

Sustainability accounting: theory and practice

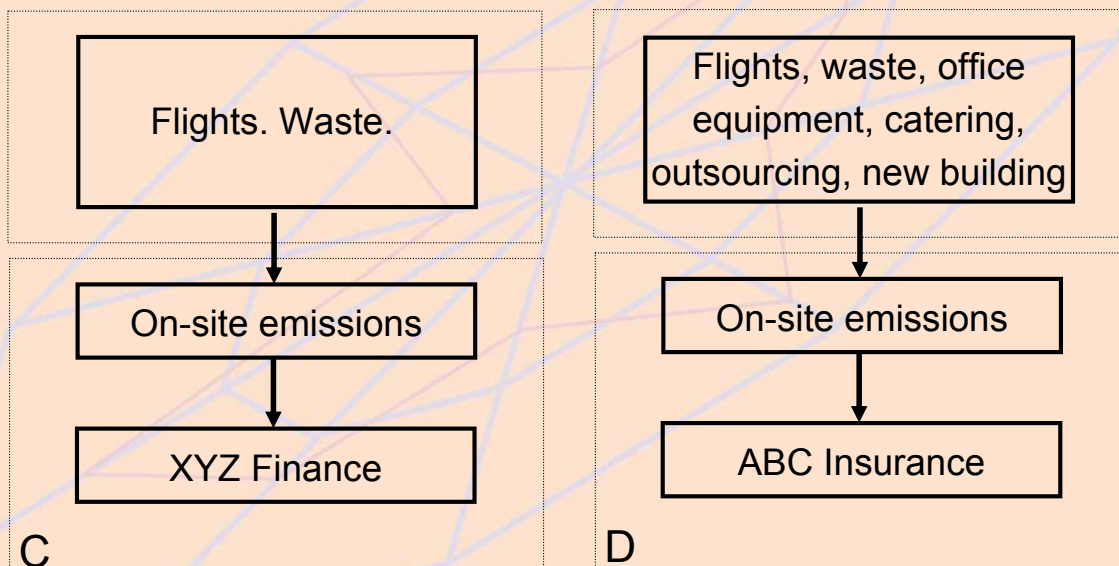
Christopher Dey,

Manfred Lenzen, Joy Murray

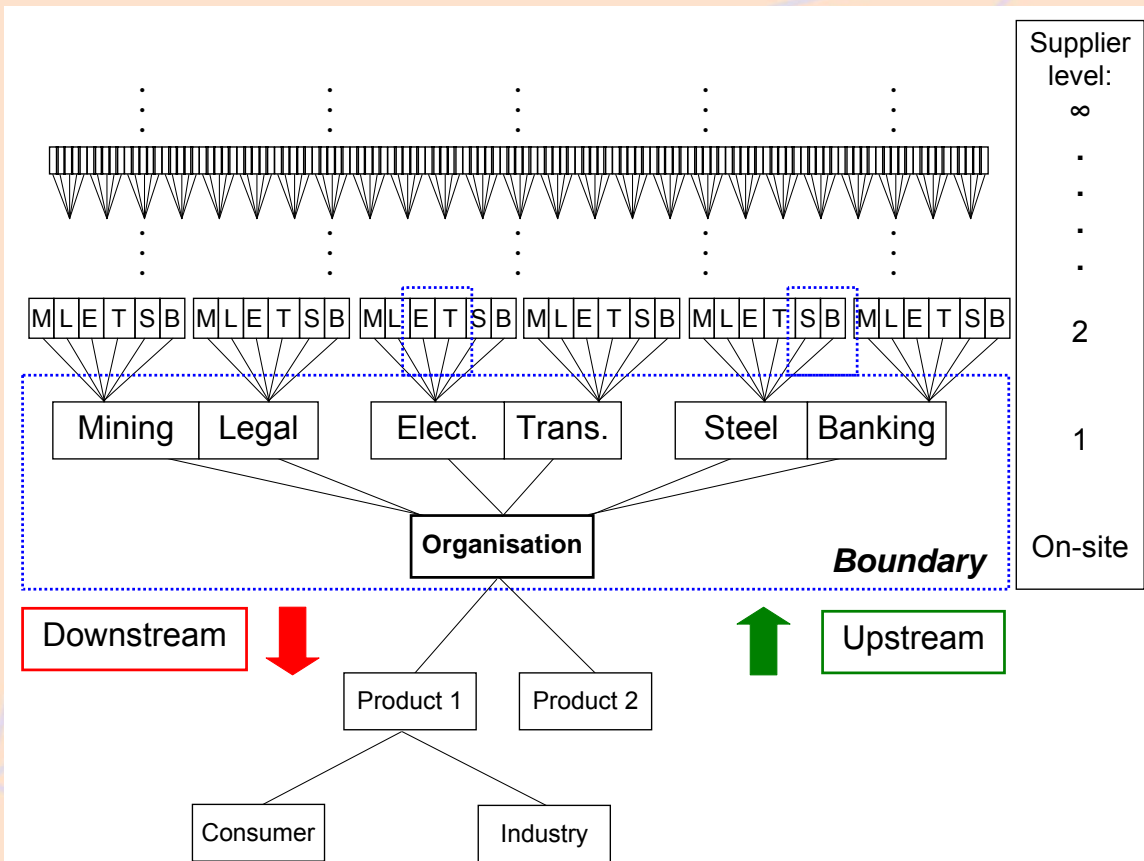
Richard Wood

Sven Lundie (Hamburg)

Carbon offsetting are organisations really carbon neutral?



Real-world complexities



The problem of quantification

- "... there is still a lack of quantification in most reporting. ... the majority of reports lack depth, rigour or quantification."
- "Most business will have supply chain impacts that they should understand and consider reporting. There is no single, quantifiable measure that companies can use as a Key Performance Indicator for the effect of their upstream supply chain on the environment."

Business footprinting

- in principle can be similar as for households
- diversity makes this impractical for quick estimates
- but boundaries much less clear
- direct emissions *relatively* straightforward
- double counting with consumers and other businesses!
- full accountability some time away

