Leveraging Resource Recovery to Pay for Sanitation
Pivot Works demonstration in Kigali, Rwanda

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How we’re different

Reorganization of treatment process
  – Extract costly-to-treat solids and BOD at headworks
  – Reduce downstream treatment needs

Design for reuse and revenue generation
  – Derive maximum value from resource recovery
  – Revenue from Pivot Fuel covers majority of costs
Solid Fuel Production
Urbanization & industrial growth is driving demand for fuel.
Pivot Works factory
Pivot Fuel Energy Balance per ton finished fuel

Inputs: 0.89 GJ/ton

1851 GJ/ton

“Surplus”: -1841 GJ/ton

2.7 GJ/ton
Fuel comparison

Energy Density (GJ/ton)

- Pivot Fuel
- Sawdust
- Logging Residue
- Birch bark
- Palmnut Shells
- Rice Husks
- Wheat Straw
- Biogas
- Bitumen
- Anthracite
Burning trials: Utexrwa

Cimerwa

- Fuel added at the precalciner to maintain temp. at 900°C
- 50/50 Mixture of Coal and Pivot Fuel
- Coal-only feed rate: 3.6-3.9 tph; Mixture feed rate: 4.2-4.6 tph
## Treatment

<table>
<thead>
<tr>
<th>Unit</th>
<th>Influent Unit</th>
<th>Effluent Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>City of Kigali - Septic Sludge</td>
<td>Residual Liquid from Dewatered Sludge</td>
</tr>
<tr>
<td>BOD</td>
<td>mg/l</td>
<td>2820</td>
</tr>
<tr>
<td>NH₃</td>
<td>mg/l</td>
<td>88</td>
</tr>
<tr>
<td>VSS</td>
<td>mg/l</td>
<td>232.3</td>
</tr>
<tr>
<td>Total P</td>
<td>mg/l</td>
<td>51.3</td>
</tr>
<tr>
<td>TSS</td>
<td>mg/l</td>
<td>505</td>
</tr>
<tr>
<td>FOG</td>
<td>mg/l</td>
<td>1.4</td>
</tr>
<tr>
<td>Fecal Coliforms</td>
<td>Cf u/ 100 ml</td>
<td>9 x 10⁵</td>
</tr>
</tbody>
</table>

**Pivot Fuel**
A viable economic model for sanitation

Pivot’s production in Kigali
Sourcing – FS is everywhere, but it’s never enough
Some of our partners