Kore Infrastructure Helps Utilities Cost Effectively Manage Biosolids

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Kore Infrastructure Technology Helps Utilities Cost Effectively Manage Biosolids

1. Reduces biosolids volume by 90%
2. Recovers carbon negative biogas
3. Generates biochar
4. Provides an economical solution with long term stability
Kore uses high-temperature “slow” pyrolysis to convert biogenic feed to gasses and carbon.

The gas composition and biochar (C) properties depend upon feedstock composition, pyrolysis temperature, and gas and solid retention time.

\[
\begin{align*}
C_6H_{10}O_5 & \\
C_6H_{12}O_6 & \\
C_9H_{10}O_2 & \\
C_{10}H_{12}O_3 & \\
C_{11}H_{14}O_4 & \\
\end{align*}
\]

Heat

- H₂
- CO
- CO₂
- CH₄
- C₂H₆
- C₃H₆
- C₃H₈

Biogas heat value > 500 BTU/ft³
Kore’s modular high-temperature pyrolysis system is designed and operated to optimize hydrogen and calorific value for various feedstocks.

- High-temperature pyrolysis >600°C at 90 minutes, destroys PFOA and PFOS
- Plug flow reactor
- T and t controlled to achieve C
Pyrolysis pilot tested for six years at Los Angeles County Sanitation Districts Joint Water Pollution Control Plant

Green Chemistry Award winner in 2012
Kore will begin a commercial-scale demonstration project in Los Angeles in Q1 2021

**Demonstration Purpose**
- Validate mechanical integrity
- Develop multiple feedstock data
- Confirm performance for two existing letters of intent
Biogas can be blended into anaerobic digesters, potentially increasing total gas production

1. Maintaining a single gas stream from the digesters to the energy recovery equipment
2. Increasing digester gas output via bioconversion of H2 and CO2 into additional methane.
3. Recovering heat from the pyrolyzer biogas to heat digester contents, reducing current heating demands.
Separating Renewable H2 from biogas

Pyrolysis → Hydrogen Separation

Feedstock → Biogas

Energy Recovery → Other Energy Uses

Biochar → Renewable Hydrogen

Other Energy Uses include:
- Other Energy Uses
- Other Energy Uses
- Other Energy Uses

Uses include:
- Uses
- Uses
- Uses

Water Environment Federation
THE Water Research FOUNDATION
## Biochar produces significant benefits

<table>
<thead>
<tr>
<th>Application</th>
<th>Benefits</th>
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| Landfill                     | • Carbon sequestration value  
                                | • Potential landfill leachate reduction/improvement (PFAS)               |
| Soil Amendment               | • Reduces irrigation water  
                                | • Reduces fertilizer application and nutrient runoff  
                                | • Improves microbial activity  
                                | • Increases crop yield        |
| Refuse derived fuel          | • Coal substitute for cement, steel, or power production                 |
| Concrete strengthening       | • Early studies indicate strength improvement                             |
| Adsorbent                    | • Multiple water and air treatment applications                            |
Kore Infrastructure Technology Offers an Economical Solution with Long Term Stability

1. Typical payback 3-7 years depending on local economics
2. Permanent solution
3. Amenable to regional solution for cost sharing
Kore encourages feedstock generators (e.g. utilities) to visit our demonstration project and begin a conversation about their biosolids management plans.