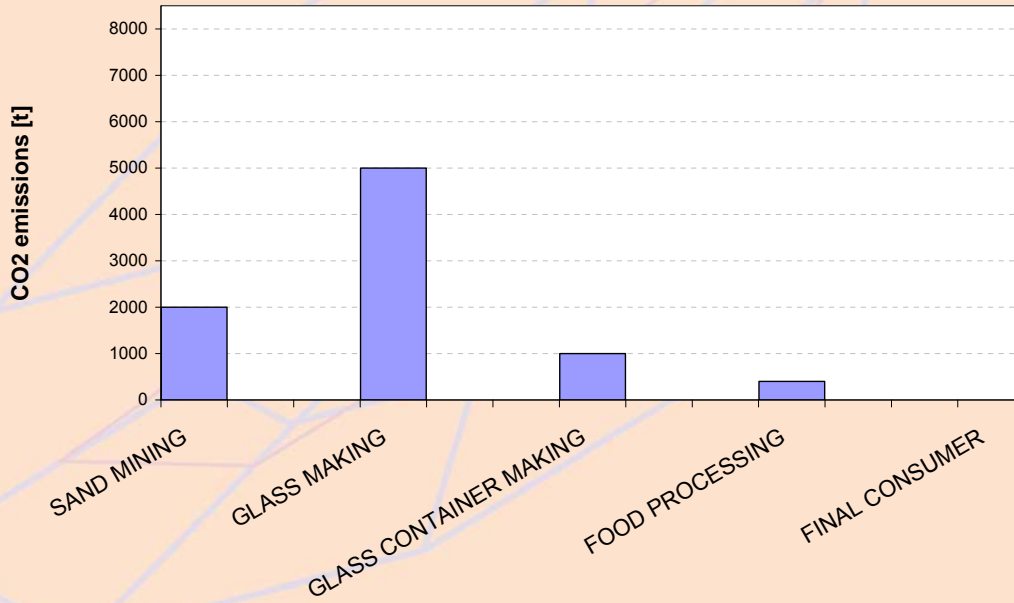
Shared responsibility

**How to allocate
indirect impacts
along a supply chain?**



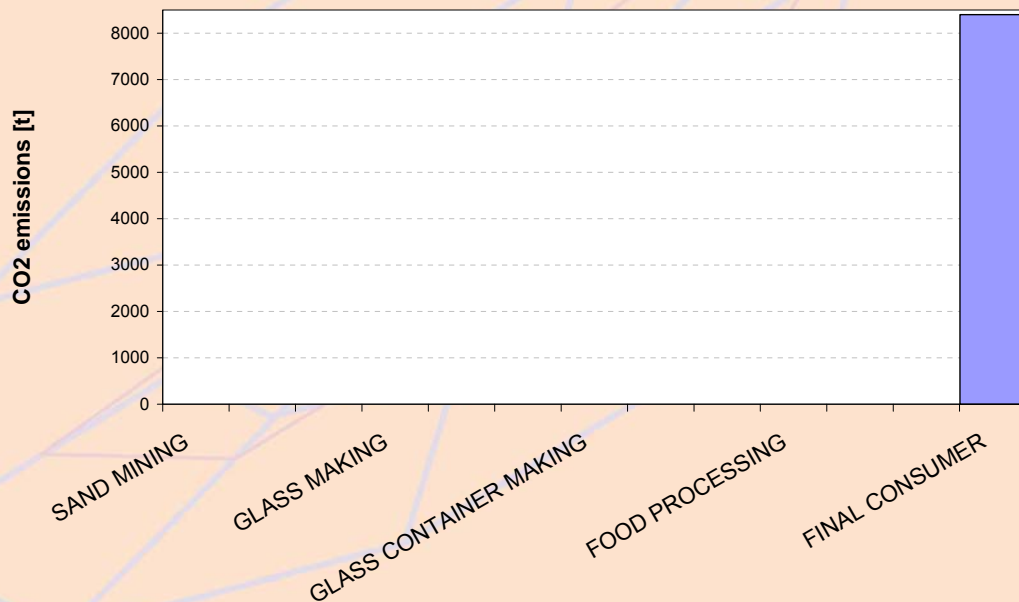
