1.3 million Tonnes of Industrial and Municipal Organic Waste Vermicomposted in New Zealand

Michael Quintern
Noke Ltd, New Zealand
Organic Waste (Resources)
Municipal Organic Waste: Biosolids from Wastewater Treatment Plants
Industrial Organic Waste: Meat Processing (Paunch and Skins)
Municipal Organic Waste: Cardboard and Paper Waste
Municipal Organic Waste: Paper Waste mixed with Food Waste
The MyNoke Process — Soil to Soil™

**STAGE 1**
Millions of tonnes of organic waste types need to be diverted from landfill each year.
- Includes: General food scraps, waste resources from fibre and dairy companies, bio solids from treatment plants, paper, cardboard, and soft green waste.

**STAGE 2**
Trucks collect various organic waste resources from customers.

**STAGE 3**
Trucks unload various waste resources at the 'MyNoke Kitchen'.
- Organic waste is sorted to remove items such as plastic, glass, wood, plastic lined cups.

**STAGE 4**
Organic waste resources are mixed in a large 'Mixing Bowl' trailer.
- Internal blades churn and mix all the resources together to create the perfect recipe for the worms.

**STAGE 5**
Mixed product is laid out on the MyNoke earthworms farms in windrows.
- Earthworms reduce the waste volume by 80%, with no odour or steam due to vermicomposting being a cold process.

**STAGE 6**
The Vermicast is ready after 6-9 months.
- Screening removes any contaminants like stones and plastic that earthworms do not eat.

**STAGE 7**
Rich Vermicast (worm poo) is the end product which is sold in retail or as bulk.
- Sold to retailers and online to home gardeners and schools for fundraising.
- Bulk supply to farmers, orchards, market gardeners, sports fields and for export.

The vermicast goes back into the soil where it came from — Soil to Soil™
Why Vermicomposting?
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Vermicomposting</th>
<th>Commercial thermal composting</th>
<th>Anaerobic digestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Expenditure for 150,000 t/a input</td>
<td>$ 2 million</td>
<td>$ 42 Million (est.) (€ 280/t)</td>
<td>$ 60 million (est.) ($ 30 Million for 75,000 t)</td>
</tr>
<tr>
<td>Operational Expenses</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Scalability</td>
<td>Highly scalable</td>
<td>Limited</td>
<td>Not scalable</td>
</tr>
<tr>
<td>Volume reduction</td>
<td>70 to 80%</td>
<td>35%</td>
<td>Marginal to volume increase - 10% (when water added)</td>
</tr>
<tr>
<td></td>
<td>Low land application costs</td>
<td>High land application costs</td>
<td>Very high land application costs</td>
</tr>
<tr>
<td>Inputs</td>
<td>Food waste, paper waste, biosolids, WAS, DAF, cardboard, green waste, manure, lake weeds</td>
<td>Food waste, green waste, biosolids</td>
<td>Food waste, manure, biosolids</td>
</tr>
<tr>
<td>Plastic contamination removing after processing</td>
<td>Not processed by compost worms Removed by screening</td>
<td>Difficult to remove</td>
<td>Extremely difficult</td>
</tr>
<tr>
<td>Carbon sequestration</td>
<td>Stable soil humus, increases root growth</td>
<td>Potentially</td>
<td>Indifferent finding</td>
</tr>
</tbody>
</table>
GHG-Reduction and Carbon-Sequestration through integrated, industrial scale vermicomposting of organic waste

- GHG-Reduction by diverting organic waste from landfill
- Carbon Sequestration by earthworms during vermicomposting
- Carbon Sequestration in agricultural soils by applying vermicast
Effects of Earthworms on Carbon Sequestration during Vermicomposting

Modified from: Zhang et al. (2013) Earthworms facilitate carbon sequestration through unequal amplification of carbon stabilization compared with mineralization.
• No Vermicast
• 400 kg N/ha (effluent disposal)
• 15.0 t DM/ha

• Vermicast [20t/ha]
• 400 kg N/ha (effluent disposal)
• 18.5 t DM/ha