

# Saving Food to Increase Margins

## REDEFINING — success in — BUSINESS

Partners in Pollution Prevention  
September 20<sup>th</sup>, 2017



**Enviro-Stewards**  
Engineers & Scientists

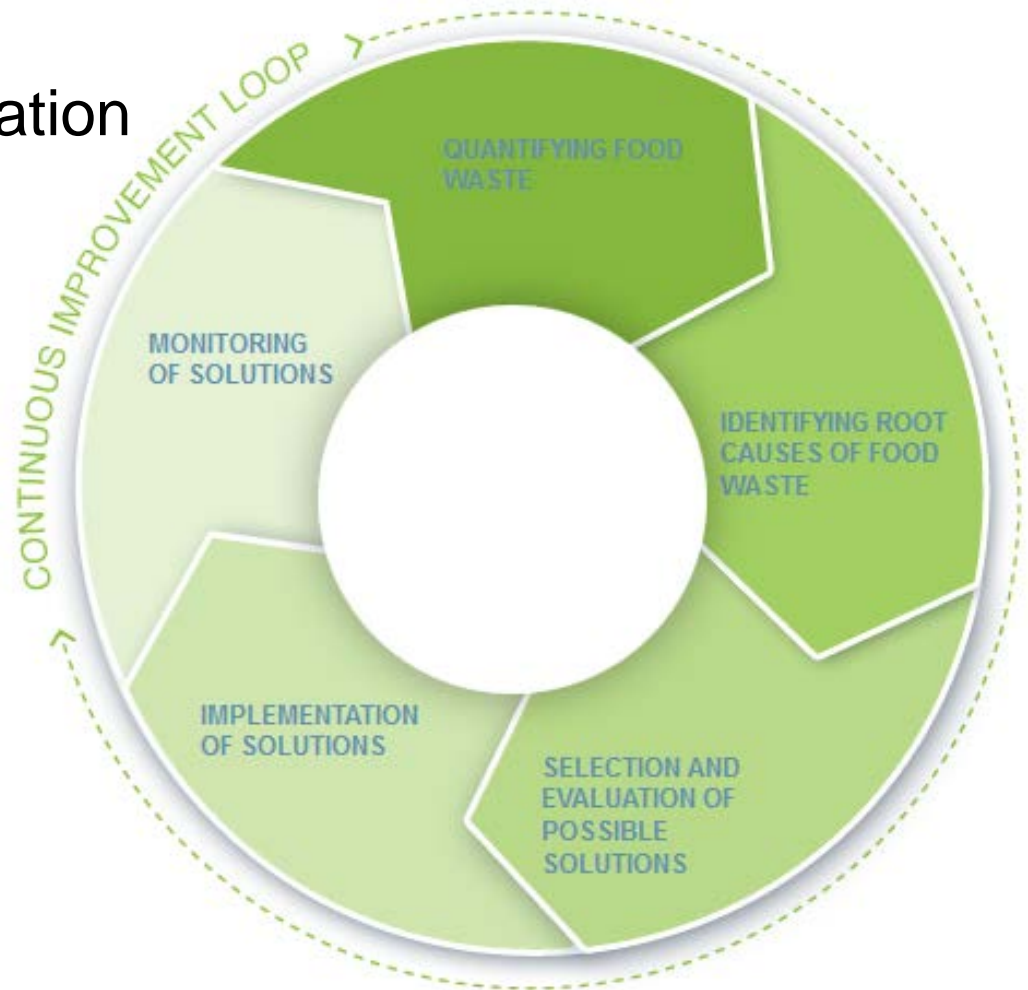


# Agenda



**Enviro-Stewards**  
Engineers & Scientists

1. Introduction
2. The Case for Conservation
3. Holistic Approach to Conservation
4. Case Studies
5. Conclusions



# Speakers



**Enviro-Stewards**  
Engineers & Scientists

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**Bruce Taylor, P. Eng., President of Enviro-Stewards**

**Lloyd Hipel, P.Eng., P2 Dept. Mgr., of Enviro-Stewards**

# Enviro-Stewards

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**Enviro-Stewards**  
Engineers & Scientists





# Enviro-Stewards Inc.



**Enviro-Stewards**  
Engineers & Scientists

Enviro-Stewards Inc. is an engineering firm and Certified B Corporation that helps clients:

- Increase their profits, productivity and efficiency
- Reduce environmental impact and sustain the environment
- Compellingly benefit society



**SAFEWATER  PROJECT**

# The Safe Water Project



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# Relevant Experience



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SOUTHBROOK  
VINEYARDS



Saputo

ANDREW PELLER  
— LIMITED —



AB | MAURI  
Passionate About Baking™





# Food Waste Crisis

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*40% of Food in North America is wasted*

*Of this, 18% is lost in the manufacturing process*





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# The Case for Conservation: Food Waste

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Food Waste Management is a cost item:

- -\$70/tonne, -\$80/tonne or -\$100/tonne

Food Waste Prevention is a revenue stream:

- +\$1,000/tonne, +\$2,000/tonne, +\$8,000/tonne

**Do not manage your food waste, prevent it.**

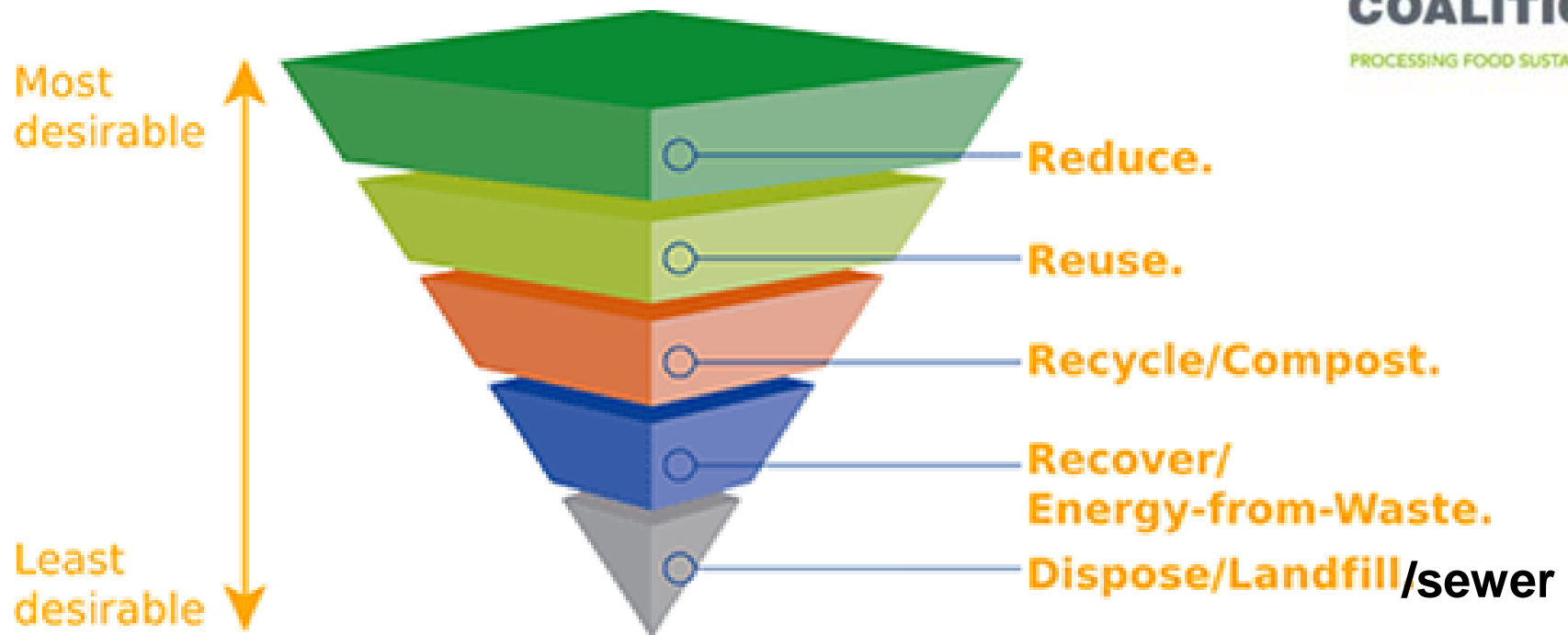




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# Food Waste Prevention Toolkit

**PROVISION  
COALITION**  
PROCESSING FOOD SUSTAINABLY



# The Case for Conservation: Energy



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Organic + Biodynamic



LEED



Conservation – 40% reduction in energy (natural gas & electricity)



**1/3 less vineyard  
land required for  
solar panels.**

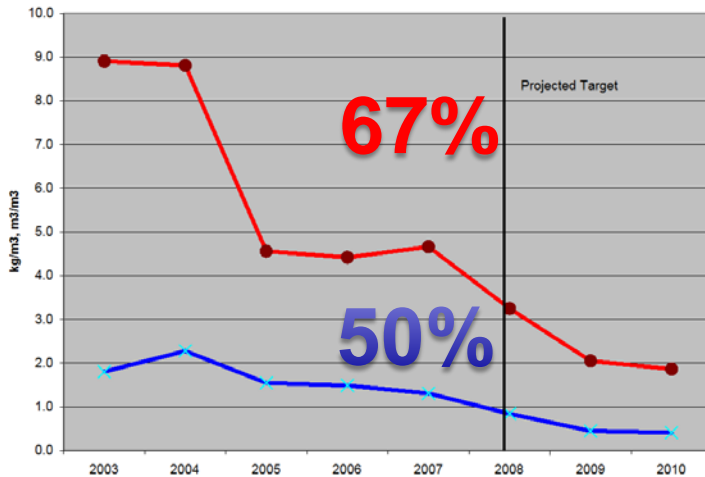


**Do not waste  
your energy  
more efficiently.**



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# The Case for Conservation: Water



**Saved water & Wine! And  
\$1.5 million less capital  
required for treatment**

**Reduce water use  
and effluent  
concentration, then  
treat accordingly.**





# Approach needs to be Multifaceted & Unbiased

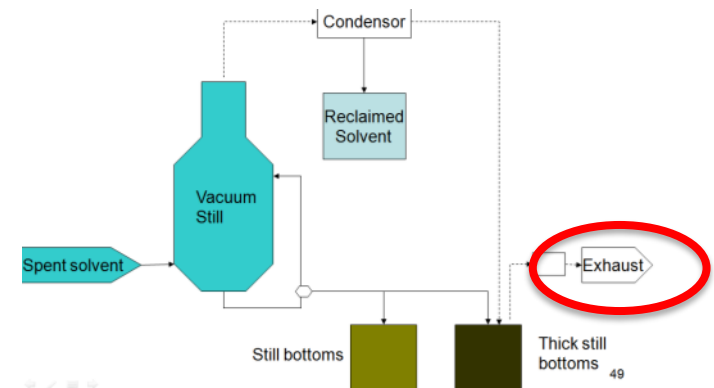


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## Advantages:

- Conserve resources
- Increase product yield
- Increase energy efficiency
- Reduce waste handling & disposal costs





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# Streamlined Approach:

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1. Who are Your Champions?
2. What are Your Wastes?
3. Why are Your Wastes Generated?
4. Where can they be Improved?
5. When should they be Implemented?

## Who? – Gaining Buy-In

- To facilitate change, a multi-disciplinary team participates in kick-off training and progress meetings.

