



# Life Cycle Assessment and Life Cycle Costing complementary tools for taking informed decisions

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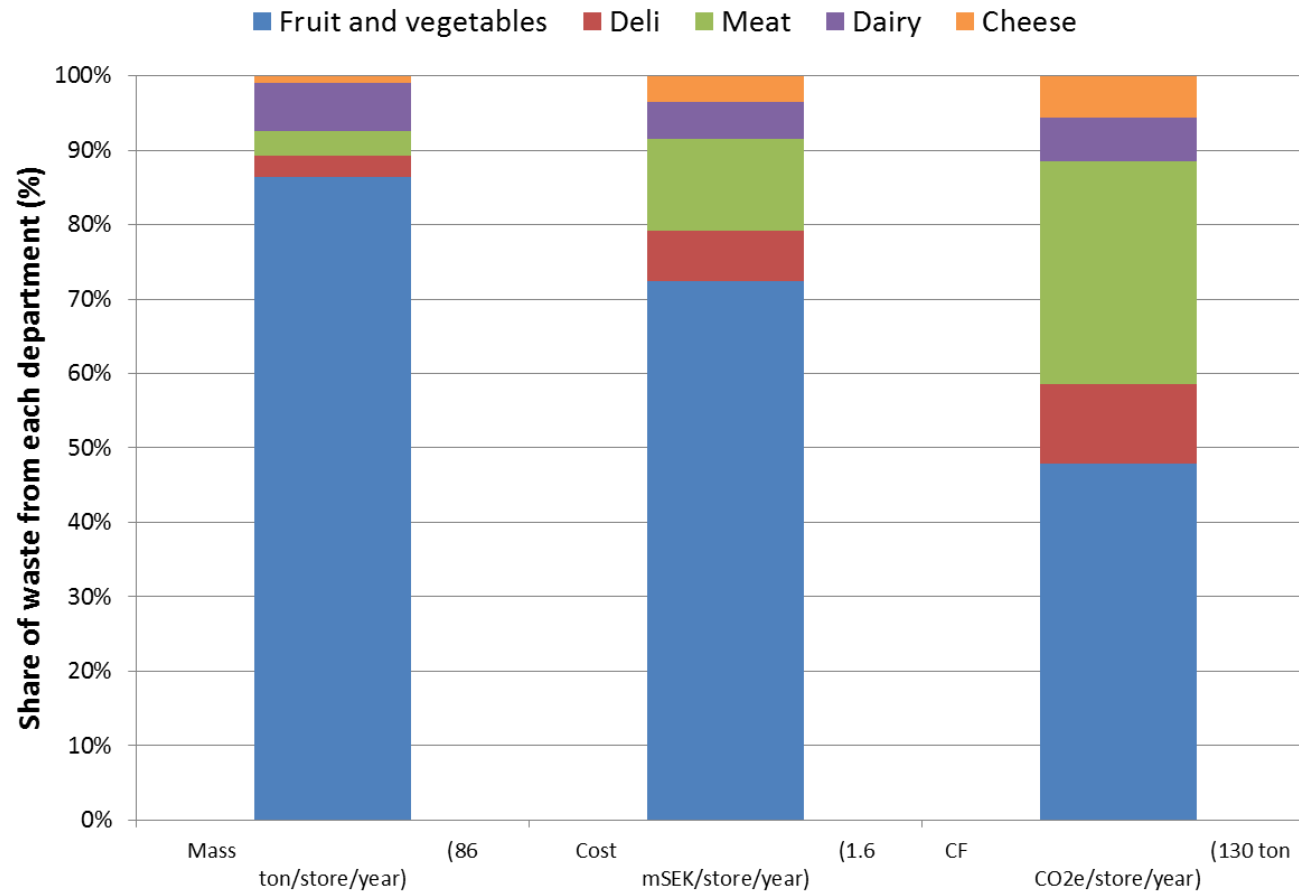
5/18/2017



