

# Measuring Environmental Sustainability in the Food Industry

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# Environmental sustainability

## Definitions:

- For renewable resources, the rate of harvest should not exceed the rate of regeneration (sustainable yield);
- [For pollution] The rates of waste generation from projects should not exceed the assimilative capacity of the environment (sustainable waste disposal); and
- For nonrenewable resources: the depletion of these should require comparable development of renewable substitutes for that resource.

# Well being of society

- Relies on food, water, energy and other materials
- Food, water and energy systems vulnerable
- Demand ever increasing
- Limited resources – potential to 'run out'

# Demand for food

- Projected to increase by 70 % to 2050
- Area of arable land per person decreasing by 1.5 % per year
- If no action is taken – disaster!

# Food waste – a global scandal

- Total food lost or wasted per year:
  - 1.3 bn tonnes of edible part
  - or 1,300,000,000 t
  - of ~4 bn tonnes food produced / year
- Total wastage of water: 250 km<sup>3</sup> pa
- Total value of food waste ~ \$750 bn



# Definition of waste

- Any material that the owner disposes of, or is required to dispose of, or they intend to disposed of.
- Examples: peelings, washings, water, energy (heat), trimmings, oil (edible, non-edible), packaging waste etc. Includes CO<sub>2</sub> and equivalents.

# ***True cost to industry of food waste =***

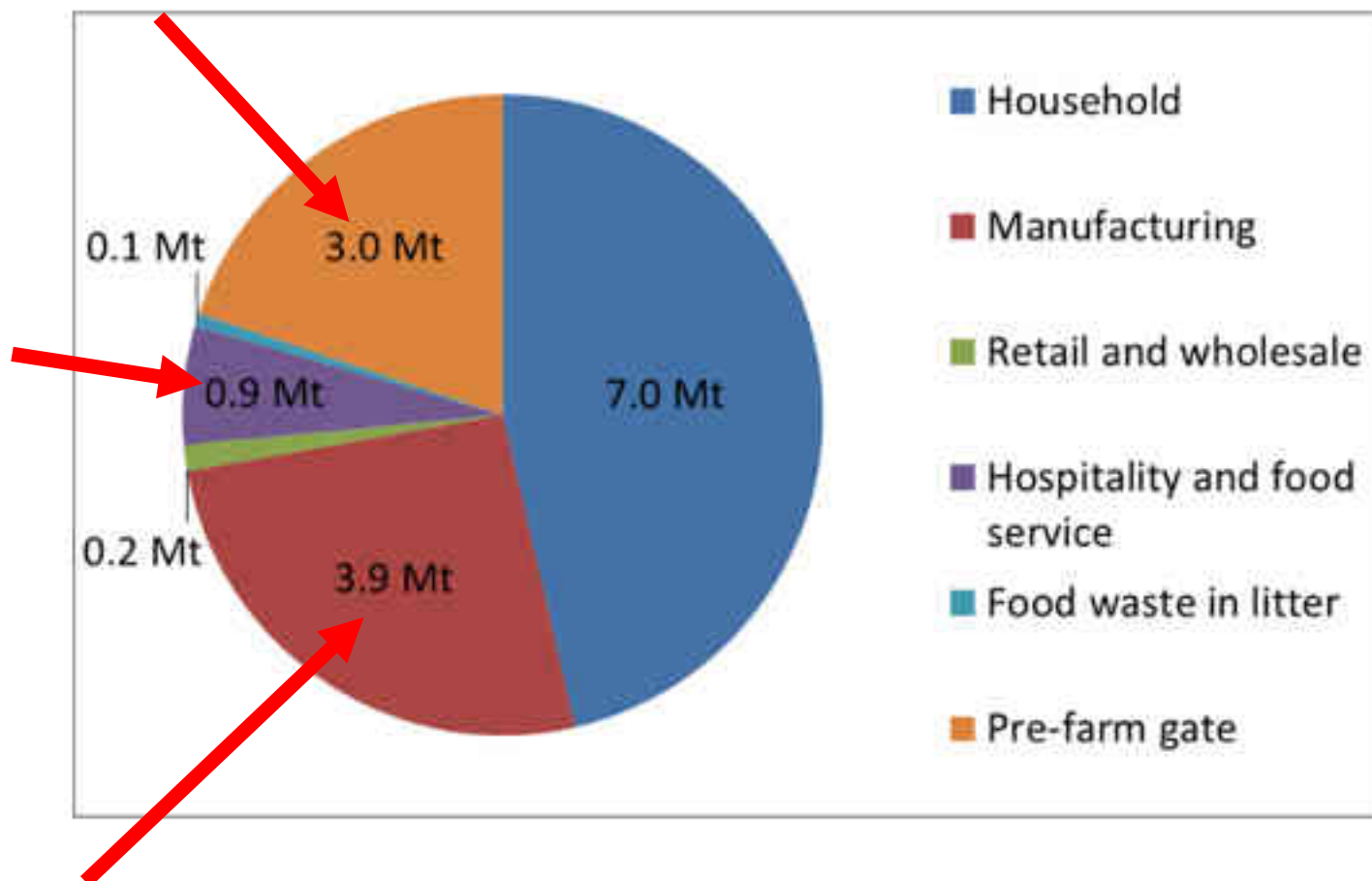
$$\frac{[\text{Cost of (ingredients + packaging + overheads + disposal + lost margin)}] \times \text{tonnes of waste}}{\text{tonnes of production}}$$

