

Waste: A Source of Savings and Competitive Advantage

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ROTHSAY
WE RECYCLE | NOUS RECYCLONS

Introduction

Maple Leaf Foods and Rothsay



The Scale of the Problem

Developed countries waste massive amounts of food.

- Americans dump a quarter of the fresh produce they buy.*
- North Americans dump about 250kg of food per year, worth around \$600.*
- In Canada, 40% of food (12 million tonnes) is wasted.
 - \$27B per year.
 - Half of this is discarded by households.
 - The other half is lost during farming and production.**

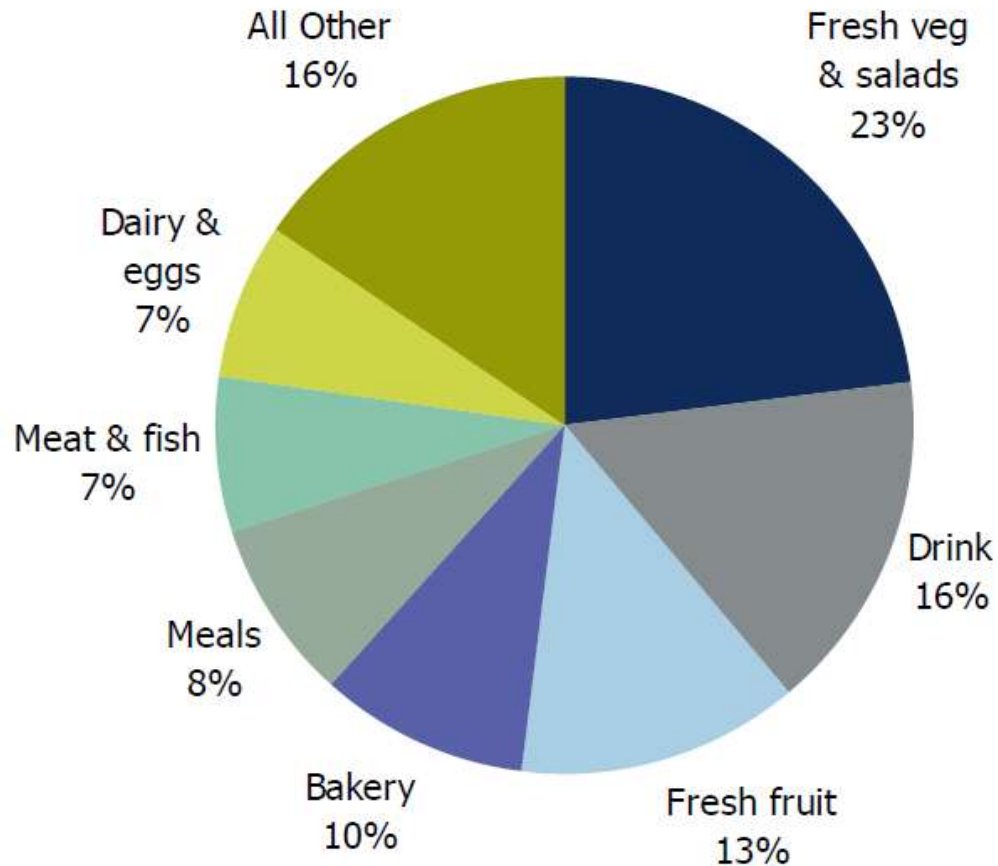
Sources:

**Vegetarian Times*

***George Morris Centre*

The Scale of the Problem

What We Waste



Source: WRAP Household Food and Drink Waste in the UK, Nov 2009

The Impact of Waste

Direct Effects

- Producing food requires resources:
 - Water and associated pumping, purification, treatment, etc.
 - Fertilizer
 - Fuel for harvesting, transportation (multiple)
 - Electricity and heat for processing
 - Packaging
- GHG emissions per tonne of food waste: 3.8t eCO₂*
 - ~34.2Mt eCO₂ generated per year.
 - The average car emits ~3.8t eCO₂ per year.
 - Food waste in Canada is equivalent to CO₂ emissions of 9 million cars.
- Landfill space is finite and disposal costs are rising.
- Municipalities incur huge cost to deal with waste collection, sewer maintenance and wastewater processing.