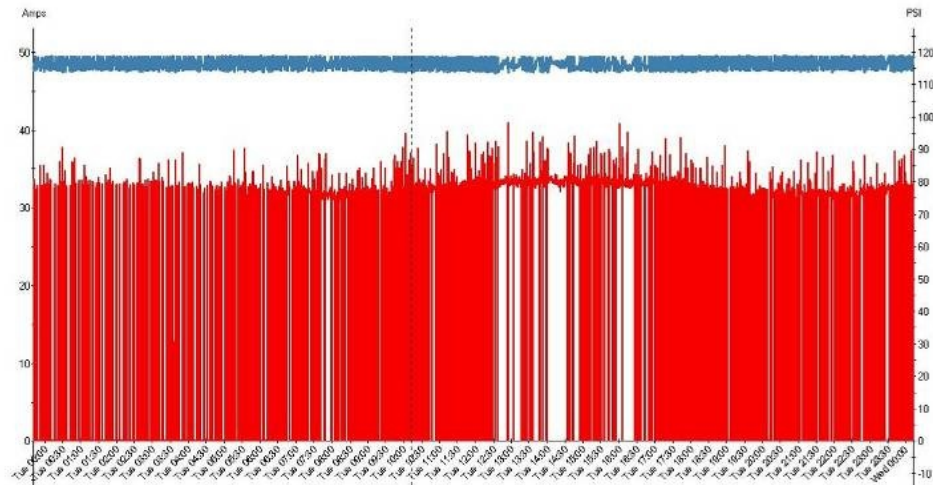




# What?

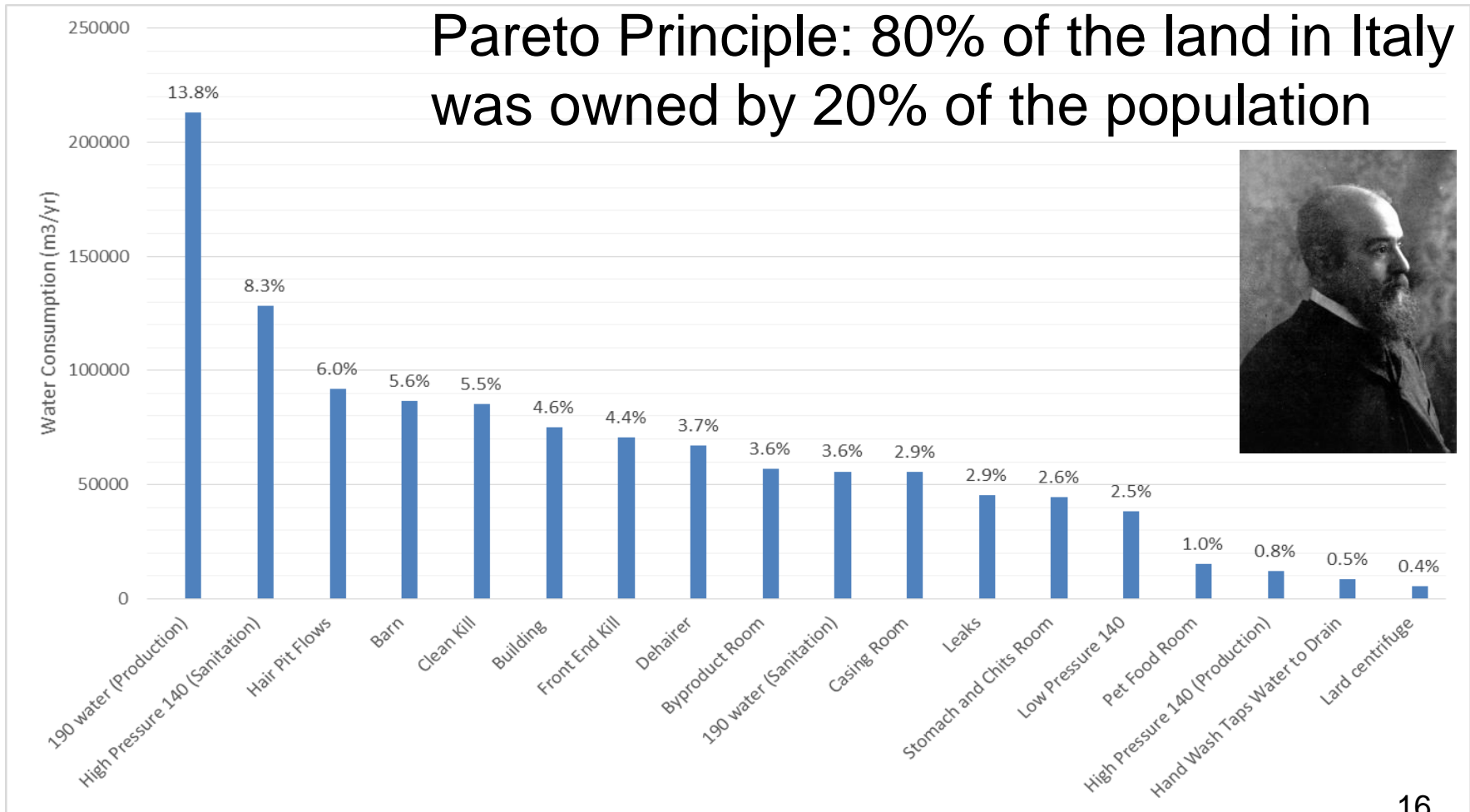
## What? – Collecting Reliable Data:

- A detailed and systematic assessment of utility consumption and waste generation is conducted





# Where (in process to intervene)?







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# Why (identifying root causes)?



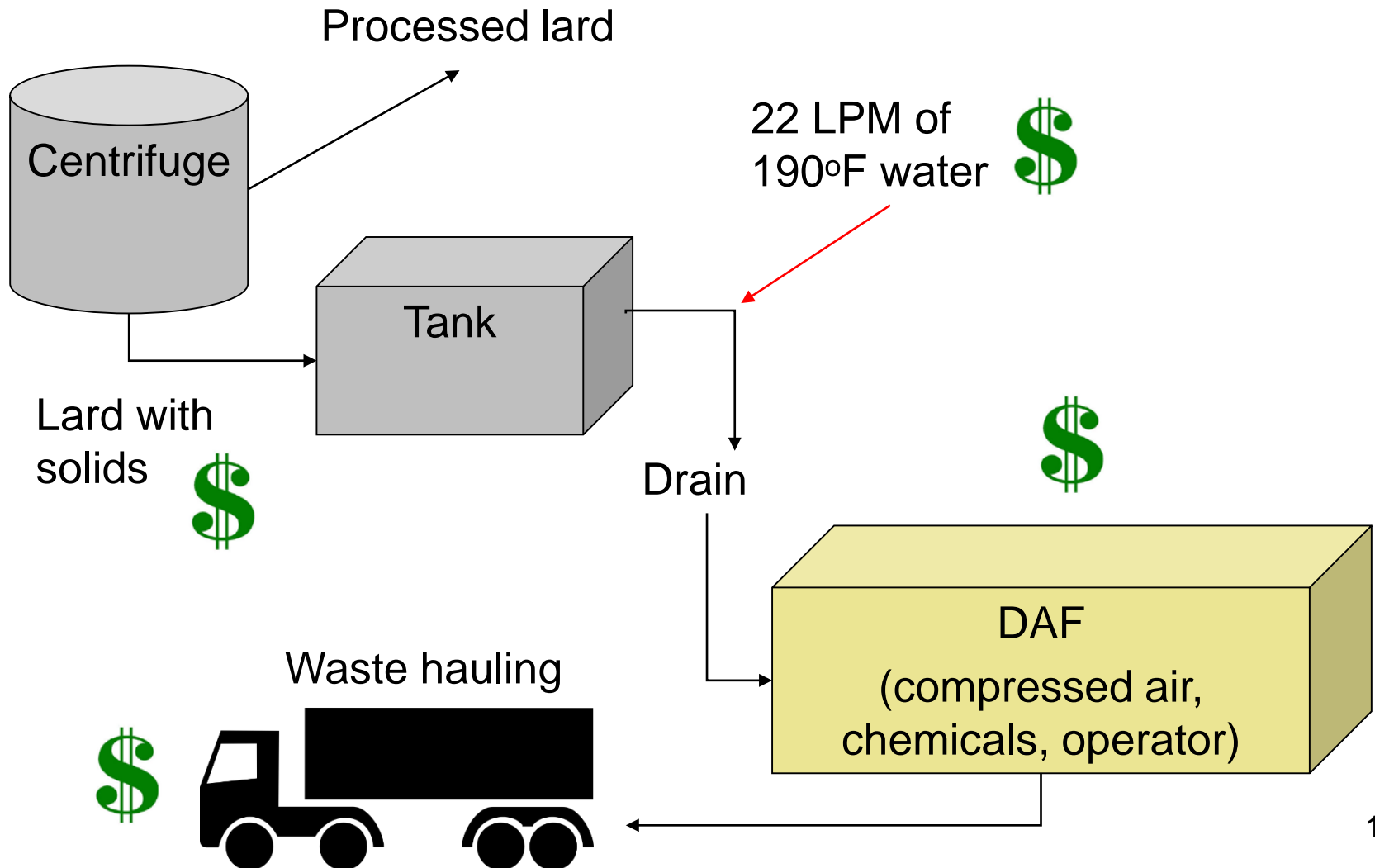
- Lard could be captured in heat traced tank and reworked
- Potentially recover 1,200 L/day of lard and 22 L/min of 190 F water
- Also avoids downstream drain clogging and effluent treatment chemicals & DAF float disposal<sub>17</sub>



**22 L/min of  
190 F water**



# Why (identifying root causes)?





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# Progress Meeting (vetting concepts)

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# When?

