



FAQs

The Next Gen Living Machine® Ecological Wastewater Reuse Technology Worrell Water Technologies, LLC

- **What is a Living Machine system?**

The Next Gen Living Machine® systems combine advanced technology and the natural ecosystem processes of a tidal wetland to create the wastewater treatment technology of the 21st Century. The Living Machine applies ecological engineering to adapt and contain nature's most productive ecosystem. The Living Machine Tidal Flow Wetland encapsulates those ecological processes to create a modular system that is beautiful and safe as well as robust and reliable for treating blackwater, graywater, and storm water. Living Machine® is a patented and trademarked technology offered exclusively by Worrell Water Technologies, LLC (WWT).

- **How does the Living Machine work?**

The Living Machine uses an engineered, packed bed containment that promotes the growth of dense, diverse ecosystems of microorganisms. Wastewater is introduced to the containment modules in computer controlled fill and drain cycles. The alternating aerobic and anaerobic conditions produce the same type of nutrient and oxygen cycles found in a natural tidal wetland. This complex natural system, enhanced and accelerated by technology, consumes the waste to produce clean water with no chemical additives or by-products.

- **What is the footprint and energy use of the Living Machine compared to other treatment systems?**

A small footprint is a characteristic of the Living Machine tidal wetland. In a recent article in Ecological Engineering (Issue 35, 2009, pages 184-192), the authors compare traditional (activated-sludge) wastewater treatment and wetland technologies: aerated subsurface flow, tidal flow, and pulse-fed wetland treatment. The conclusions support our findings that the Living Machine® tidal flow wetland system provides the optimum combination of energy use and footprint requirements. For a side-by-side comparison, go to www.livingmachines.com

- **How could a Living Machine® help solve water problems in states such as California, Florida and Texas?**

By allowing water to be treated and reused multiple times, Living Machine® technology can dramatically reduce the amount of potable water required for certain applications. In fact, Living Machine® technology is capable of "sewer mining," that is taking water out of an existing sewer pipe and reclaiming it for irrigation, industrial processes, and other non-potable uses.

- **Can customers save money with a Living Machine? How would a return on investment be generated?**

Customers save money by using the Living Machine. Specifically, by:

- Avoiding sewer hook-up fees
- Avoiding cost of constructing sewer lines
- Reducing cost of water and sewer service
- Reducing energy cost
- Reducing operations and maintenance labor and cost

Immediate savings in addition to life cycle savings can be realized. For example, a school in North Carolina saved over \$4 million in construction and sewer hook-up fees with a Living Machine. WWT Engineers are experienced in helping clients identify and maximize the economic and financial benefits of Living Machine® systems.



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- **Does the Living Machine® qualify for LEED certification?**
Yes. The Living Machine® has been part of LEED certification efforts for several customers, including the new headquarters office facility for the Port of Portland in Oregon currently being built at the Portland Airport. The Living Machine® is part of their cutting-edge sustainable design for which they are seeking LEED Platinum certification.
- **What type of customers have chosen the Living Machine®?**
Commercial, institutional, and government clients are using Living Machine systems for schools, resorts, office buildings and food processing operations. For a complete list go to www.livingmachines.com
- **Is a Living Machine® system safe? Are there any odors associated with the process or the effluent?**
The Living Machine® is designed to protect health and operate safely and reliably. Wastewater is always below the surface of the Living Machine® system’s wetland media (crushed aggregate, or gravel) so there is no potential for accidental contact with partially treated effluent or the development of a mosquito breeding habitat.

Second, the Living Machine process itself minimizes odor generation. Odors are eliminated by careful design relying on simple odor removal mechanisms. A properly maintained Living Machine® system will have the pleasant smell of the plants used in the wetland, including flowers when flowering plants are chosen. Many of our systems have been built inside buildings.

- **What local, state, or federal regulations do you follow and why can’t the water that’s recycled be used as drinking water? Wouldn’t that go further to solving water problems globally?**
Living Machine® systems have been permitted in over a dozen states under federal and state laws and regulations governing wastewater treatment and reuse. These regulations prevent wastewater treatment systems from being used for direct wastewater treatment to potable (drinking water) use. Drinking water consumption is frequently a very small percent <10% of total water use. Therefore, technologies such as the Living Machine® can make a major impact on overall water usage.

CONTACTS

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