Full (100%) Producer Responsibility

>> only on-site impacts



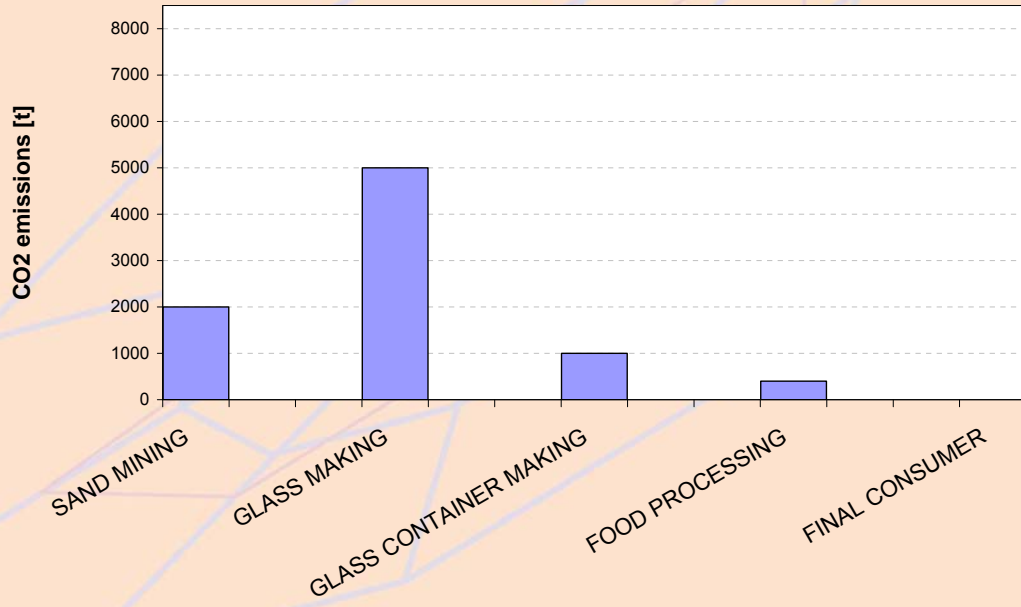
Full (100%) Consumer Responsibility

>> all upstream impacts with the consumer