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<b>TOTAL ESTIMATED CAPITAL COSTS</b>	<b>\$70,000</b>
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<b>TOTAL ESTIMATED ANNUAL O&amp;M COSTS</b> (RELATIVE TO STATUS QUO)	<b>(\$54,457)</b>
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<b>STRAIGHTLINE PAYBACK PERIOD (yrs)</b>	<b>1.3</b>
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**77% ROI**

<b>NET PRESENT VALUE BEFORE TAXES</b> (assuming 20yr project life, 5% interest)	<b>\$748,656</b>
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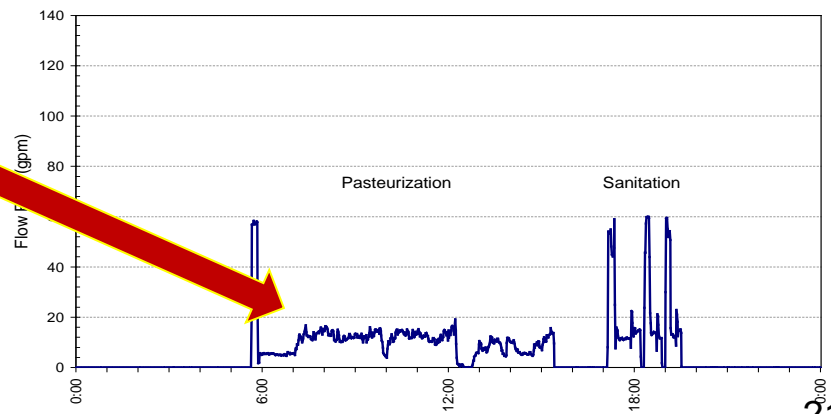
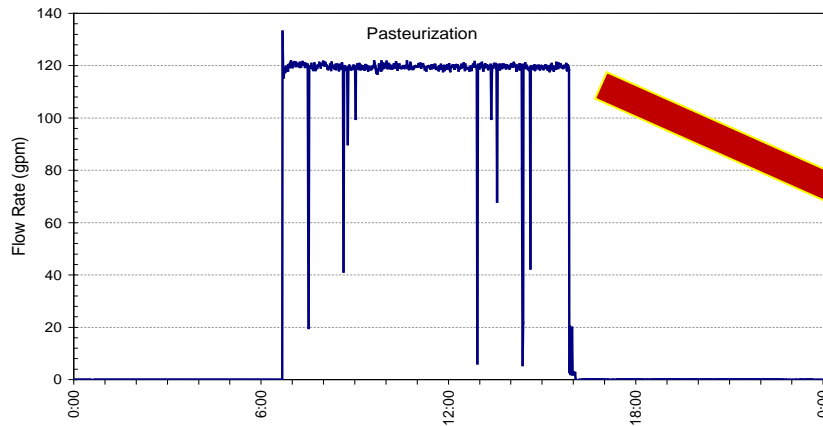


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# Monitoring, Tracking and Reporting

## Documenting & Retaining Gains:

- Data loggers, email alerts, and quarterly conservation certificates verify and retain economic, environmental and social gains



# A Concise & Practical Approach to Identify Viable Conservation Opportunities



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**ASSESS**

**IMPLEMENT**

**MONITOR**



## **Assess**

Identify & Quantify Opportunities  
and Their Business Cases



## **Implement**

Design & Supervise Implementation  
of Selected Measures



## **Monitor**

Monitor, Track & Report on Net  
Environmental & Financial Savings

# Case Studies



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# Establish and Minimize BP Oven Preheat Requirement

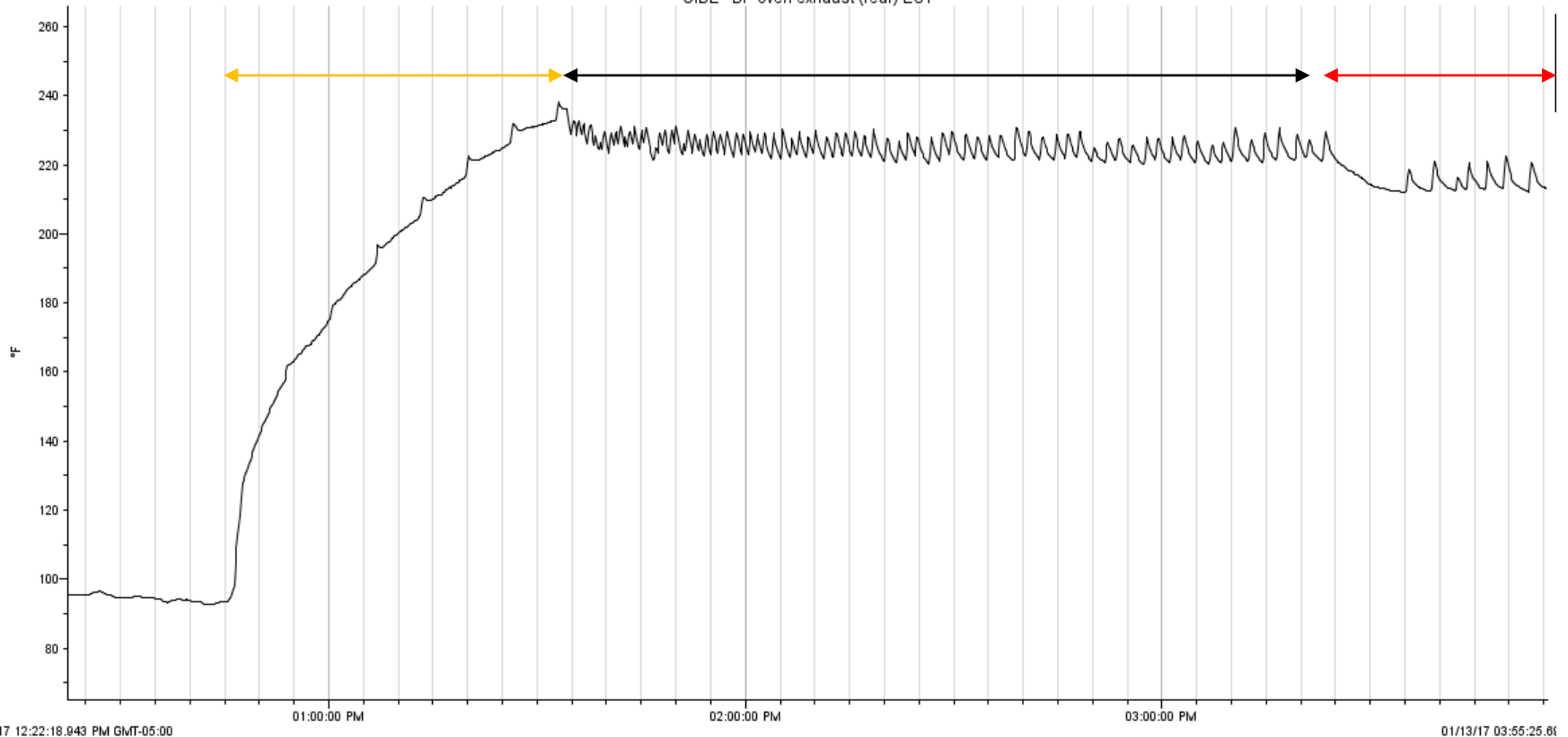


Warmup Time: ~1hour

Oven heated with no product ~1hour

Product entering oven

CIBL - BP oven exhaust (rear) EST





# Establish and Minimize BP Oven Preheat Requirement

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- Time to reach steady state temperature in oven  $\sim 0.75 - 1.0$  hours
- Recommended to establish preheat requirement for each product and minimize preheat period
- Reduce fuel consumption by \$4K and electricity by \$1K (combustion blower, exhausts, and turbines)