*So if costs rise, so does cost of waste*

*But if you make more, cost of waste falls*

*ONLY if waste stays constant OR falls*

**Figure 1** Amounts of food waste arising in the UK by sector (total = ca. 15 Mt)\*



# UK impact

- Food waste >£19bn pa
- ~90 Mt CO<sub>2</sub> eq pa (agriculture, manufacture, retail, wholesale, hospitality)

WRAP, 2013

- Packaging: 1.7Mt = 10% of waste stream

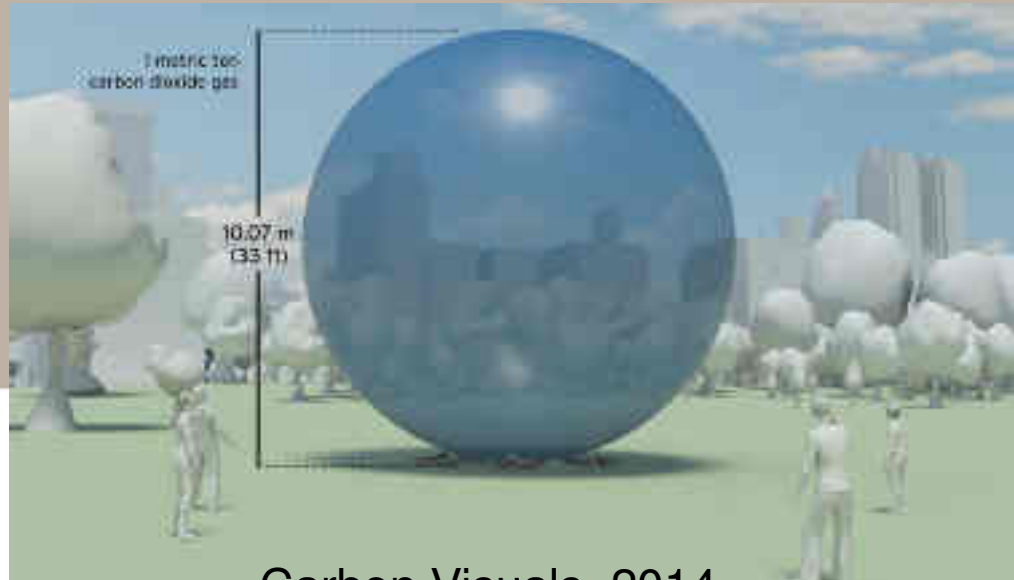
DEFRA, 2010, WRAP, 2011



# Food industry Carbon footprint

- Almost 37 TWh of energy (2010)
- Approx. 11 million tonnes of CO<sub>2</sub>

Carbon Trust, 2016



Carbon Visuals, 2014

# Helping industry change

- Need useful metrics
- Should be based on easily available data
- Should be clear where changes may be made and
- Should be able to monitor progress

# Industry familiar with auditing

- Auditing – measurement against a standard
- International standard
  - ISO 14000 series Environmental Management Systems
- Environmental Audit Toolkit

# Environmental Audit Toolkit

- Originally developed in partnership with Reynold's Catering Ltd
- Has 10 key aspects evaluated by supplier questionnaire
- Based on EcoVate Environmental Performance Checklist + standards from Wal-Mart, M & S and Sodexo

# Application

- Wide range of business types
  - Horticulture
  - Manufacturing
  - Catering and hospitality
- Where food is being 'processed'

# Toolkit questions

- Environmental management
- Waste
- Materials
- Energy
- Emissions
- Transport
- Water
- Packaging
- Purchasing
- Onward sustainability

Original article

## An audit tool for environmental measurement in the UK food sector

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**Summary** An audit toolkit was developed to enable food companies to measure their suppliers in terms of environmental management. Environmental practices and performance metrics were audited using a customised survey that enabled the quantification of best practice, common practice and areas for improvement. It was tested on six suppliers to a major fresh food company. Key areas of best practice included separation and recycling of waste streams, efforts to reduce use of raw materials, energy, water, pesticides, herbicides and fertilisers. Some suppliers were working with stakeholders to reduce environmental impacts. The supplier with the best environmental performance had developed and implemented an Environmental Management Policy and was working towards ISO 14001 accreditation. The study identified four areas for improvement by the suppliers. These were the implementation of an Environmental Management System, the sourcing of more renewable materials and energy, the systematic measurement of the food miles of products and carbon and water footprinting.

