JANICKI BIOENERGY

Advanced Distillation Technology

*Presentation to the Senate AWTED & House AgNR Committees*

Olympia, WA | March 14, 2017

Peter Janicki

CEO
Locations in WA & UT
650 Employees
135 Engineers
State-of-the-Art Facilities
R&D
Project Management
Engineering Design & Analysis
Composite & Metal Mfg.
Large Scale, High Precision

Advanced
Composite Parts & Tools

Founded by Peter & Susan Janicki in 1993
Crew Module
Human habitat from launch through landing and recovery
787 MANDRELS

Boeing 787 Mandrel Segments
ONGOING PROGRAM WITH MULTIPLE SHIP SETS

PROPRIETARY
Boeing 787 Mandrel Segments
ONGOING PROGRAM WITH MULTIPLE SHIP SETS
A NEW PATH

Four years ago, we were approached by the Bill & Melinda Gates Foundation...

They wanted SOLUTIONS:

- From someone with technology development experience,
- With a new perspective on sanitation—
- Not someone entrenched in traditional sanitation solutions.

...that was the start of the Janicki Processor journey.

New Delhi, India, March 2014
THE PROBLEM

How can we destroy human born fecal pathogens such that they cannot make people sick and contaminate the local water supply without adding financial burden to the community?

Kibera slum, Kenya, June 2014
THE INPUTS TO THE PROBLEM ARE VARIED:

- Digested and undigested sludge
- Very wet to very dry sludge
- Garbage
- Foreign objects
- Dirt and other inorganic content
CURRENT SOLUTION #1

Manual Emptying of Pit Latrines

Step 2

Waste is manually dug out of pit and placed into cans.
CURRENT SOLUTION #1

Manual Emptying of Pit Latrines

Step 3

The waste is emptied back into the environment.
### PILOT PLANT

2013
Pilot was manufactured and assembled

2014
Plant underwent testing in WA

2015
Plant was Commissioned in Dakar, Senegal

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**SPECIFICATION** | **S100 CAPACITY**
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Biosolids Processed | 10 wet [5 dry] tons/day
Net Electricity Produced | 100 kW
Re-use Water | 1,000 gallons/day
Ash | 0.5 tons/day
Footprint | 2,013 ft.$^{2}$
### JANICKI PROCESSOR S200
**First Commercially Available Model**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosolids Processed</td>
<td>50 wet [10 dry] tons/day</td>
</tr>
<tr>
<td>Net Electricity Produced</td>
<td>250 kW</td>
</tr>
<tr>
<td>Re-use Water</td>
<td>13,000 gallons/day</td>
</tr>
<tr>
<td>Ash</td>
<td>1-2 tons/day</td>
</tr>
<tr>
<td>Heat</td>
<td>30-60 GJ/day</td>
</tr>
<tr>
<td>Minimum % Total Solids</td>
<td>20%</td>
</tr>
<tr>
<td>Footprint</td>
<td>~78 ft. x ~42 ft. (~3,276 ft.2)</td>
</tr>
</tbody>
</table>
THE PROBLEM:
Puget Sound dairies generate large amounts of manure and must make costly investments in traditional handling solutions. Even with these costly investments, dairies are criticized as a leading contributor to surface and ground water contamination.
ADVANCED VAPOR RECOMPRESSION DISTILLATION (VRD) SYSTEM

INPUT CAPACITY SERVES APPROX. 1,000 COW FARM:
25 gallons per minute or 36,000 gallons per day at 2% - 8% solids content (up to 98% liquid content)
 ADVANCED VRD SCHEMATIC

- **WET MANURE**
- **WATER & AMMONIA**
- **FILTER**
- **COMPRESSOR**
- **ELECTRICITY**
- **DRINKING WATER**
- **WATER TREATMENT**
- **RE-USE WATER**

**DRIED MANURE SOLIDS:**
- Pathogen-Free
- Rich in N-P-K
- Use as fuel for energy recovery, bedding, fertilizer

**RE-USE WATER:**
- Clean water for re-use on the farm
- Pathogen-Free

**DRY MANURE**

**STEAM**

**FILTER**

**WATER & AMMONIA**

**COMPRESSOR**

**ELECTRICITY**

**DRINKING WATER**

**WATER TREATMENT**

**RE-USE WATER**
CLEAN WATER
This pathogen-free water can be recycled for on-farm purposes such as animal drinking water, flush water, or irrigation.
ZERO DISCHARGE LIQUID TO ENVIRONMENT
Rich in nitrogen and phosphorus, this valuable organic material can be sold or used as bedding, a nutrient-rich soil amendment, or a fuel source for energy production.
VALUABLE OUTPUT: DRY MANURE SOLIDS
STORAGE LAGOONS
ANAEROBIC DIGESTION
<table>
<thead>
<tr>
<th>TECHNOLOGY COMPARISON</th>
<th>STORAGE LAGOONS</th>
<th>ANAEROBIC DIGESTION</th>
<th>ADVANCED VRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>KILLS PATHOGENS</td>
<td>✗</td>
<td>✓ 90%</td>
<td>✓ 100%</td>
</tr>
<tr>
<td>PRODUCES CLEAN WATER</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>ZERO WASTEWATER GENERATED</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>ELIMINATES RISK OF NUTRIENT &amp; BACTERIA LEACHING OR RUN-OFF</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>SEPARATES NITROGEN INTO A CONCENTRATED FERTILIZER</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>PRECISION APPLICATION:</td>
<td></td>
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<tr>
<td>Allows for precise, site-specific, variable rate application of Nitrogen to fields.</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>ENERGY RECOVERY POTENTIAL (Electricity, Heat)</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>REVENUE GENERATION &amp; COST-SAVINGS POTENTIAL</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>UNSUSCEPTIBLE TO BIOLOGICAL UPSET CONDITIONS</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>HIGHER AIR QUALITY &amp; LOWER ODOR</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
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</table>
“A sustainable regional bread basket is critical to Puget Sound’s economy, health and environment. We have an opportunity for a science-based and cost-effective way of dealing with manure waste—helping farmers create new revenue, recover valuable resources, eliminate pathogens, and improve water quality for at-risk salmon and shellfish.”

—Jessie Israel
Director, Puget Sound Conservation
The Nature Conservancy
LETTERS OF SUPPORT

Letters of support for this project and the team bringing it forward have been sent from a wide variety of stakeholders and champions. The letters of support come from the following:

**U.S. Representative Susan K. DelBene** Member of Congress, 1st District, Washington

**Shana Joy** Puget Sound Regional Manager & Policy Assistant, State of Washington Conservation Commission

**Jesse Israel** Puget Sound Conservation Director, The Nature Conservancy

**Dan Wood** Executive Director, Washington State Dairy Federation

**Steven Rowe** President and CEO, Newtrient

**Bill Dewey** Director of Public Affairs, Taylor Shellfish Farms

**Leif Fixen** Conservation Program Manager, American Farmland Trust

**Scott Kinney** General Manager/CEO, Dairy Farmers of Washington

**Steve Matzen** Sr. Vice President, Northwest Dairy Association (Darigold)

**Monte Marti** District Manager, Snohomish Conservation District
SUPPORT OF LOCAL FARMS

Coldstream Farms, Deming, WA
Natural Milk Dairy, Stanwood, WA

Photos: http://www.delaval-us.com/Meet-our-customers1/Natural-Milk/
ECONOMY BOOST
This locally developed technology provides great opportunity for WA State jobs and manufacturing.
WASTEWATER TREATMENT

BEGINNING

FLIGHT

TODAY

PROPRIETARY