# Bun Line Losses



- **Problem:** 3.5 % buns are sticking to pans, being thrown out
- **Root Cause:** current process yields continuous use of poorly glazed pans
- **Solution:** purchase extra pans, replace sticky pans when loading dough, send for re-glazing



# Bread Line Waste Characterization

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- **Problem:** bread dough that sticks to conveyor slides down ramp and hits ground
- **Root Cause:** lack of flour on bread dough, no catch tray
- **Solution:** install catch tray, reprocess dough. Investigate flour coverage at former

13,000 kg/year, \$10,000/year, project cost: \$100, payback: 0.01 years

# Overall Results

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- Potential electrical savings: 348,000 kWh/yr (18%)
- Potential natural gas savings: 146,000 m<sup>3</sup>/yr (35%)
- Potential food waste reduction: 110,000 kg/yr (42%)
- Total value: \$196,000/yr



# Have a great day everyone!

Fan 1: ON Fan 4: ON  
Fan 2: ON Fan 5: ON  
Fan 3: ON Fan 6: ON

## Condenser One

Comp. 1: OFF  
Comp. 2: OFF

Suction Pressure: 51.1 psi  
Discharge Pressure: 119.9 psi

Temp # 2: 0.3 °C Temp # 1: 0.9 °C

Main Chill Tank

## Condenser Two

Comp. 1: OFF  
Comp. 2: OFF

Suction Pressure: 52.8 psi  
Discharge Pressure: 132.5 psi

Drive Speed: 0.0%  
Cooling Tower Drive ON

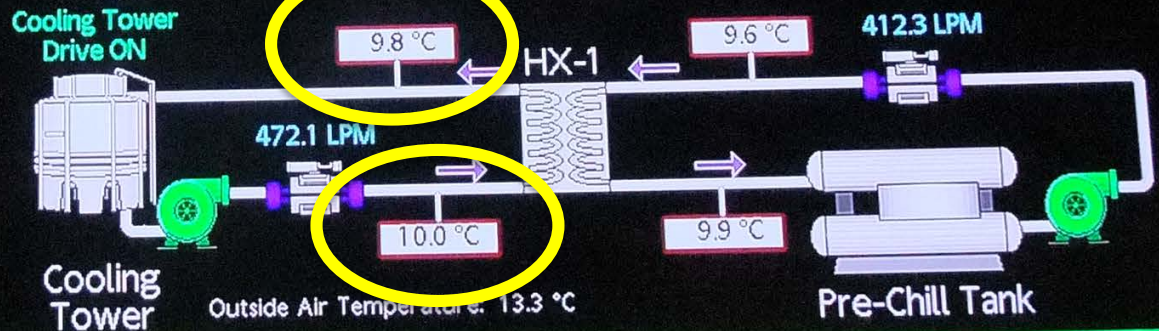
Cooling Tower

## Bagger Status

Bags per minute: 16.9  
Recipe Chosen: Recipe 2

## Kettle Status

Sal Steam Pressure: 0.0 psi  
Gus Steam Pressure: 0.1 psi  
Ron Steam Pressure: 0.4 psi  
Main Boiler Steam Pressure: 10.0 psi



No Active Alarms



# What is the why about this picture

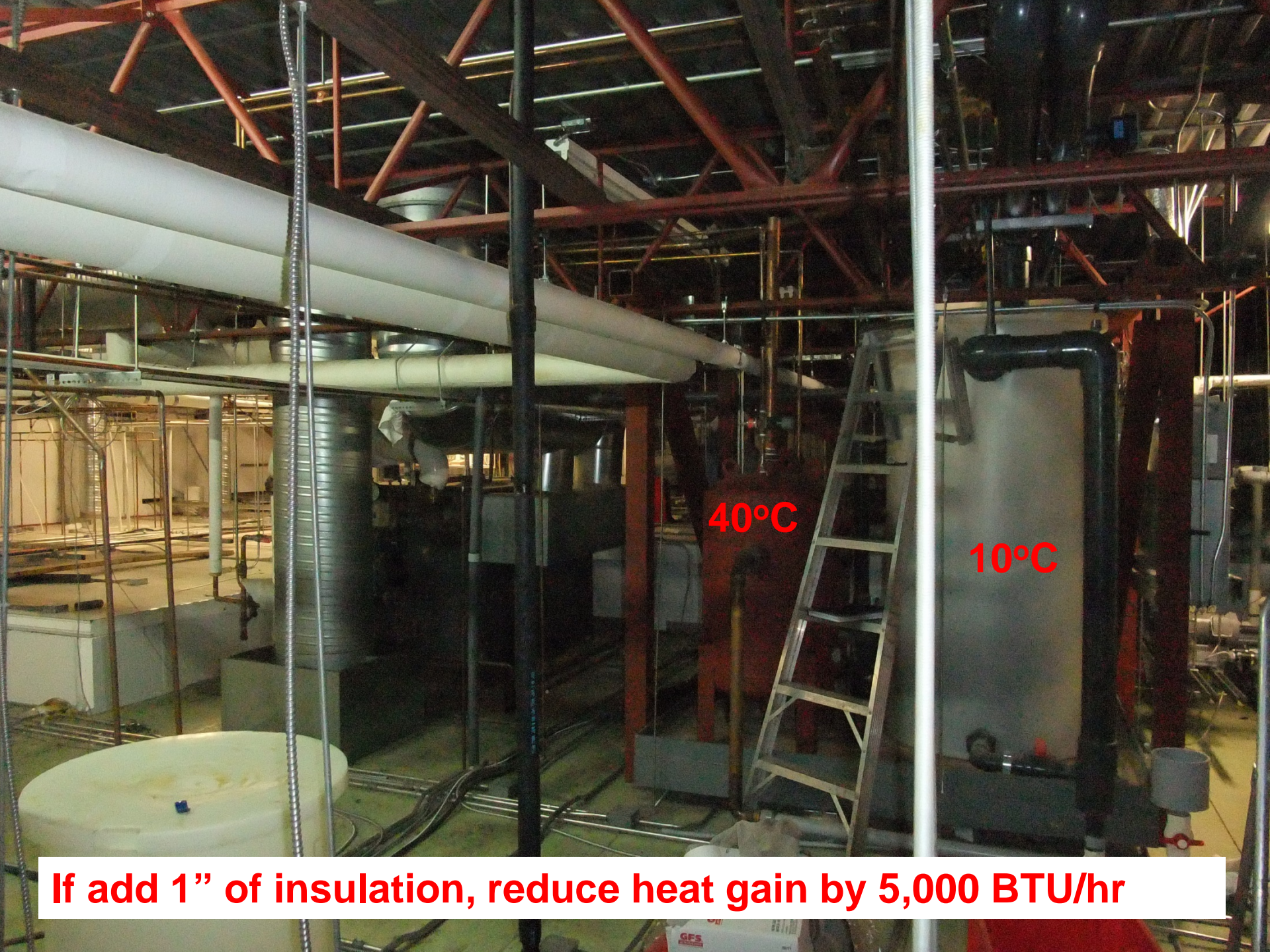
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**Gain 40,000 BTU/hr  
from blowers heat**

