1 in 5 children deaths worldwide are due to diarrhea
800 million people worldwide lack access to safe water
50% of the world’s hospital beds are people suffering from water related illnesses
To get clean water, people often boil the water in their homes, creating 2-10 Tons of CO2 Emissions per year plus innumerable negative health impacts.
We can manufacture 250,000 filters/yr at Cascade Engineering helping up to 2.5 million people per year.
Agenda

- Who we are
- Hydraid® BioSand Filter
- Spotlight on Applications
- Conclusions
Founded 1973
about cascade

founded by Fred Keller in 1973

$300 million annual sales

registrations:
ISO9001/ISO14001
TS16949 Certified

12 manufacturing plants
1000+ employees
expertise in large injection molding
(40 - 9000 tons)

markets
agriculture
furniture
transportation
material handling
renewable energy
solid waste & recycling
safe water
TBL consulting
Start with Something Good
Make it Good Business
# Fourteen Business Units

## B to B
- Automotive Solutions
- Commercial Products
- Europe
- CK Technologies
- Noble Polymers

## B to C
- Cascade Cart Solutions
- Xtreme RFID
- CapturIT
- Cascade for the Home
- Renewable Energy
- Decade Products

## Service Consulting
- Cascade Consulting
- Invisible Waste Services

## Social
- Triple Quest
sustainability focus

cascade engineering purpose

to make a positive impact on our society, the environment and to be financially successful

LEED Platinum Certified HQ and LEED certified manufacturing plant in NC

B Corporation Certified

looking to partner with like-minded companies
Committed to Sustainability

Cascade Engineering:

- is driving to zero waste to landfill
- is constantly increasing % of recycled content in products
- is an employer of choice committed to a diverse workforce
- is committed to anti-racism and employing people from poverty
Certified B Corporation

• First in Michigan

• Provides a roadmap for positive impact

• Clarifies legitimacy of our purpose

• Voluntarily meet comprehensive standards

• Build constituency among Michigan businesses

Certified B Corporation
bcorporation.net
Deeper Issues We Uncovered

• Access to transportation
• Access to childcare
• Flexibility for child sick time
• Racism
• Hidden language of poverty
  — Learning to speak each other’s language
• Transparent path to promotion
• Transparent path to more pay
Median Income Ratio by Race

Asian/White: $1.14

Hispanic/White: $0.73

Black/White: $0.58

1973 - 2008
Progress to Date – Our Team’s History

**Hydraïd® BioSand Water Filter Timeline**

- **1800’s**
  - Slow sand filtration (SSF) first used to improve water quality in European and American cities

- **1900’s**
  - Introduction of SSF to U.S. cities in the early 20th century was the primary factor responsible for the massive decline in infant mortality and waterborne disease during this period

- **1991**
  - Dr. David Manz of the University of Calgary, Canada conducts initial lab and field tests on the BioSand water filter, which improves on the SSF Method

- **1999**
  - Dr. David Manz patents plastic Hydraïd® BioSand Water Filter

- **2000**
  - West Michigan Rotary becomes distributor of the concrete iteration of the BioSand filter

- **2003**
  - West Michigan Rotary Partnership establishes partnership with the Peace Corp to implement BioSand filters in the Dominican Republic

- **2004**
  - Centers for Disease Control (CDC) audits BioSand filter, recommends randomized control studies
  - University of North Carolina (UNC) initiates health impact studies
  - Cascade Engineering joins team to manufacture plastic Hydraïd® filters

- **2006**
  - International Aid joins team to distribute Hydraïd® filters
  - Hydraïd® filter presented to the United Nations
  - UNC’s Dr. Mark Sobsey ranks BioSand filter the #1 sustainable home-sized point-of-use technology
  - U.S. Navy Project Handsclap joins team as logistics provider
  - Amway joins team as R&D partner, and donates add-on technology

- **2008**
  - Dow joins team as manufacturing partner, donates resin for a plastic BioSand filter

- **2009**
  - Triple Quest formed (Cascade Engineering/The Windquest Group [partnership])
  - Triple Quest/Cascade Engineering acquires Hydraïd® License and introduces improved filter design
  - UNC releases initial data from health impact studies

- **2010**
  - 1,000 filters sent to Haiti following the January earthquake

- **2012**
  - University of North Carolina (UNC) publishes first health impact study on the Hydraïd® BioSand Water Filter confirming greater or comparable reduction in diarrheal disease in comparison to trials of concrete BioSand water filters in Cambodia, Kenya and the Dominican Republic

Since 2006, 55,000 Hydraïd® BioSand Water Filters have been implemented worldwide.
Partners Include

- US Navy Project Handclasp
- Rotary International
- The Government of Honduras
- Coffee Growers Association of Honduras
- USAID
- Amway
- Dow
- Grand Valley State University & University of North Carolina
- Safe Water Team
- Thirsting to Serve
- Pure Water for the World
- Oxfam
- Caring House Foundation
- Wishing Well International
- Flood the Nations
- Hands in Mission
We Have A History Of Bringing Groups Together

