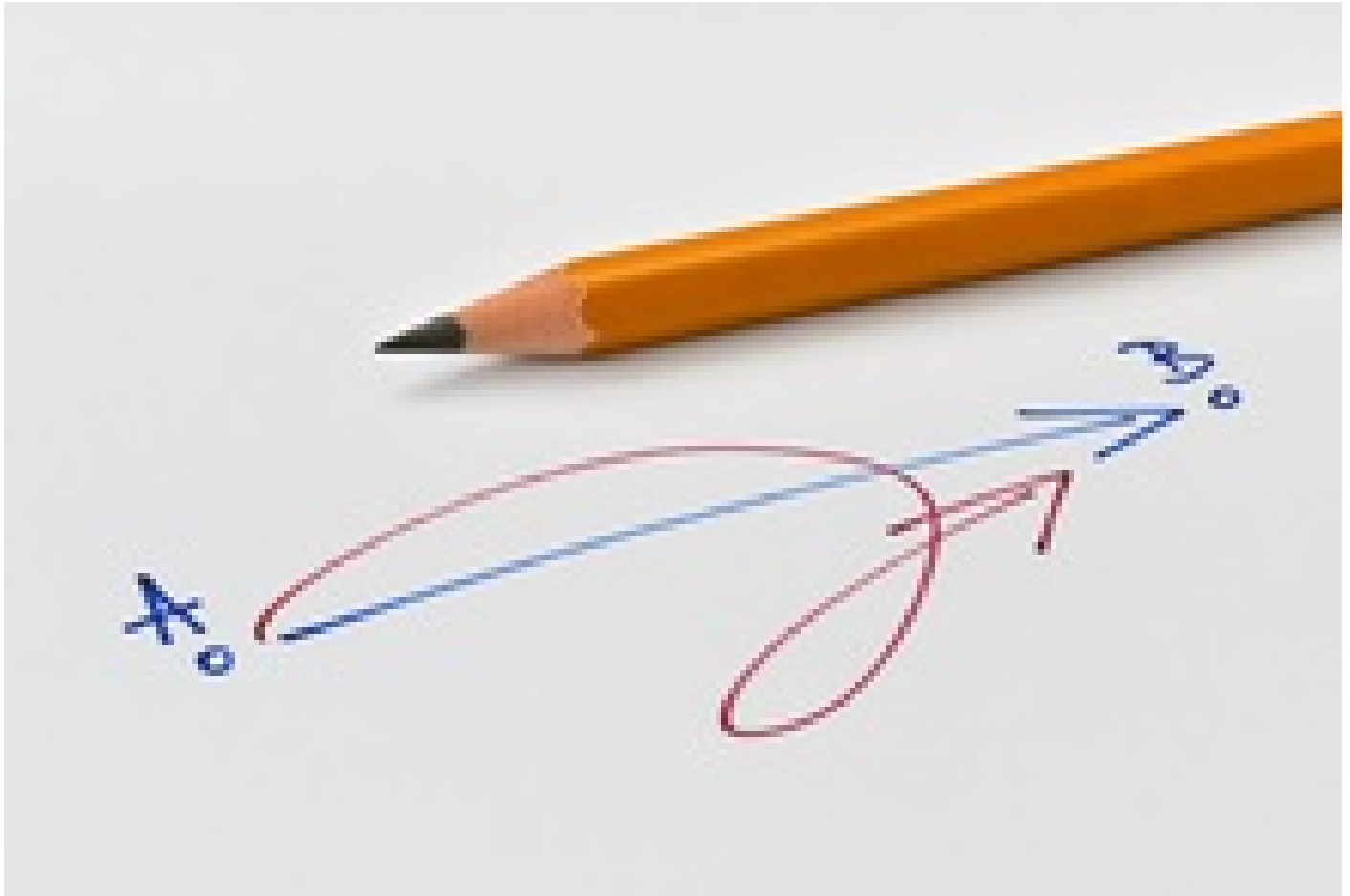


[Home](#) ■ [News](#) ■ [HUBER Technology Blog](#) ■ [Practical Challenges Going From Waste To Resource](#)

Practical Challenges Going From Waste To Resource



Heraclitus of Ephesus probably said it best [“The only thing constant is change”](#). When you consider the collection and treatment of wastewater, Heraclitus’s thoughts are quite [apropos](#).

One can be relatively certain that he did not have wastewater in mind when he coined the phrase. It was thought that Heraclitus writings seem purposefully written to force a reader toward independent thought and realization. As discussed in an earlier article [“Our Curious Relationship With Sludge”](#) the purpose and mission of the wastewater treatment plant is in a constant state of change. It’s not boring being a water professional these days.

The time period when a treatment plant was constructed has significant effect on what can be done to meet new and emerging challenges. What once was state-of-the-art at the time the plant was built can often fall short of the new treatment objectives. With changes in regulations aimed at tighter forms of pollution control in very early days, plants would adapt from basic primary treatment to secondary treatment techniques. These were relatively straight forward modifications. With the introduction of [more sophisticated processes](#) such as tertiary treatment and beyond, operations became increasingly more complex. More consideration needed to be given to protect equipment with delicate features or a high-replacement value. Unwanted constituents in the wastewater that had previously passed through the facility increasingly had to be captured and removed.