**Gain 31,400 BTU/hr  
from condensing water  
vapour in room chillers**







40°C

10°C

**If add 1" of insulation, reduce heat gain by 5,000 BTU/hr**





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# Case Study Excerpt



Resource	Annual Savings	% of Total
Electricity	217,000 kWh	14%
Natural Gas	1,330 GJ	12%
Water	3,340 m <sup>3</sup>	20%
Product	55,000 L	-
Financial	\$95,000	-
Average Payback	0.5 years	

**\$95k with 1/2 year payback**



# Food Waste Prevention

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## **Problem:**

- Product loss from edge on cheese blocks (75% to process, 25% to landfill)

## **Root Cause:**

- Misaligned conveyors

## **Remedy:**

- Quantified loss justified conveyor modification (2.5 g/block, \$74,000/yr)

20,600 kg/yr of cheese

# Food Waste Prevention

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## Problem:

- Installed new butter churn with existing transfer piping

## Root Cause:

- Devalue to process cheese when steam line

## Remedy:

- Reduce pipe length by 2/3 (\$53,000/yr)

13,000 kg/yr of butter

# Food Waste Prevention

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27,000 kg/yr recovered as  
process cheese

## **Problem:**

- String Melter contents were lost to landfill at end of run

## **Root Cause:**

- Operating Procedure

## **Remedy:**

- Divert melter contents to process cheese (\$117,000/yr)



# Process Integration

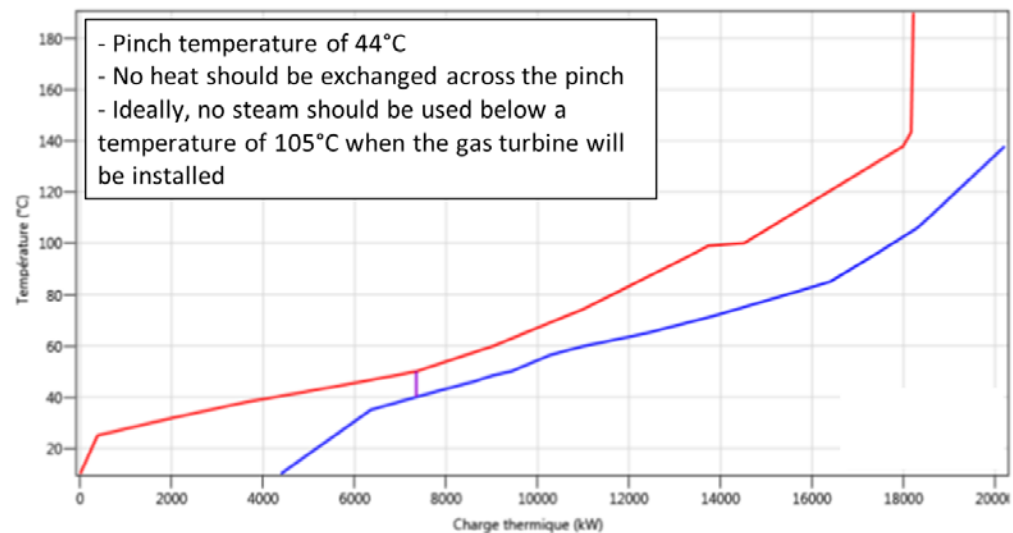
**In 2014, Campbells retained Enviro-Stewards and Optienergie to complete a Process Integration Study**

**The study found Opportunities to save about:**

- **3,233,000 kWh/yr**
- **4,570,000 m<sup>3</sup>/yr of gas**
- **123,000 m<sup>3</sup> of water**

**\$1.645 million/yr with  
under 2 year payback**

**They then commissioned a  
Food Waste Prevention  
Assessment that incidentally  
saves (embedded) energy & water**





# Collateral Food Loss



500 tonnes/yr of vegetables

## Problem:

- Collateral (good product) loss from optical sorter

## Root Cause:

- Processing rate results in air purge rejecting adjacent good product

## Remedy:

- Adjust rate and/or reprocess (\$225,000/yr)

# Prevention vs Management



## Problem:

- Re-occurring losses of frozen beef and chicken at the can pre-filler and weight checking steps in the process

## Root Cause:

- Filling mechanism could not accommodate gaps in production

## Remedy:

- Redesign filler (\$171,000/yr)

13 tonnes/yr of meat



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# Andrew Peller Case Study

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## *Socially:*

- *Preserve Canadian jobs*
- *Conserve the output of 27 hectares (38 soccer fields) of vineyard*