The Impact of Waste

Indirect Effects

Municipal Solid Waste Discarded (by material) in 2010



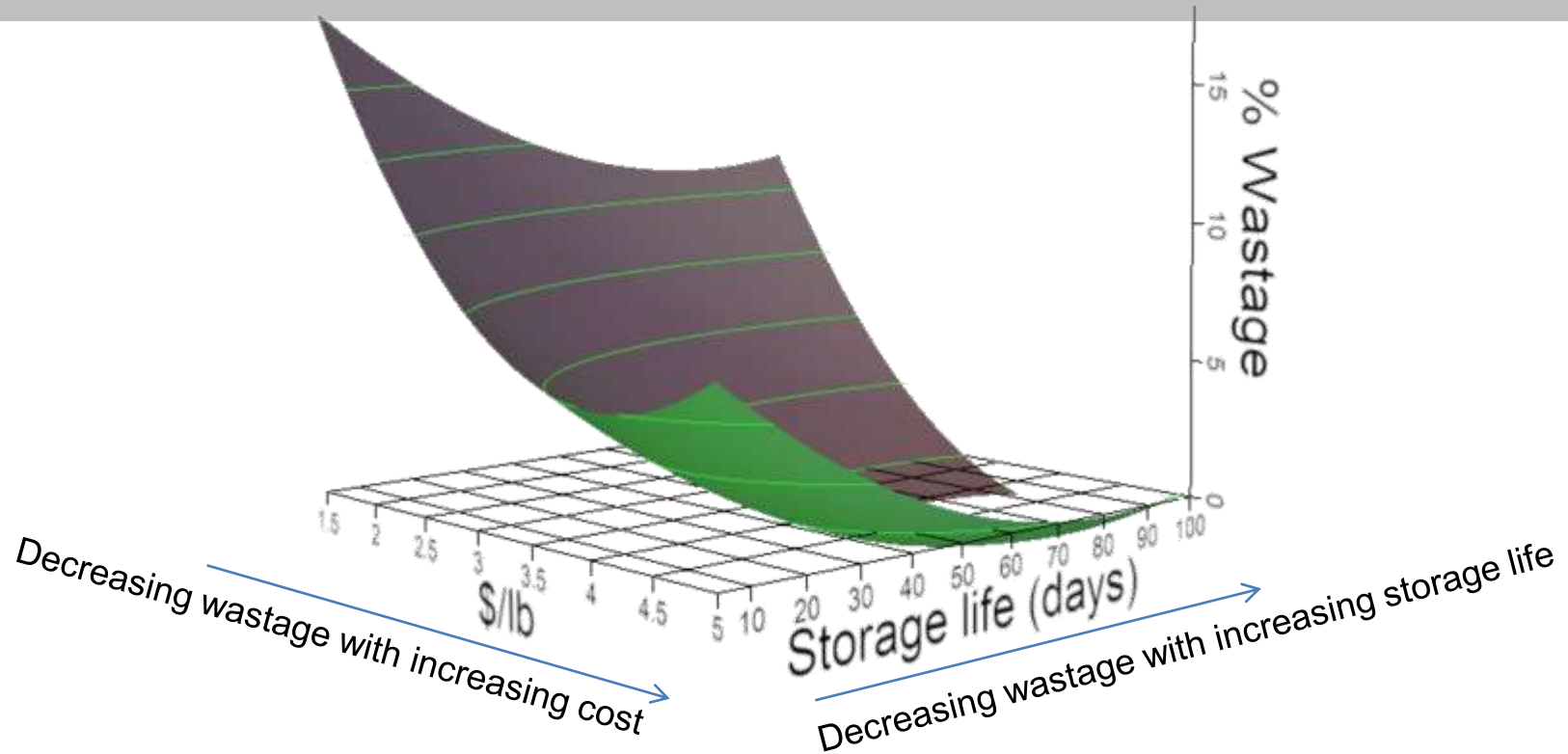
The Impact of Waste

Indirect Effects

- Discarded food waste (i.e., organic waste) decomposes anaerobically in landfills to produce the potent greenhouse gas methane.
- 27 million tonnes eCO₂ are generated annually from Canadian landfills*, 20Mt of which escapes to the atmosphere.
 - 3% of national emissions.
 - Equivalent to 7 million cars.

Why Does It Happen?

Two Influencing Factors: Storage Life and Unit Cost



People tend to waste less if a food is more expensive.

