

**The CINETIK™ Linear Electro-Dewatering Press can improve biosolids quality and reduce sludge volume, driving significant cost reductions for municipalities.**

**Background**

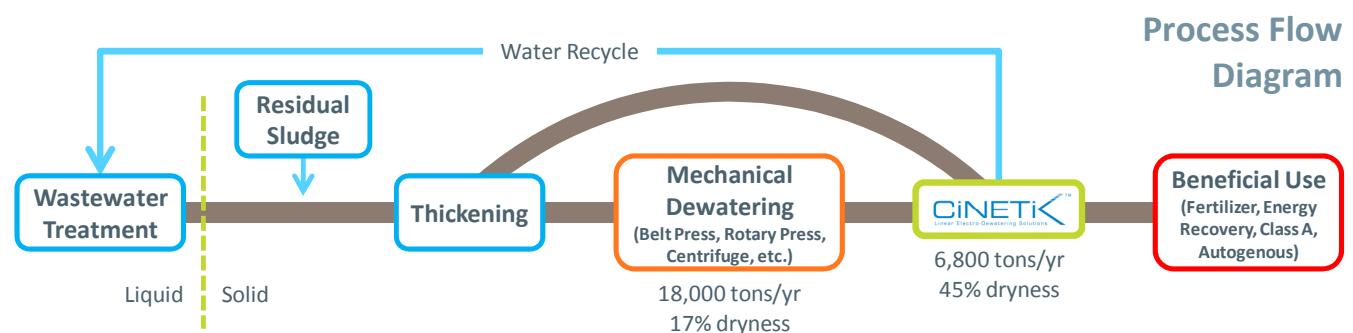
A municipal treatment plant produces 18,000 wet tons of Class B biosolids every year, and uses a belt press and 25 lbs/dry ton of polymer to bring the biosolids to a final dryness of 17%. These solids are currently land applied nearby to comply with the city’s environmental goals.

With more stringent EPA and State regulations on the horizon, the city is facing the reality that nearby land application will no longer be a feasible option for disposal, and is expecting that with an increase in hauling distances, as well as an increase in tipping fees, its sludge disposal costs will rise to \$50 per wet ton in the short term and will continue to increase in subsequent years. As a result, the city is looking for ways to decrease the total biosolids volume leaving its WWTP, thus reducing the handling, transport, and tipping costs associated with disposal. Furthermore, obtaining Class A biosolids could create additional options for land application as well as further decrease disposal costs.

**Why CINETIK™?**

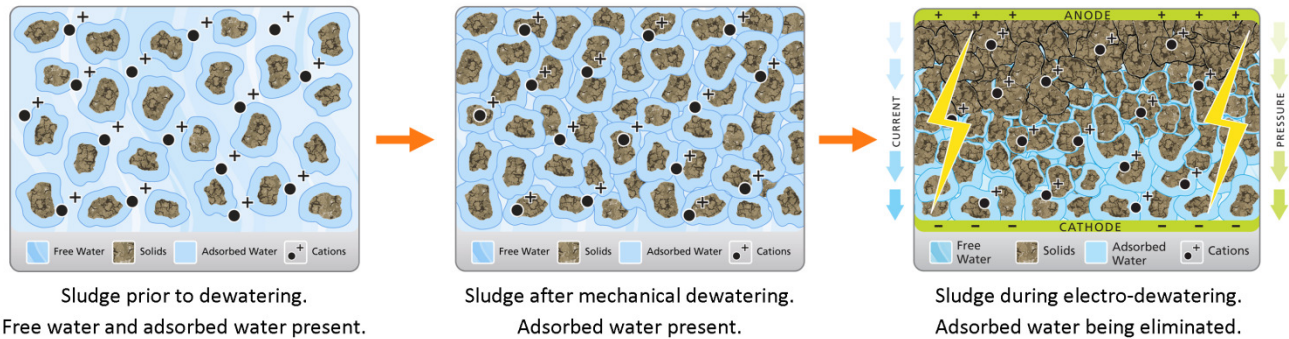
After reviewing a number of technologies, including lime addition, digesters, and dryers, the city selected the CINETIK™ Linear Electro-Dewatering (LED) Press as the right solution for this project. The main factors driving the decision towards LED included:

- Seamless integration with existing processes and equipment (see process flow below)
- Significant sludge volume reduction (>60%)
- Pathogen elimination (Class A potential)
- Minimized infrastructure cost (small footprint)
- Energy efficiency (significantly lower energy consumption than dryers)
- Process flexibility
  - Quick adaptation to varying sludge throughput and characteristics
  - No special sludge conditioning nor chemicals required



## How It Works

The CINETIK™ Linear Electro-Dewatering Press brings solid-liquid phase separation beyond what can be achieved by mechanical dewatering technologies. Adsorbed water cannot be extracted by mechanical dewatering (belt press, rotary press, centrifuge, etc.) due to the solid’s particulate size and its strong bonding forces with the water molecules. The CINETIK™ technology utilizes the principal of electro-osmosis to “pull” on the water molecules instead of “pushing” on the sludge.



Electro-osmosis is based on the fact that when a continuous electrical current is applied to electrodes immersed in a porous media, the current causes the transfer of cations from the positive pole (anode) to the negative pole (cathode). When biosolids are the porous media, the movement of cations actually carries adsorbed water molecules towards the cathode, where the water is drained. As a result, large quantities of water are removed, reducing the sludge volume by 50% or more in the process.

The application of an electrical current to the sludge also has a direct impact on its quality. The combination of electricity, heat, and pressure disinfects the sludge, eliminating E. Coli, salmonella, enteric viruses, and parasites. The end product is a Class A biosolid that can be easily put to beneficial use. Certification of the CINETIK™ process to Class “A” PFRP is underway.

## Project Economics

Belt Press Sludge to be Electro-Dewatered			
Initial Dryness 17%	Wet Tons/Year 18,000	Days/Year 350	Hours/Day 24
		Wet Tons/Day 51.4	Wet Tons/Hr 2.1
	Dry Tons/Year 3,060	Dry Tons/Day 8.7	Dry Tons/Hr 0.4
Current Biosolids Disposal Cost			
	Cost/Wet Ton \$50	Wet Tons/Year 18,000	<b>Total Cost/Year \$900,000</b>

CINETIK™ Output After Belt Press			
Final Dryness 45%	Wet Tons/Year 6,800	Wet Tons/Day 19.4	Wet Tons/Hr 0.8
CINETIK™ Energy Usage & Cost			
Energy Usage (kWh/Ton H <sub>2</sub> O Extracted) 272	Energy Usage (kWh/Ton Feed) 169	Energy Usage (kWh/Dry Ton) 996	Electricity Cost (\$/kWh) 0.10
Energy Cost/Ton H <sub>2</sub> O Extracted \$27.20	Energy Cost/Ton Feed \$16.90	Energy Cost/Dry Ton \$99.60	<b>Total Energy Cost/Year \$304,817</b>
CINETIK™ Biosolids Disposal Cost			
	Cost/Wet Ton \$50	Wet Tons/Year 6,800	<b>Total Cost/Year \$340,000</b>

Annual Savings with CINETIK™			
Volume Reduction 62%	Sludge Disposal Savings \$560,000	Energy Cost \$304,817	<b>Net Annual Savings \$255,183</b>

NOTES:

- Initial dryness achieved with conventional mechanical dewatering equipment varies.
- CINETIK™ A-Series units run in automatic mode. It is advantageous to maximize the number of days and hours in a day where they will be functioning in order to optimize the project's ROI.
- Final dryness achievable is a function of sludge type and source. Typical final dryness varies between 30-50 %, depending on the customer's objectives.
- In most cases, the disposal cost of the electro-dewatered biosolids is a fraction of the original sludge elimination cost. LED upgrades the quality of the material through disinfection, odor control, and improved structural characteristics.

## Conclusion

Through the implementation of the CINETIK™ Linear Electro-Dewatering technology, annual net savings of over \$250,000 are expected for the city. Since beneficial reuse of the biosolids and savings associated with improved biosolids quality have not been analyzed, the savings in this case study arise entirely from the reduction in sludge volume produced by the WWTP. These savings alone create an attractive economic payback, and when coupled with the potential for beneficial reuse, the more sustainable, eco-friendly solids handling process within the municipality creates an environmental payback as well.

*CINETIK™ Linear Electro-Dewatering technology, a division of Eimco Water Technologies, offers municipal wastewater treatment plants the most cost-effective solution to the widespread problem of rapidly increasing sludge disposal costs.*

For more information on CINETIK™, please contact Treatment Equipment Company at 800-454-4306  
[www.treatmentequipment.com](http://www.treatmentequipment.com)