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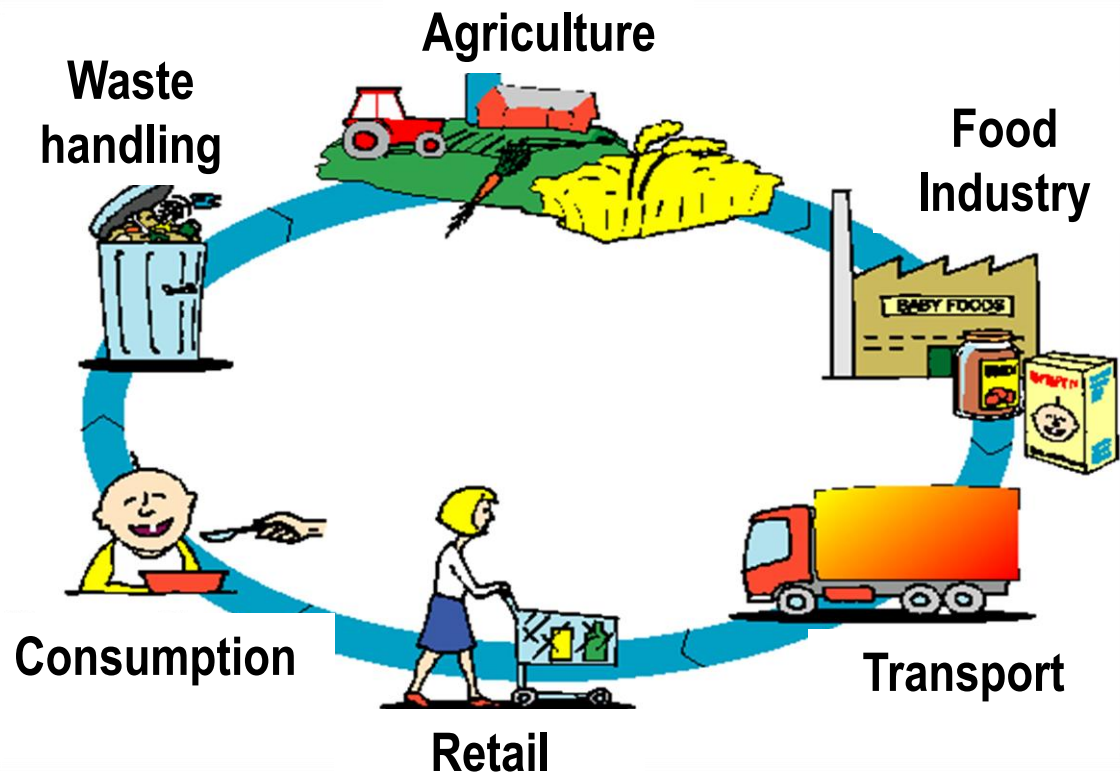
# Waste of perishable products in a Swedish supermarket using different basis



Eriksson, Mattias (2015). *Supermarket food waste.*, PhD Thesis, Swedish Agricultural University, Uppsala

# Life Cycle Assessment and Environmental Life Cycle Costing

- LCA: environmental impacts from cradle to grave
- E-LCC: all costs (real money flows) associated with the life cycle of a product