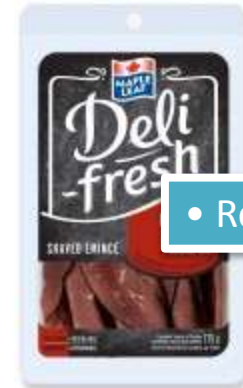
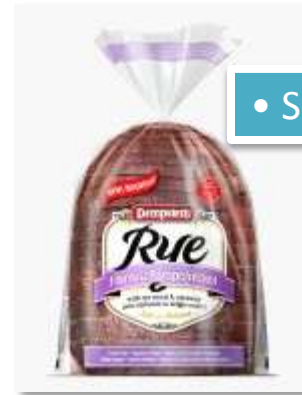
People also tend to waste less if food has longer storage life.

Reducing Waste

An Opportunity for Food Producers

- **Better Portioning, Better Packaging**
 - Smaller quantities
 - Individual sealed portions/pieces

• Smaller packages



• Re-sealable



• Each boneless breast is individually sealed



• Each separately sealed serving contains six slices.

Trends

Population Demographics are Changing

- More single households.
- Aging population.
- Less time to spend on food preparation.
- Focus on value, convenience, quality, and health.



- Ready to eat
- Simple ingredients



- Ready to cook

Trends

Food Preparation Is Changing

- Food preparation is moving away from the home.
- Grocery stores increasingly selling ready-to-go meals.
- Butchering, baking, cooking, washing (vegetables) moving from the grocery store to production facilities.



Trends

Food Preparation Is Changing

- Value is important.
 - Growth of discount and big box retailers
 - Increasing popularity of “club pack” products



Producers have an opportunity to create more value for consumers through their ability to reduce waste.

Producers Can Make a Difference

Centralized Food Production is Highly Efficient

- Uses less energy
 - Over 40% of home electricity use is used for cooking.
- Up to 100% food waste recapture
- Up to 100% recycling of non-food waste
- Consumer generates less waste, uses less energy. The only waste is packaging which consumers already know to recycle.



Pre-cooked bacon

Producers Can Make a Difference

Centralized Food Production is Highly Efficient



| | Centralized Production | Home Preparation |
|---------------|-----------------------------------|--|
| Energy use | Continuous, natural gas powered ✓ | Electric (usually), on-off cycles, wasted heat |
| Water use | Controlled water use ✓ | Orders of magnitude greater usage |
| Meat waste | Sent to rendering plant ✓ | Sent to landfill |
| Waste fat/oil | Sent to rendering plant ✓ | Down drain or municipal waste depot |
| Produce waste | Sent to compost or other ✓ | Composted (hopefully) |
| Packaging | Recycled ✓ | Recycled (hopefully) |
| Bakery waste | Used as animal feed ✓ | Composted (hopefully) |