**Keywords** Environmental management systems, environmental measurement, food sector, stakeholder engagement, supply value chain, sustainability performance metrics.

# Scoring

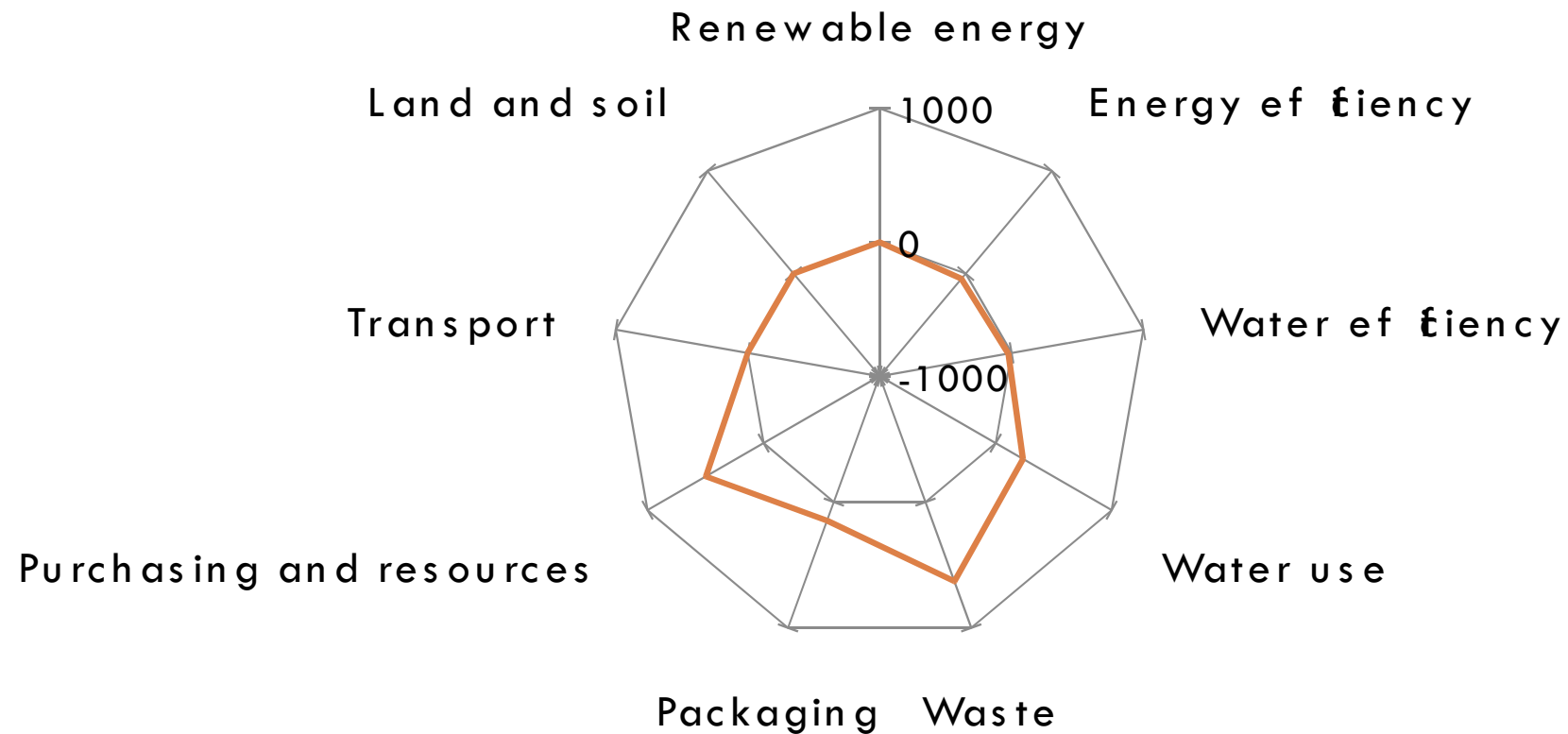
- Descriptive and yes/no answers
- Scoring ranged from 0 – 100
- 4 levels
- Higher marks for more detailed replies
- BUT time consuming, subjective