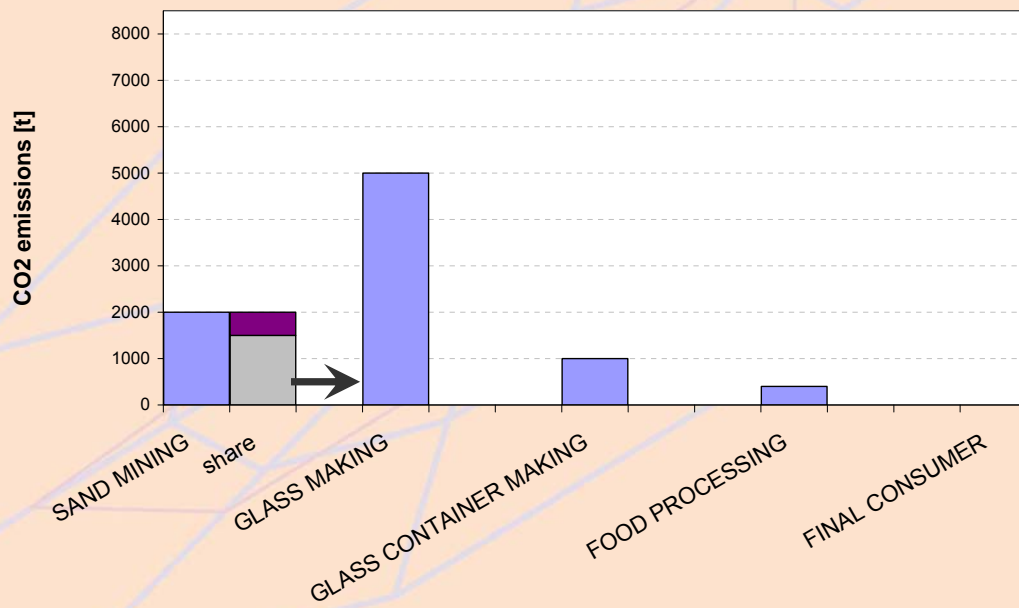




Sharing responsibility ...

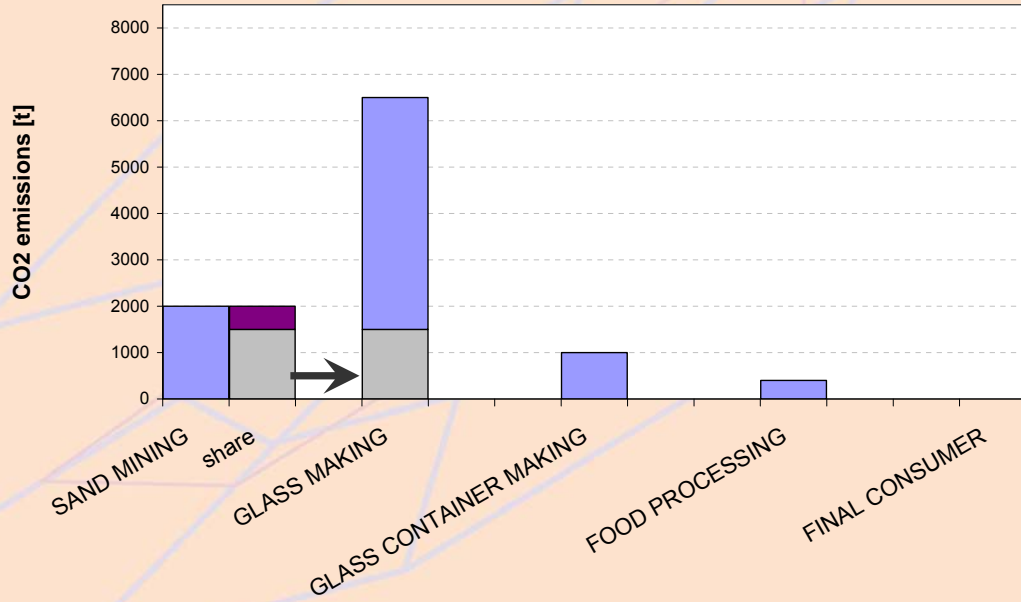


Sharing responsibility ...