## *Environmentally:*

- *6 Olympic pools of water*
- *Power for 14 homes*
- *350,000 bottles of wine*

## *Economically:*

- *\$300,000/yr with 1.2 month payback*  
*(1,000% Annual Return on Investment)*

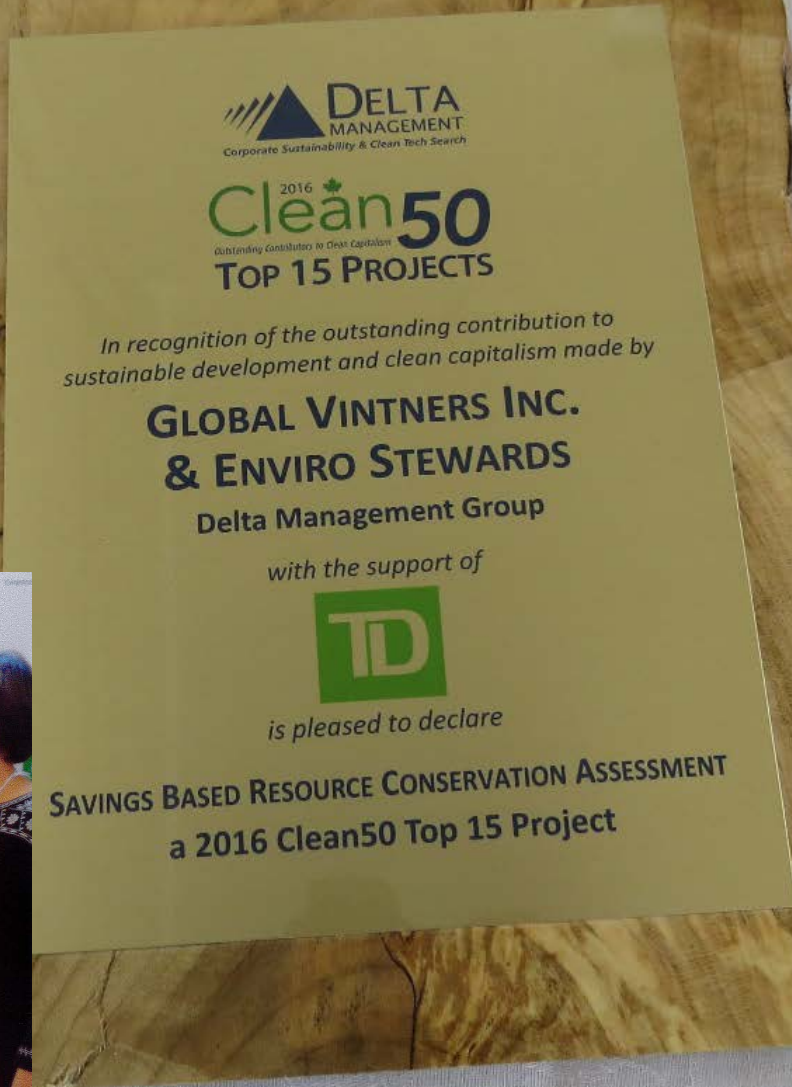




# 2016 Clean50

Outstanding Contributors to Clean Capitalism

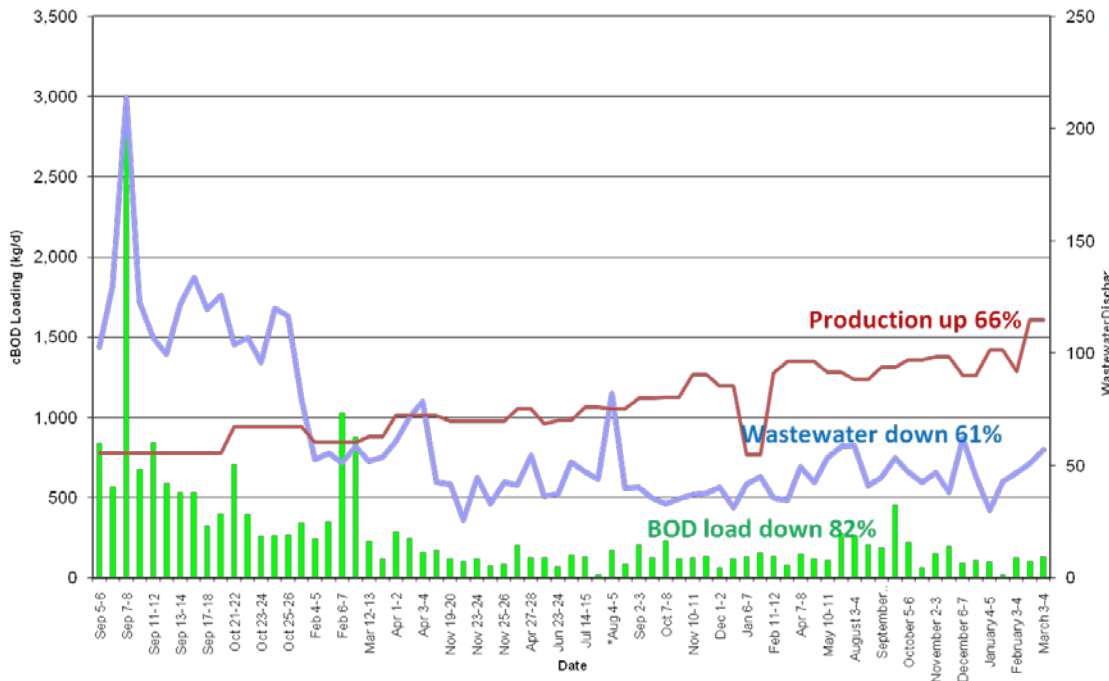
## TOP 15 PROJECTS



# Case Study: Tim Hortons Plant

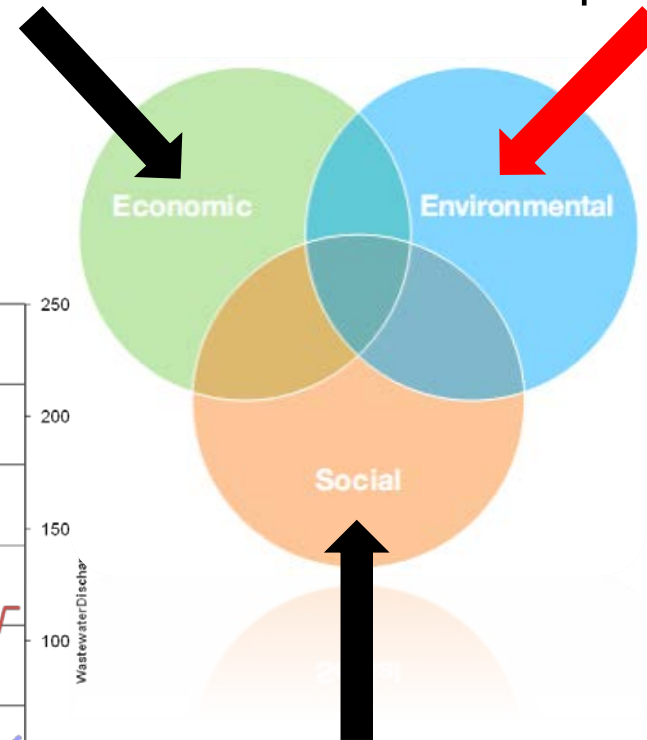


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Revenue

Compliance



Responsibility



# Tim Hortons Continued



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Category	Annual Savings		Canadian
	Quantity	Units	Dollars
Electricity	852277	kwh	\$ 85,227.72
Natural Gas	164294	m3	\$ 49,288.32
wastewater volume	36748	m3	\$ 91,869.02
wastewater organic loading	240024	kg	\$ 120,011.93
Greenhouse gas emissions	560	tonnes	N/A (yet)
Solid waste to landfill	510	tonnes	\$ 3,750.00
Sewer Surcharge	140285	\$	<u>\$ 140,285.40</u>

**\$ 490,432**

**Expenditure \$187,500, 260% ROI, 0.4 yrs**

SHARE YOUR FEEDBACK WITH US!



## 2011 SUSTAINABILITY & RESPONSIBILITY REPORT

OVERVIEW

INDIVIDUALS

COMMUNITIES

THE PLANET

GRI INDEX

### DID YOU KNOW ?

Since 2010, our Fruition Fruits and Fills facility has purchased BioSand filters to help offset some of its water use. These filters have provided 800,000 L per year of clean drinking water to the people of South Sudan, which helps prevent water-related illnesses such as



Printed on 100% post-consumer waste.

**Fruition**  
FRUITS & FILLS



**Enviro-Stewards**  
Engineers & Scientists

Enviro-Stewards Inc. is pleased to present the following

# Sustainability Credit

## ion business

### Local company earns B Corporation certification

**Gail Martin**  
*Independent Editor*

An Elmira company is one of only 20 companies in Canada that has been certified as a B Corporation.

If you don't know what that means, you're not alone.