One thing leads to another

New challenges emerged in areas of practical implementation. For instance, modifications in the headworks that required going to a [finer level of screening](#) presented challenges on a number of fronts. With finer openings and new medias on the screen itself (such as perforated plate) being considered for modification, greater hydraulic head-losses were imposed on the design. Actual influent throughput capacities are possibly reduced when retrofitting existing structures. This situation would require the addition of more channels to accommodate similar or greater influent flows.

Similar challenges arose for the capture of sand and grit. Grit was nothing new regarding issues of the material settling in basins and

causing operation and maintenance issues. However, with the new processes being brought online, the more sensitive technologies employed were affected by abrasive wear and the need to [extract a finer grit particle](#) increased.

With the implementation of these improved techniques for headworks screening and grit-capture, volume-related issues arose. The significant increase in volume of [the material collected needed to be handled and processed](#) properly. Cost for material handling became a much bigger consideration. In addition, many of the processes downstream being protected by these improved headworks and grit systems were inadvertently affected by the removal of the organics out of the flow stream. This created a need to separate out the organics from the inorganic and return the nutrient back to process.



Three parallel HUBER Multi-Rake Bar Screen RakeMax® in a municipal STP - a reliable, sturdy travelling screen with very high screenings discharge capacity

The shift beyond pollution control to resource recovery

Staying true to form, priorities and focus shifted. While pollution control continued to be a mandate, new priorities emerged to include higher energy efficiencies and developing techniques for resource capture (such as reuse-water, biosolids, and thermal energy) from the surrounding operations and the waste stream itself. Increased cost of energy associated with operating these new Resource Recovery facilities gave rise to justifications for co-generation technologies to create energy. This was accomplished by putting the volatile organic laden sludge to work through anaerobic digestion. This process produced biogas providing fuel to drive electrical generation turbines. Electrical generation on site and reclamation of waste heat in the process opened up the possibility to move towards a [net-zero energy](#) threshold for the plant. Along with the electrical generation, extracting usable reuse water and biosolids for both agriculture, bio-fuels, and off-site energy purposes, created [new possibilities for revenue streams](#) to offset the added costs of operation. This opened the door for movement towards revenue positive opportunities.

With these new possibilities also came additional unique practical, political, and financial challenges. Leaving aside the political and financial challenges for another article, some of the practical changes needed in the existing facility such as improved headworks and grit-capture equipment becomes critical to these new resource recovery techniques. Improved [protection from unwanted inorganic debris](#) in the sludge is essential. By removing debris, improved capacity efficiencies are developed in the digestion and co-generation processes to make the systems function at levels required to have it maintain positive revenue to achieve success. The drive to optimize and increase energy capacity of the anaerobic digesters opened up the viability of [accepting food wastes and waste grease](#) to effectively increase energy production. This in turn opened another point of entry for material to enter the treatment process which requires considerations for proper screening and classifications of the incoming wastes.

The shortest distance is not always A to B

Most of the treatment plants that undergo these new directions are retrofitted. By the time many of these facilities are ready to go to the next level many changes in process configuration or modification of existing technology have occurred in order to keep pace with the

changing mandates and regulations . As we have been discussing earlier in this article, a lot of the modifications to [protect and condition the flow stream](#) for these advanced forms of treatment could and should happen at the headworks structure itself. This is not always possible. Perhaps the added process only requires a fraction of the flow. It would not be practical to go through a major headworks renovation. Another factor might be site restrictions preventing any further expansion of the headworks facility.

Membrane Biological Reactors (MBR) are a good example. As a technology that has been widely employed around the world, the MBR process provides an excellent method to produce reclaimed water. Many versions of this technology are susceptible to fouling and [require finer levels of screening](#) than what is typically employed for conventional wastewater treatment processes. In many cases additional ultra-fine screens are [added into the design](#) much further into the process flow.

What from here?

It is quite probable that most folks in the water industry a generation ago did not really fully imagine what would become of our treatment facilities today. Unforeseen issues will arise and our approaches and technologies will adapt. There are certainly some clues on the horizon. Taking a harder look at how we live, consume, and dispose of things has recently initiated a whole movement of awareness regarding the use of supposed ["disposable" wipes](#). Another issue on the rise is the use and [disposal of plastics](#). [Resiliency of treatment facilities](#) in the face of unusual weather events are also top of mind after our recent hurricane season.

Perhaps old grumpy and obscure Heraclitus of Ephesus was right with his obtuse reasonings challenging us to move towards independent thought and realization. When you stop and think about where we are at in this industry and where we are going, it is a task worth doing. These are exciting and challenging times.

HUBER Technology, Inc. 1009 Airlie Parkway
Denver, NC 28037

Phone: (704) 949-1010
Fax: (704) 949-1020
huber@hhusa.net
<http://www.huber-technology.com>

A member of the HUBER Group