USAID and Rotary Clubs Join to Provide Clean Water and Improved Sanitation Worldwide

Collaboration merges Rotary's grassroots strength with agency's technical expertise
Agenda

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Hydraid® BioSand Filter Technology

Techniques Employed:
Biological Layer: Naturally forming layer addresses bacteria and viruses
Filtration: Filters out parasites and a % of bacteria and viruses
Post-filter Chlorination (optional): addition of 1 drop of chlorine/liter adds a layer of bacteria and virus protection
## Reduction of Microbial Organisms (Filter Alone)

<table>
<thead>
<tr>
<th></th>
<th>Without BioLayer (first 2 weeks)</th>
<th>With BioLayer (after 2 weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>% Reduction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parasites</td>
<td>99-99.999%</td>
<td>99-99.999%</td>
</tr>
<tr>
<td>Bacteria</td>
<td>70-99%</td>
<td>95-99.9%</td>
</tr>
<tr>
<td>Viruses</td>
<td>50-99%</td>
<td>80-99.9%</td>
</tr>
</tbody>
</table>

*Source: David Manz, inventor*
Researched Technology

• Ranked Best Point of Use Technology –

Hydraid® BioSand Filter technology ranked best overall technology for the developing world by industry expert, Mark Sobsey of University of North Carolina.

### TABLE 3. Scoring of POU Treatment Technologies Based on Sustainability Criteria

<table>
<thead>
<tr>
<th>technology</th>
<th>quantity</th>
<th>quality</th>
<th>ease of use</th>
<th>cost</th>
<th>supply chain</th>
<th>overall score</th>
</tr>
</thead>
<tbody>
<tr>
<td>free chlorine</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3 (liquid) 2 (tablets)</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>coagulation/chlorination</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>SODIS</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>8</td>
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<tr>
<td>ceramic filters</td>
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<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>biosand filters</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>13</td>
</tr>
</tbody>
</table>

• Field Tested and Approved –

Researched and field tested with thousands in operation worldwide.
Simple Process of Dirty Water In, Clean Water Out
Advantages of the Filter

• Researched technology
• Simple solution
• Affordable
  – Less than $1 per person per year
• Low maintenance
  – Gravity fed
  – No need for replacement components
  – Lasts for 10+ years
Agenda

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WATERWORLD Areas of physical and economic water scarcity

- Physical water scarcity
- Approaching physical water scarcity
- Economic water scarcity
- Little or no water scarcity
- Not estimated
Lineth Tells Us How The “Blue Filter” Has Improved Her Life

http://www.hydraid.org/prob/index.htm

- "My name is Lineth. Come with me. Getting water every day is hard work, but it doesn't make you sick. But drinking contaminated water, yes, and it can even kill you. Many people in my village become ill when they drink contaminated water. My cousin who is the same age as me became ill when he drank that water. As you can see, in the water there are many small things that can make you sick. But there are none of those things in our water because my family has a filter. A blue filter. I'm going to help my mother." – Recorded by Image Group during Honduras Trip 2009.
Improved Health & Productivity

Before the filter, 3-4 kids were sick at any time. After having the filter for 2 months, she said for the first time, all the children were healthy and she had more time to work. She didn’t have to take them to the hospital and pay, instead kids were doing chores and making for a cleaner home.
Before I had this filter I suffered of diarrhea, bellyache because of the water, cough and flue very often, and now I don’t anymore

What about your children?
• The children used to suffer of these diseases as well
Thanks, what’s your name?
• Adelina Hernandez
So, has the filter come to change your family life?
• Yes it has
Do you use the water from the filter for?
• Drinking
What about cooking?
• Yes, cooking as well
Well, what can you tell to the filters producers?
• It is good to have a filter and we have to take care of it because we live healthier because we don’t suffer of diseases that much.
What community is this?
• Malsincal
Ok, thank you very much
• You’re welcome
Cultivating Local Entrepreneurship

After receiving the Hydraid® BioSand Filter, she was able to create her own micro-business selling a bag of popsicles for 1 Lampira.

For the first time she has the opportunity to build her own home based business and financially contribute to the support of her family. Because she had safe water and more time since she was not caring for sick children.
Sourcing Sand And Gravel Locally

• As programs scale, there is the opportunity to source some components locally increasing growth
Water was an issue before the quake, now it is the difference between life and death.

With the help of the US Navy Project Handclasp, we were able to get commitment for 1,000 filters to be installed in Haiti.

3 of those filters went to the orphanage where these boys now live.
US Navy’s Project Handclasp Helped Transport Filters

Helping >10,000 people fight cholera in Haiti
Agenda

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Conclusions

- **Effective Technology:**
  - Proven to reduce diarrhea, a leading cause of death

- **Manufacturing:**
  - Ability to manufacture more than 250,000 a year

- **Logistics:**
  - US Navy’s Project Handclasp “#1 requested item”

- **Local Development:**
  - Increased health and wealth creation ops. as a result
Next Steps

“Do all the good you can,
To all the people you can,
In all the ways you can,
For as long as ever you can.”

www.triplequest.com

Start with something good and try to make it good business