Maximizing Value from Waste

Rendering

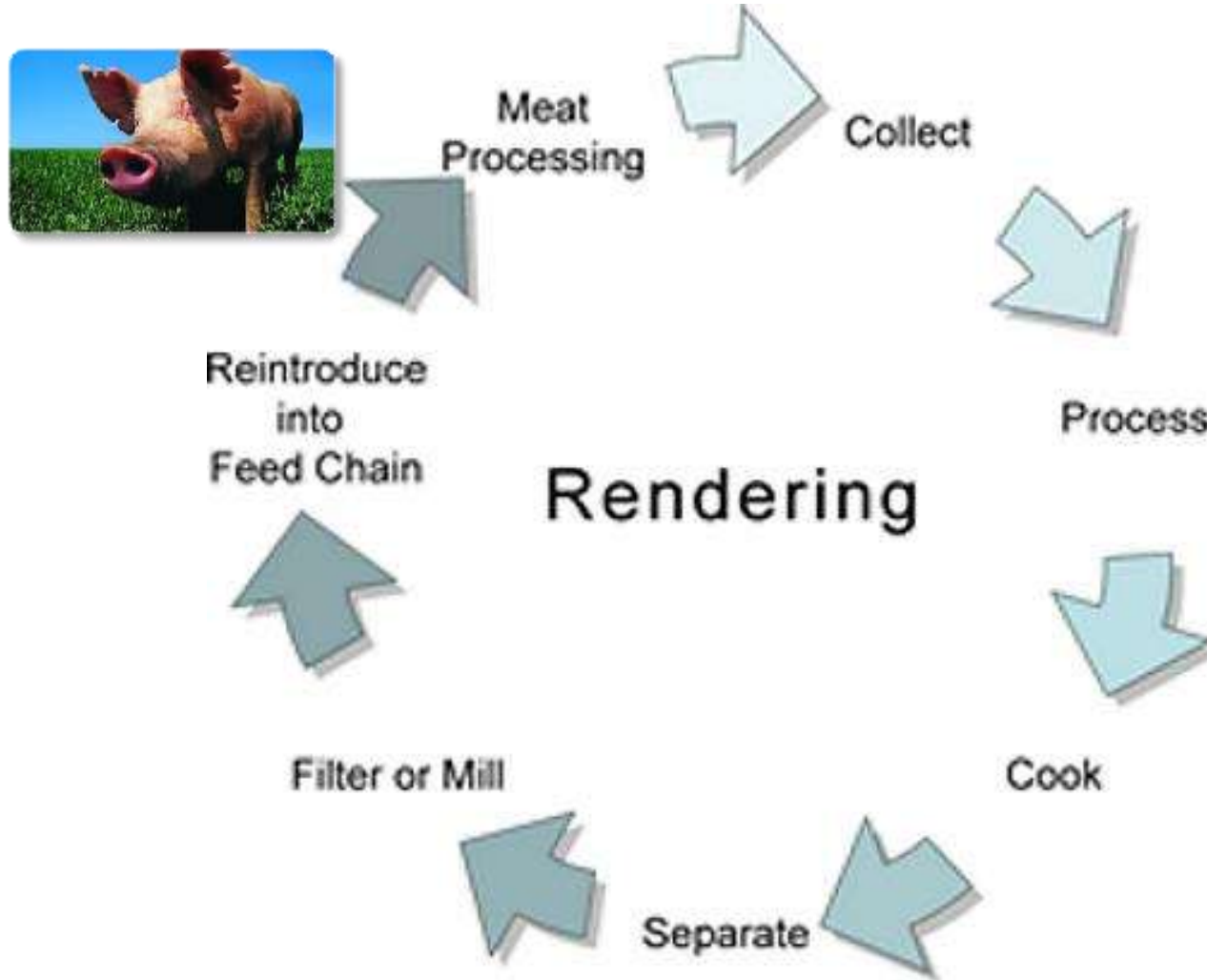
- An essential service.
- Recycles 2.5 billion kilograms of animal by-products annually in Canada.
- Recycles hundreds of thousands of litres of used cooking oil annually.



Rothsay's Dundas, ON facility

Maximizing Value from Waste

Rendering



Maximizing Value from Waste

Rendering

- Animal by-products are transformed into animal feed ingredients, and fat.
- Fat is used in consumer and industrial products, and biodiesel.



Rothsay's biodiesel plant in Montreal

- Canada's first commercial scale plant.
- 98% GHG reduction vs diesel fuel.



Maple Leaf Foods and Rothsay run biodiesel in several fleets in Ontario and Quebec.

Maximizing Value from Waste

Anaerobic Digestion and Composting

- “Clean” organic waste from food processing is an ideal feedstock. Municipal waste is problematic.
- Rothsay de-packages and sorts waste according to its best use. In addition to rendering, there is:

Anaerobic Digestion

- Produces biogas which is usually used to generate green electricity for the grid.
- Fertilizer by-product is ideal for land application.



Composting

- Aerobically breaks down organic material.
- Produces fertilizer that is ideal for land application.

Maximizing Value from Waste

Anaerobic Digestion (AD) and Composting

- Diversion of organic waste from landfill
- Avoidance of methane gas emissions
- Displacement of fossil fuel (AD)
- Generation of green electricity (AD)
- Return of nutrients to the soil