# Improvements

- Scaling similar to 'sensory'
- Anchors within scales
- Excel spreadsheet
- Scoring using 'sliders'

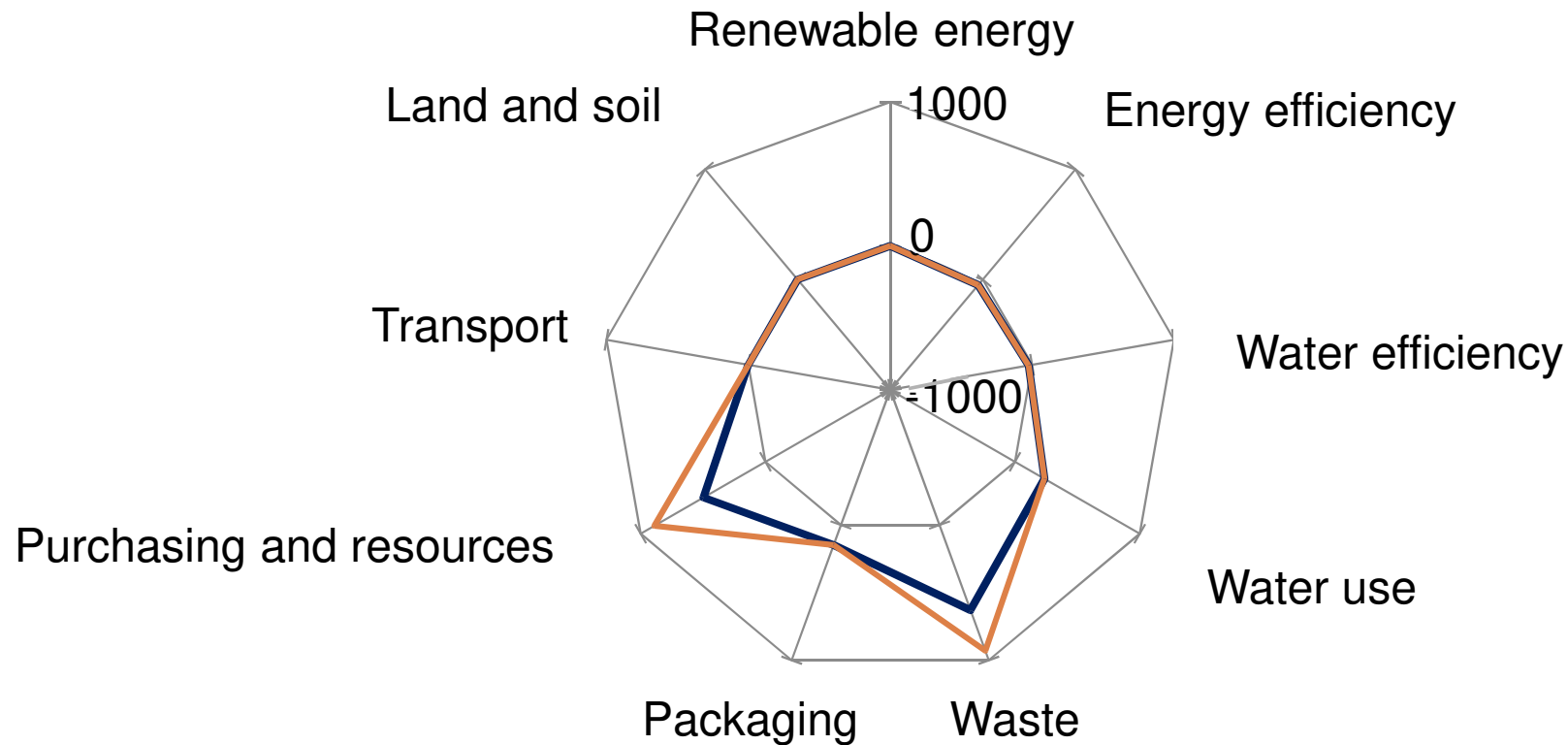
[/media/richard/STORE N GO/IFST Conference 2016/Sustainability Q'aire.xlsx](#)

