The North Auburn Fisheries unit, located in Auburn, Alabama harvests Nile Tilapia year round. The tilapia grow to maturity in two adjacent tanks located inside of a greenhouse to. The winter months make it difficult to keep the water warm for healthy growth conditions. Monetary constraints posed by traditional heating methods creates the need to develop a sustainable heating system that utilizes the fish waste at hand.

1. **Proposed Design**
   - **Fixed Film Anaerobic Digesters**
     - 55 Gallon, 15° cone bottom tank with removable lid and stand.
     - Denim insulation, and black tarp to keep digester temperature between 32° C and 35° C.
     - Fixed film of textured plastic electrical conduit pipe to increase contact between bacteria and total solids.
     - Digesters run in batch mode, with a hydraulic retention time (HRT) of 1 day, and a solid retention time SRT of 10 days.
     - Slurry runs through system in updraft mode.
     - System of 5 digesters produces 16 meters cubed a day.

2. **Solar Still Design**
   - Heat tilapia sludge from 22° to 35° C, on cloudy and sunny days during the winter months.
   - Run in batch mode for about 1 hour
   - Two solar stills at a time heat the sludge for one digester
   - The solar stills will be filled 3 times a day with 24 gallons of sludge
   - Top of solar still can open to allow user to push leftover sludge into outlet

3. **Cost Estimate**
   - **Components**
     - Solar stills: $264.30
     - Fixed Film Anaerobic Digesters: $2,094.10
     - Pump and piping: $592.19
   - **Cost Saved on Heating** (December - February): $223.39
   - **Increased Revenue from Fish Sold** (December - February): $2937.00
   - **Revenue from System Per Year**: $219.80

4. **Summary**
   - Methane aquaculture system consists of:
     - 4 solar stills
     - 5 fixed film anaerobic digesters
     - Rain water capture barrels
     - Methane burner for heating

   This increases the revenue potential of tilapia by facilitating increased tilapia growth and decreasing the use of electrical heating. The system also creates an opportunity to educate future generations on the potential of sustainable energy.

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