# Methodological issues to be streamlined for side flows

**What to include exactly?**

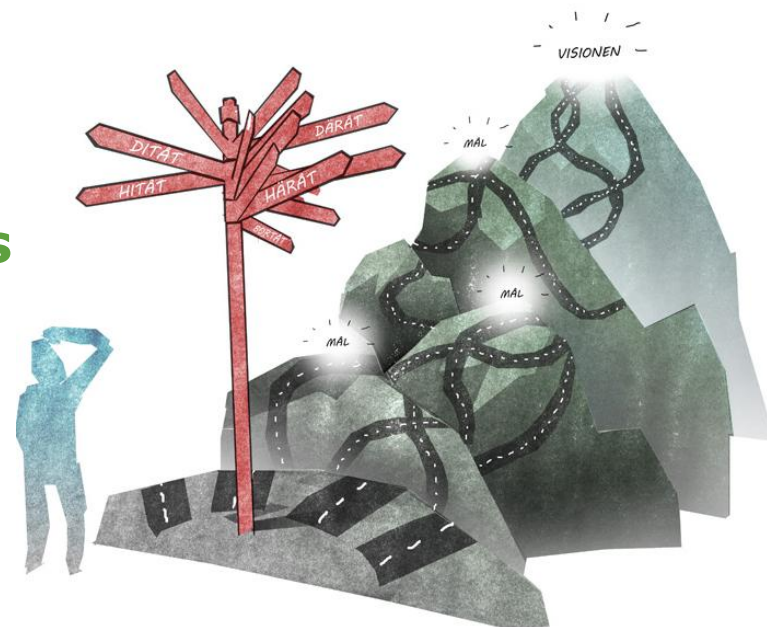
**Backpack?**

**Substituting  
product/process?**

**Market effects?**

**Investments**

**Taxes**

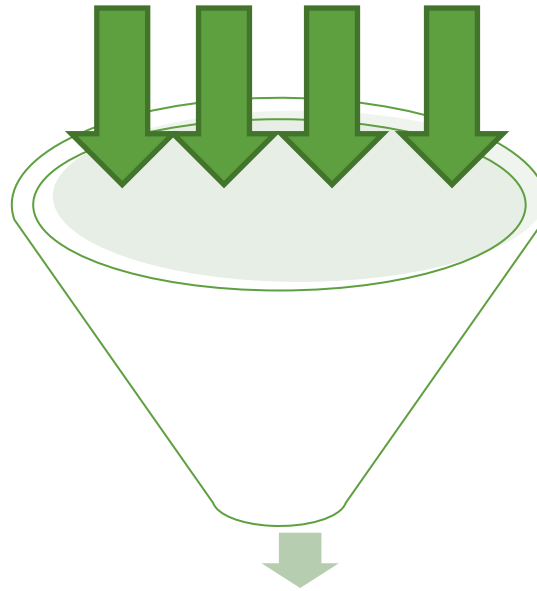


## Our task in REFRESH

### Background

- Stakeholders are seeking alternatives for handling surplus food and side flows
- Need for consistent and simple science-based tools supporting decision making
- ..that are based on current science and relevant frameworks and standards

LCA, E-LCC, WFD, FUSIONS



RECOMMENDATIONS FOR  
SCOPING E-LCC AND LCA  
FOR SIDE FLOWS

### Benefits from our work

- Easier to compare results having a streamlined approach
- Base for simplified guidance models for food producers innovators
- Promote environmentally sustainable and economically feasible solutions for valorising side flows

# REFRESH approach

## 1. Two distinct situations are considered

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- Driving product – PEF recommendations
- Side-flow
  - the less the better

# REFRESH approach

## 2.The REFRESH Situations (RS)

### **RS1:Prevention of a side flow**

- Prevention or reduction of a flow

### **RS2: Side flow valorisation**

- The side flow has some value for the generator

### **RS3: Valorisation as a part of waste management**

- No value for the generator, but the receiver generates something being marketable.

### **RS4 End of life**

- No value for generator nor receiver

For each RS

- Functional Unit
- System boundaries
- Allocation rules

Two situations:

- Foot print study (RS2-RS4)
- Intervention study

# The practitioner's perspective of the REFRESH work

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- No need to master all frameworks
- Comparable results
- Serve as a base for a robust simplified tool allowing innovators to include both the environmental dimension and the cost dimension in their decision taking in a robust way
- Provide worked out full LCA and LCC on selected cases demonstrating the full potential of the method developed
- LCA to look at the impact of changes in large flow of selected products

Guidance documents that can be downloaded from REFRESH website:

- Generic Strategy LCA and LCC
- Methodology for evaluating life cycle costs (LCC) of food waste
- Methodology for evaluating environmental sustainability





## Questions?

**Fell free to contact REFRESH LCA and LCC team:**

- Karin Östergren and Jennifer Davis, RISE Agrifood and Bioscience Sweden
- Fabio De Menna and Matteo Vittuari, University of Bologna, Italy
- Nicole Unger, University of Natural Resources and Life Sciences, Vienna, Austria;
- Marion Loubiere, Deloitte Sustainability, France.