# Results before



Environmental impact score: 2130

# Results after



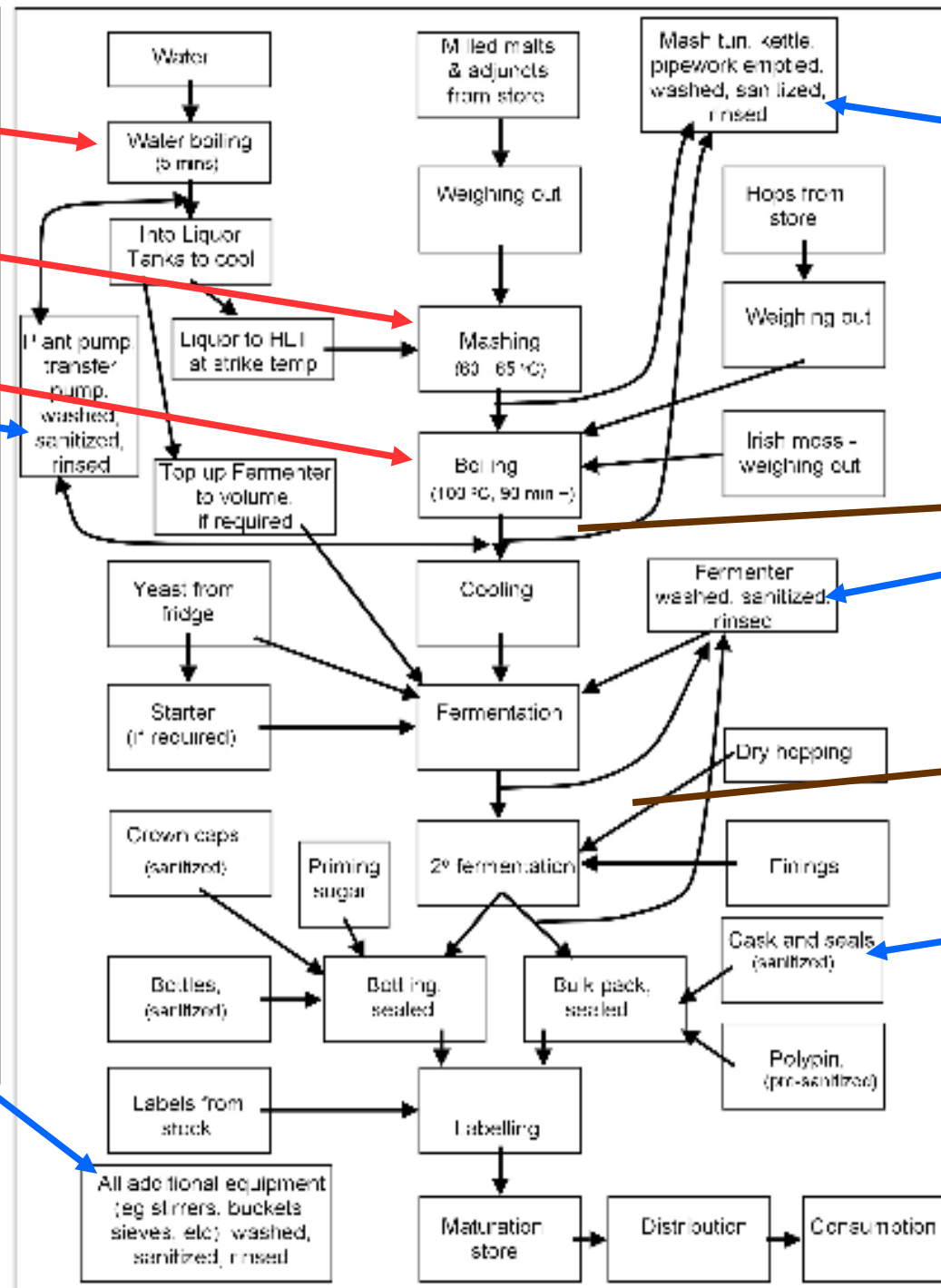
Environmental impact score: 1436

# Sustainability analysis









- All the data should be readily available
- Eg energy, water use, waste disposal etc
- Need to understand at which points in processes gains can be made

# SACCP – Sustainability Analysis Critical Control Points

- Similar to HACCP
  - Follow 7 principles:
    - Identify use of energy, water, waste etc
    - Identify where these are used/produced (critical point identification)
    - Establish quantities used/produced
    - Use EA tool to analyse
    - Introduce changes and set targets for improvement
    - Record
    - Verify and monitor progress



# Feedback from users

- Easy to use 
- Sliding scales assisted data input 
- Results were presented in a useful format 
- Acceptable time input 
- Acceptable level of data input 
- Useful information 
- Reduce environmental impacts 
- Relevance to business – not clear
- Improve fuel efficiency 

# conclusions

- Enables quantification of environmental impact
- Helps find improvement opportunities
- Can impact 'bottom line'
- Reduces environmental impact
- Usable by wide range of businesses
- Can fit along side HACCP as part of QMS

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# Thank You

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