Case Study

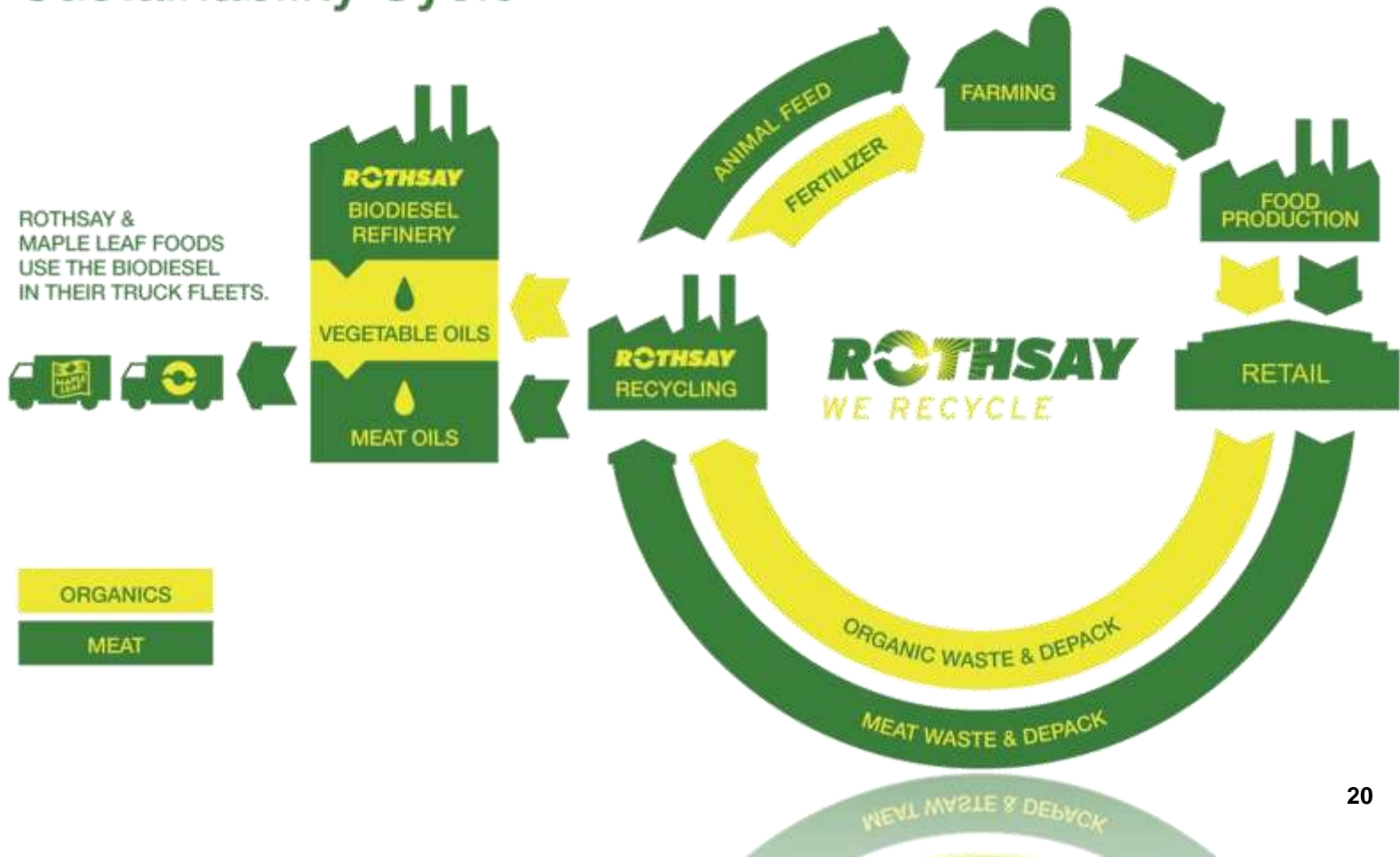
Seacliff Energy, Leamington, ON

- Diverts 40,000t/yr from landfill.
- Offsets 5,400t of eCO₂/yr (or 1,400 cars equiv.)
- Produces electricity for 1,200 homes
- Produces enough fertilizer to grow 2,000 acres of corn

Maximizing Value from Waste

Putting It All Together

Sustainability Cycle



The Path Forward

The True Cost of Waste Must Be Passed Through

- Waste will continue be a problem unless there is structural change.
- Key enabling condition: waste generators must feel the cost of their GHG impacts, and the disposal of the waste they create.
 - A continent-wide carbon offset program is one way.
 - A ban on organic waste from landfills is better yet.
- Quebec has a ban starting in 2020. Nova Scotia and some municipalities already have one. Much of Europe has one. This is just the beginning.

In Summary...

Solutions Exist

Society has the means to reduce food waste along the entire chain. It is already being done today but far more will be required in the future.

“Waste is worse than loss. The time is coming when every person who lays claim to ability will keep the question of waste before him constantly. The scope of thrift is limitless.” –Thomas Edison