<http://eu-refresh.org/>

# Simplified Excel Model

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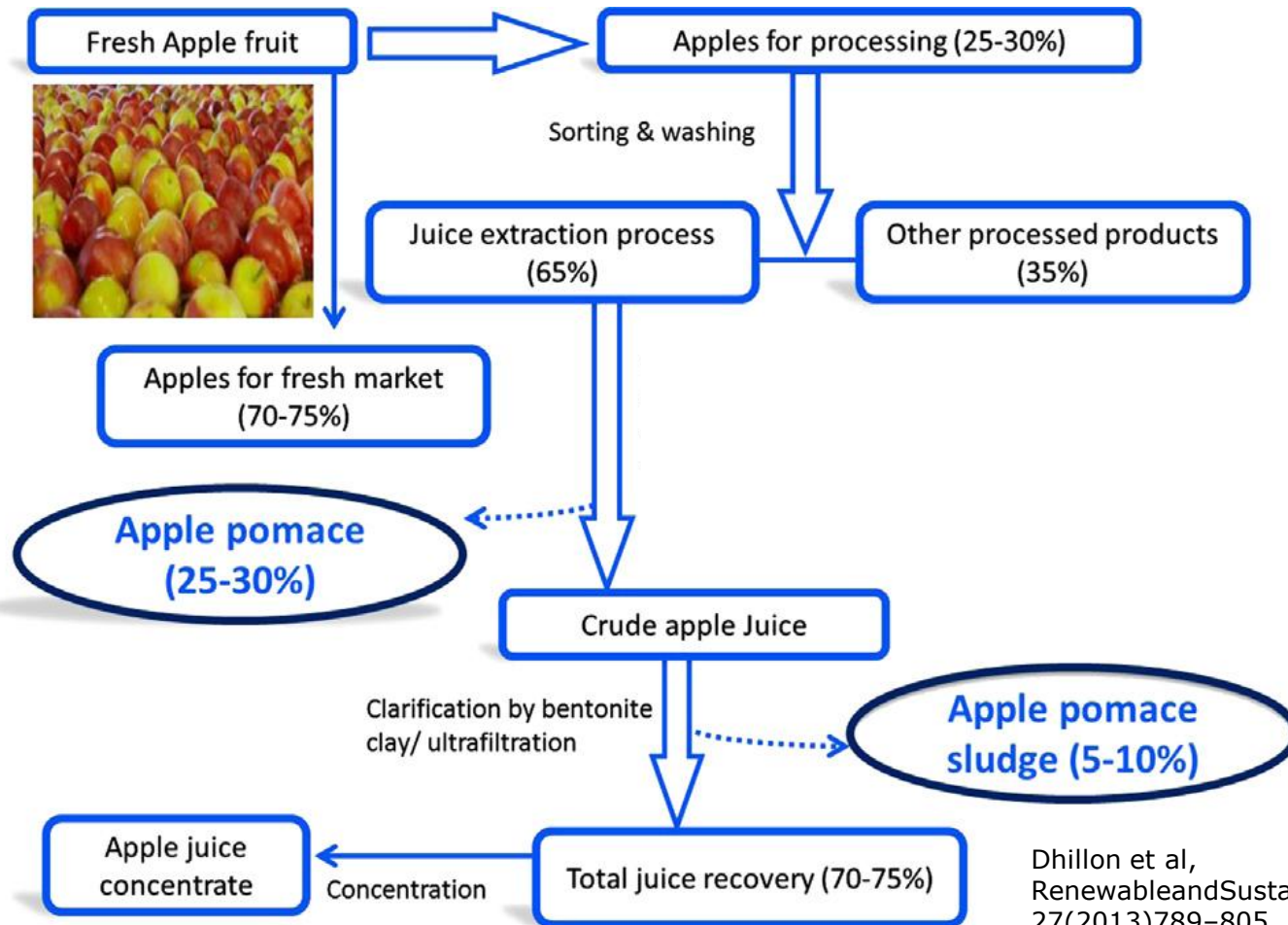
- Educating tool on current valorisation options of side flows that cannot be prevented.
- Aimed to give a hint on hot-spots for different valorisation routes and pin-point important information needed.
- The model compares two different scenarios (current and future) and provides the anticipated change in impacts (GWP) /costs from a system perspective.

# Simplified Excel Model

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- The pre-set model is based on a European averages - but possible to make changes
- Choice of side flows are based on recommendations by experts/stakeholders within in REFRESH on the criteria: cannot be prevented, large volumes, high valorisation potential
- The choice of open for consultation. A link to a survey will be sent out after the conference to collect your inputs.

# Apple Pomace



World market apples:  
70 million ton

EU: 12 million ton  
(WAPA)

Apple Pomace is rich in  
carbohydrates, and  
vital nutrients:

In this model: land  
spread, feed, energy,  
pectin

Dhillon et al,  
RenewableandSustainableEnergyReviews  
27(2013)789-805

# Round the table discussions

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- Demonstration of the current set-up of the simplified excel tool for apple pomace
- Discussion (small groups, 5 min. + all)
  - Layout in general
  - Level of detail (more, less or OK)
  - In which situations would you find the model useful?
- Prioritized side flows (all)
  - Any side flow that you think is of particular interest? Which and why?