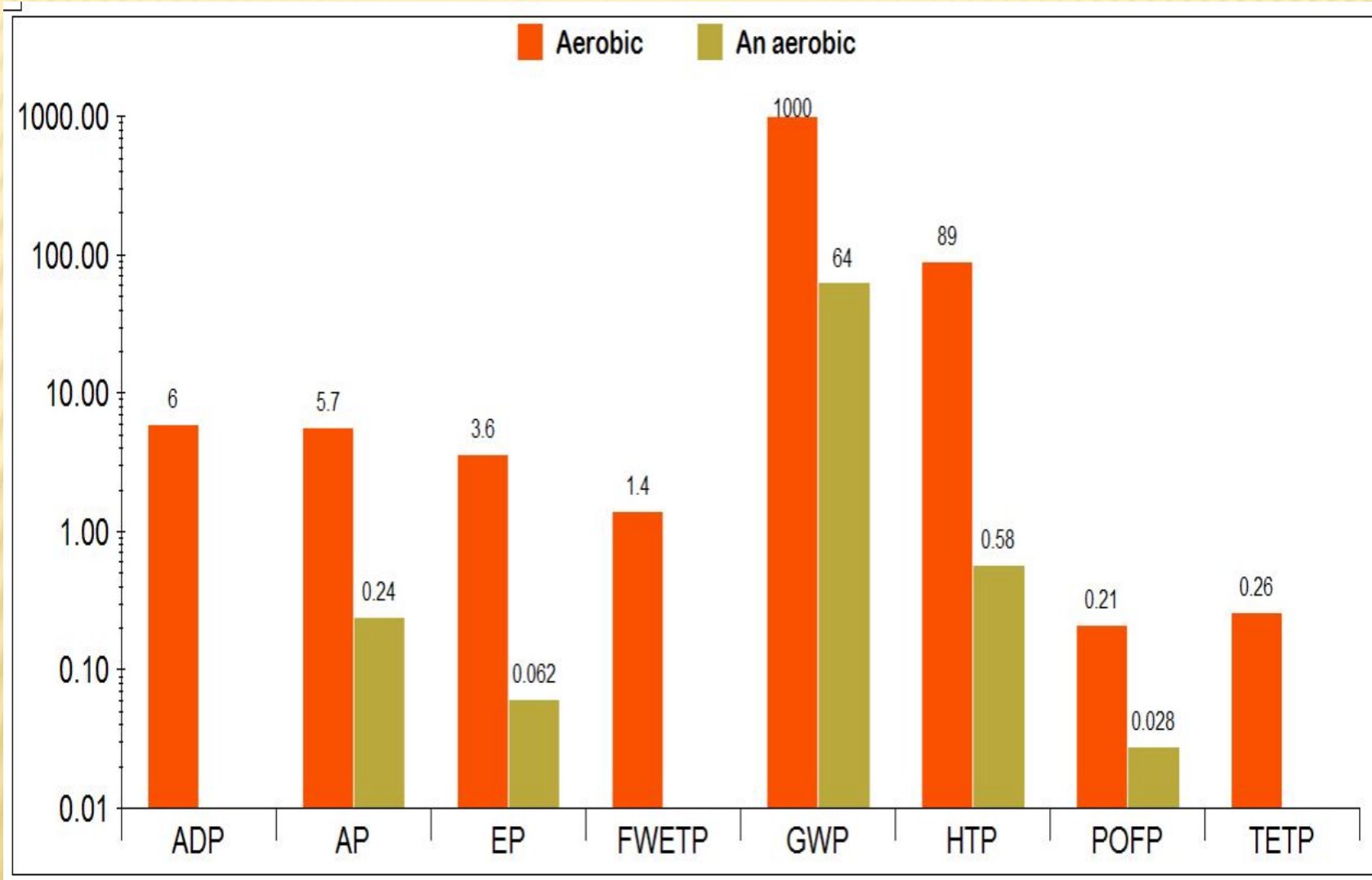
Cost analysis of dewatering system



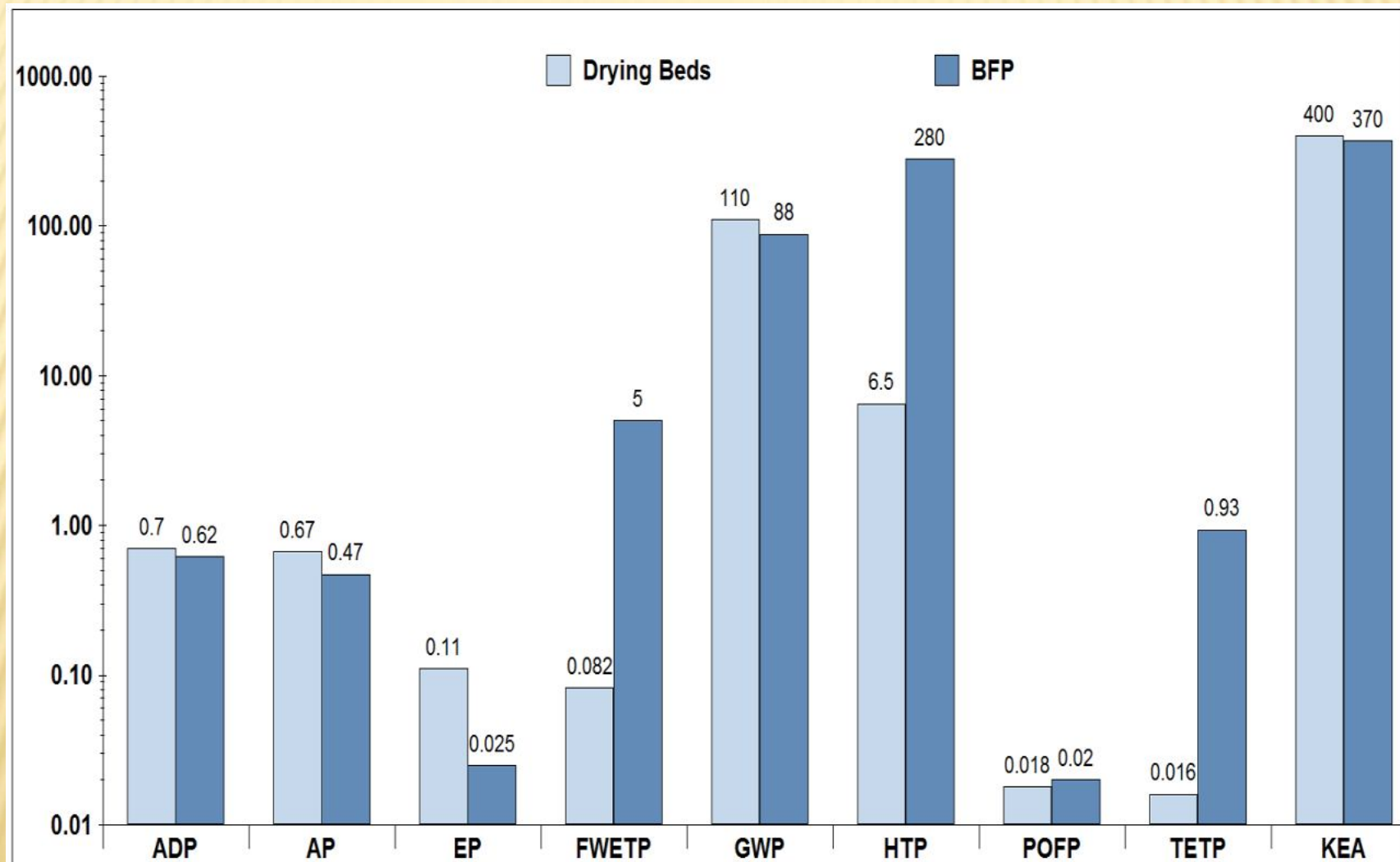
Total cost analysis of dewatering systems



Environmental impacts of anaerobic / aerobic digestion processes



Environmental impacts of dewatering system



Conclusion and Recommendations

- **Life Cycle approach provide a sustainable system analysis tools to study the water system.**
- **Anaerobic digestion process with energy recovery is a promising and cost-effective options for conversion of sewage sludge to biogas.**
- **The environmental impact of anaerobic digestion is lower than conventional biological treatment.**
- **This work regarding water system analysis at EP is going on to identify any failure at earlier stage.**

Thank You for your Attention