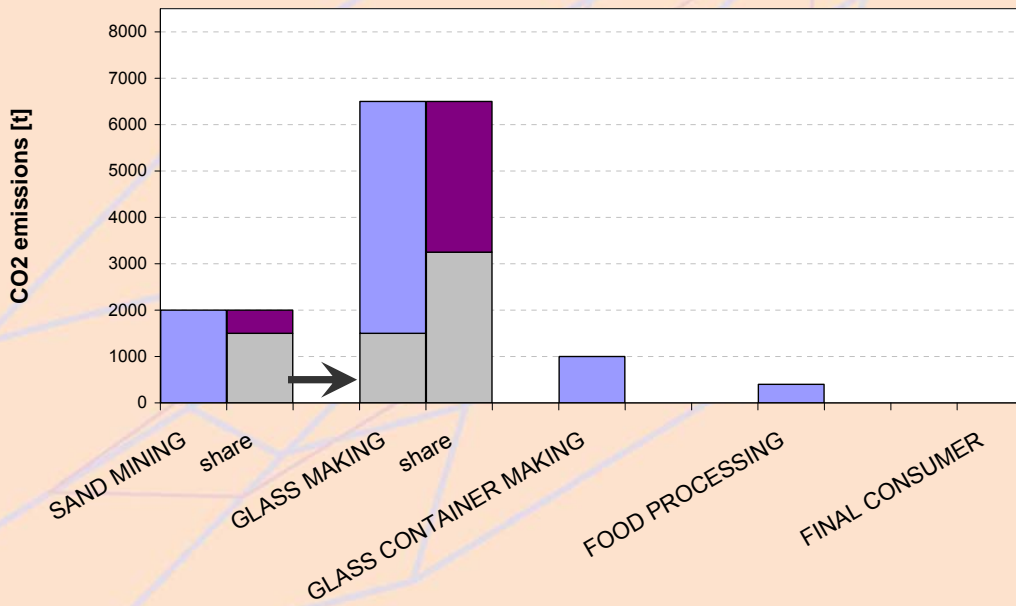




Sharing responsibility ...

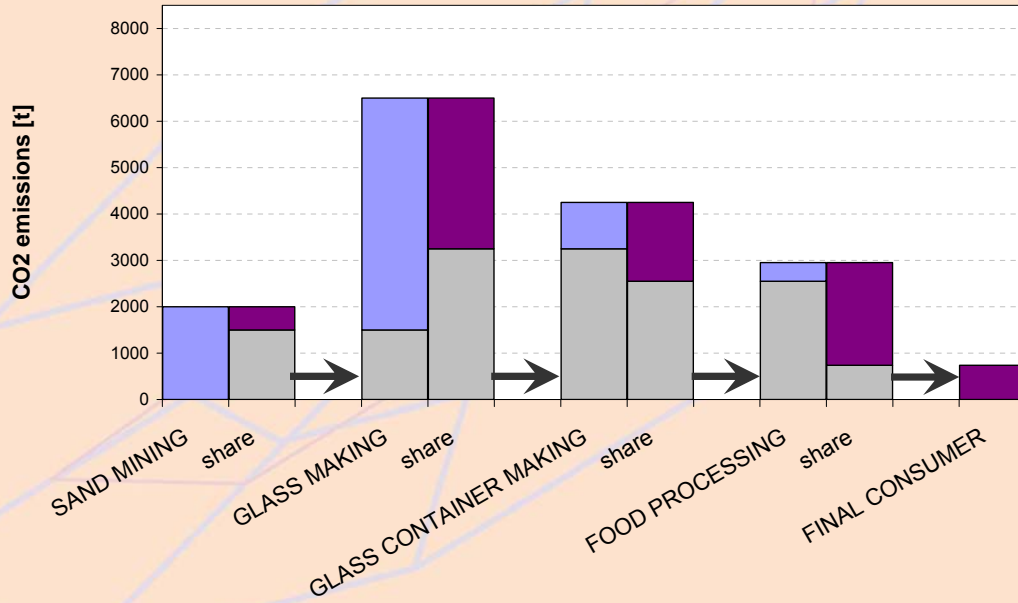


Sharing responsibility ...