B Corporations are a relatively new concept. It is a certification that tells the world that at your business, maximizing profit is not the only bottom line environmental and social concerns are also at the forefront.

At Enviro-Stewards, however, the B Corporation certification is merely a recognition of the way the business has always run, since day one.

Bruce Taylor, founded Enviro-Stewards in 2001,

not-for-profit, or a for-profit corporation.

He opted to go the for-profit route, in part because that would make it easier for him to work with prospective clients.

"You wouldn't find a company asking Greenpeace to come in and do an environmental audit," said Taylor. "A for-profit has more credibility (in the business field)."

Even so, Taylor incorporated many of the tenets that are hallmarks of an NGO — donating 10 per cent of profits to charitable organizations, providing a living wage to his employees, and providing volunteer and work projects for his employees.

"Because of this, we get incredible loyalty from our staff," said Taylor.

In the recent economic downturn, instead of

head of Fruition, came with Taylor on a future trip, donating water filtration units, as well as empty pails and a fruit-drying unit, providing a way for families in the area to preserve fruit, something they couldn't do before.

The way he treats his employees, combined with the heart of Taylor's work — helping corporations find environmental efficiencies that are not only good for the environment, but also good for the bottom line (and staff morale as well) — made the B Corporation designation an easy fit.

Taylor was encouraged to go through the certification process after attending a recent conference.

He had to go through a rigorous list of questions — including

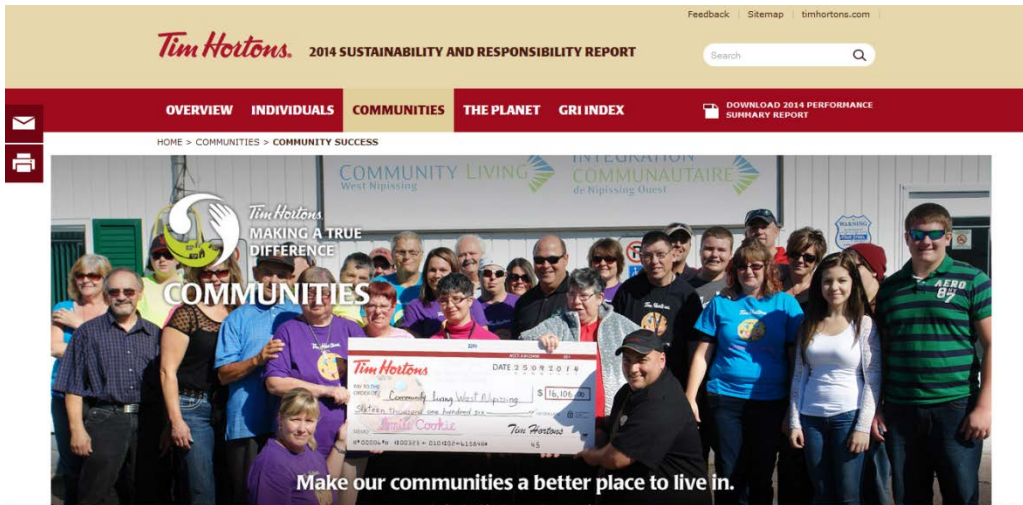




# Clean 50 Top 5 Project



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## Fruition Fruits & Fills: Enviro-Stewards

In 2010, Tim Hortons Fruition Fruit & Fills sponsored 40 bio-sand filters that purify drinking water in South Sudan, Africa with Elmira Ontario based engineering firm Enviro-Stewards ([www.enviro-stewards.com](http://www.enviro-stewards.com)). The success of this program, and the resulting economic, environmental, and social benefits led the project to be selected as one of the top 5 Sustainability Projects in Canada for 2014 by Corporate Knights.

In 2013, civil conflict relapsed in South Sudan which prevented Enviro-Stewards from traveling to maintain their bio-sand filter projects. In 2014, and when it was safe to travel, Tim Hortons sponsored Enviro-Stewards to return to South Sudan to re-inspect the Fruition & Fills bio-sand filters and determine if they remained operational. The Enviro-Stewards team, alongside personnel from the South Sudanese Safe Water Project, found that of the 40 bio-sand filters, only one was out of daily use. The teams worked together to refurbish this out-of-use bio-sand filter and it is now fully operational. The exact locations of the Fruition & Fills bio-sand filters can be viewed [here](#).

More than 400 people have received safe water for the last 4 years due the Fruition & Fills initial sponsorship. Thirty-one bio-sand filters are located in homes and nine in schools which provide approximately 1.2 million L of clean water every year.

 **40 FILTERS**  
= **1.2 MILLION L**  
OF CLEAN WATER/YEAR



Locally constructed BioSand Filters (BSFs) sponsored by Tim Hortons Fruition Fruit & Fills waiting to be installed to purify water in homes in Kajo Keji County, South Sudan.

## Canada's Sustainability Heroes

2014  
**Clean 50**  
Outstanding Contributors to Clean Capitalism

The Clean50 Awards are given annually to 50 individuals or small teams in 16 categories, who have made the greatest contribution to clean capitalism and sustainability in Canada over the prior two years. Clean15 Projects are those considered to be the most impactful initiatives in Canada.

It will take a combination of leadership, collaboration, innovation, energy and, ultimately, political will to move Canada through the obstacles towards cleaner, healthier, sustainable management of our bountiful resources and our uncertain future. Our solutions will require brave new policy, actions, and scientific and economic tools, built with long term vision.

The work of Canada's sustainability tool-smiths is shining the way on our journey towards sustainable, equitable, responsible prosperity.

Congratulations to 2014 Clean50 Project Honourees:



## Enviro-Stewards and Fruition Fruits & Fills Waste Discharge Reduction PROJECTS

In-plant measures in Ontario are saving \$490,000/yr with an ROI of 260%, and reducing loading to sewer 80%, landfill 70% and GHG emissions 30%. A portion of the savings sponsored 40 BioSand Filters that purify 800,000 L/yr of drinking water and avoid 120 tonnes/yr of GHG in South Sudan, Africa. Fruition Fruits & Fills is a subsidiary of Tim Hortons Inc. Enviro-Stewards Inc. is an engineering firm and Certified B Corporation that helps clients increase their profits, sustain the environment, and compellingly benefit society.

[www.enviro-stewards.com](http://www.enviro-stewards.com)



[www.Clean50.com](http://www.Clean50.com)

# Conclusions

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**Enviro-Stewards**  
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- Preventing food waste is at least 10 times less cost than managing it as an organic wastes
- Do not waste your energy more efficiently (prevention is less costly than renewables)
- Conservation is one of the most lucrative investments a company can make (a dollar saved is a dollar profit)
- Multifaceted & systemic analysis identifies and justifies greater gains with faster returns

# Contact Us:

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**Enviro-Stewards**  
Engineers & Scientists

***For a free walkthrough & opinion on the  
magnitude of your potential savings contact:***

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Elmira, Ontario  
N3B 3J9

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**Fax:** (519) 669-5002

Or visit us at our website:

***[www.enviro-stewards.com](http://www.enviro-stewards.com)***

