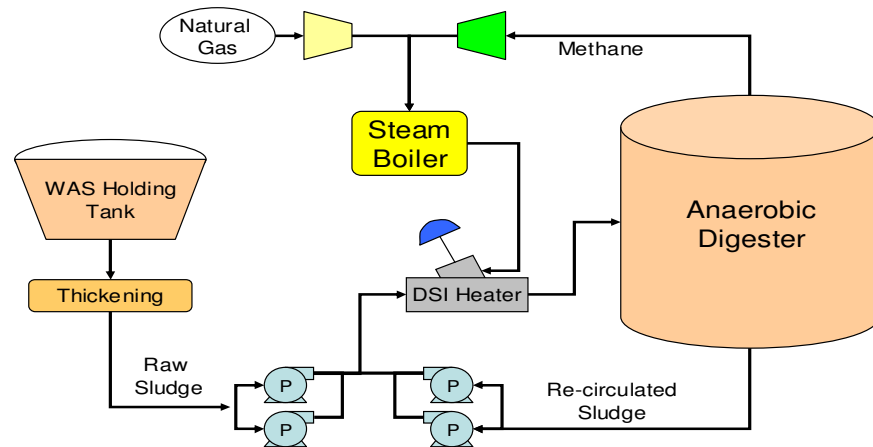


**Application: Anaerobic Digestion – Sludge Heating (Thermophilic)**

Municipal Wastewater facilities facing growing processing demands and limits in their current facilities, are considering thermophilic digestion as a solution. Thermophilic digestion differs from mesophilic digestion in that it operates at approximately 132°F. The advantage that thermophilic has over mesophilic is a faster solids destruction rate which is stimulated by higher temperatures. Operating at a higher process temperature puts sludge closer to the point at which it burns. To

## Anaerobic Digestion



address this problem, heating strategies which employ multiple heat exchangers (2-3) in series are used to spread out the temperature rise. This approach presents the following challenges when heating sludge:

- Spreading the temperature rise across 2-3 heat exchangers still exposes the sludge to scorch problems which can lead to plugging and fouling. Heat exchangers must be operated above the desired set-point in order to achieve the temperature transfer.
- Multiple heat exchangers significantly add to the pressure drop across the heating system. This increased pressure drop places a higher demand on the sludge pumps, which leads to increased energy consumption.
- Heat exchangers, by design, operate in a temperature add/lag response mode. Monitoring and managing the temperature control system becomes complex and makes temperature control difficult to achieve.
- Capital costs, maintenance costs, and building logistics are increased as a result of multiple stages of heating, increasing pump demand, and floor space required.

**PSX Heater Solution:**

The PSX heater disperses steam uniformly at high velocities into the sludge which provides heat transfer instantaneously. The PSX heater can achieve temperature rises as low as 1 °F and as high as 250 °F without burn-on or scorching. This efficiency in heating, allows for single stage heating to be implemented. The PSX can also be mounted directly in the process piping, in any orientation, thus reducing the capital costs associated with installation of heat exchangers.

**ProSonix Direct Steam Injection Key Benefits:**

- Reduced energy costs by lowering pressure drop and reducing demand on sludge pumps
- Reduced maintenance and increasing reliability by elimination of plugging and fouling
- Better temperature control allows for more uniform heating improving process control
- Compact heater size allows for minimal installation requirements