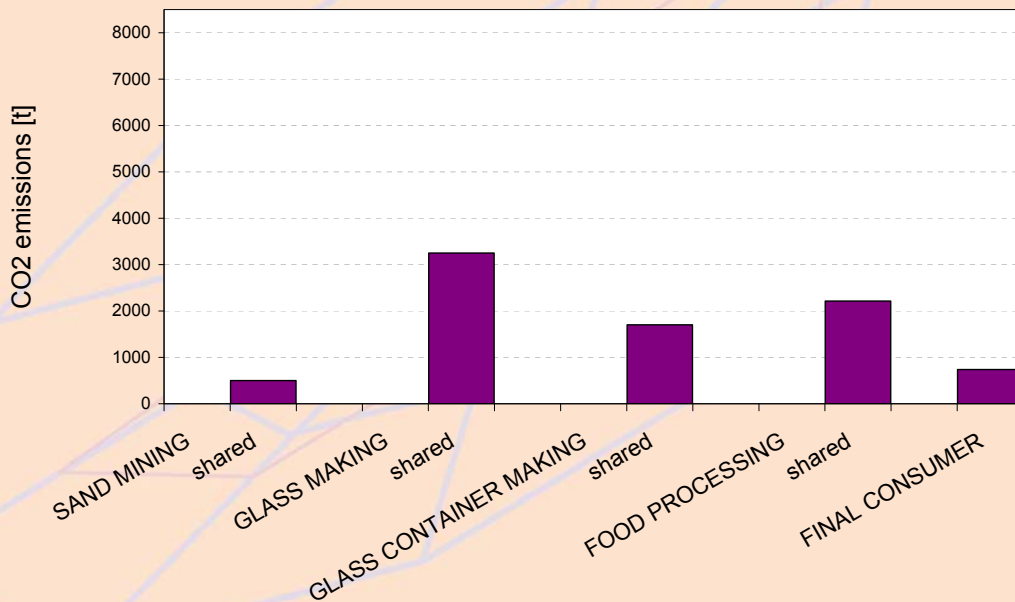




Sharing responsibility ...



... shared responsibility





The screenshot shows the software interface with a menu bar (Edit, View, Tasks, Results, Help) and a toolbar (New, Open, Save, Print, Import, Export, Sort, Filter, Group, Search, Knowledge Base). A left-hand navigation pane lists 'Tasks' (General Details, Expenditure & Revenue, Expenditure Allocation, Revenue Allocation, Margins & Taxes, Indicator Selection & Onsite Impacts, Calculate) and 'Results' (Expenditure, Revenue, Total Impacts, Total Impacts - Shared Responsibility, Total Intensities, Total Intensities - Benchmark Spider, Total Intensities - By Layer, Commodity Breakdown, Commodity Breakdown Graphs, Impact By Layer, Impact By Layer - Area Graphs, Ranked Structural Paths). The main content area features a green background with the text 'bottomline³ triple bottom line' and 'WELCOME'. Below this, there are sections for 'Before you begin' and 'Data Collection'.

Before you begin

You are about to use BottomLine3 software (BL³) to calculate your organisation's Triple Bottom Line (TBL) Account. The software is based on the Integrated Sustainability Analysis (ISA) research framework established by the ISA Group within the University of Sydney (www.isa.org.usyd.edu.au). BL³ involves a choice of financial, social and environmental indicators. Each indicator characterises the impact of your organisation's activities. Some of these impacts occur within the premises of your organisation: for example, you may use natural gas which generates CO₂ emissions when being combusted.

These are called direct (or on-site) impacts. Some other impacts occur off-site: this happens because inputs that your organisation purchases for its operations are produced by other organisations (your suppliers), causing impacts within their premises. These impacts are called indirect impacts. Generally, what your organisation requires for its operations causes impacts throughout a vast multitude of upstream suppliers, spread across the whole country and even overseas. Accounting for all these indirect, upstream impacts is usually referred to as a life-cycle assessment. BL³ carries out a complete upstream life-cycle assessment of your organisation's impacts. You can use the results of this assessment, for example in your annual sustainability report, or for strategic analysis of your supply chain.

Data Collection

In order to calculate your TBL / sustainability results two sets of information are required. One input is your organisation's financial accounts. The other is your direct (on-site) impacts such as water use, land use, emissions and employment. The outputs from BL³ are comprehensive sustainability results across a wide range of indicators. They include aggregate figures, detailed breakdowns and rankings of indicators into supply-chain contributions.



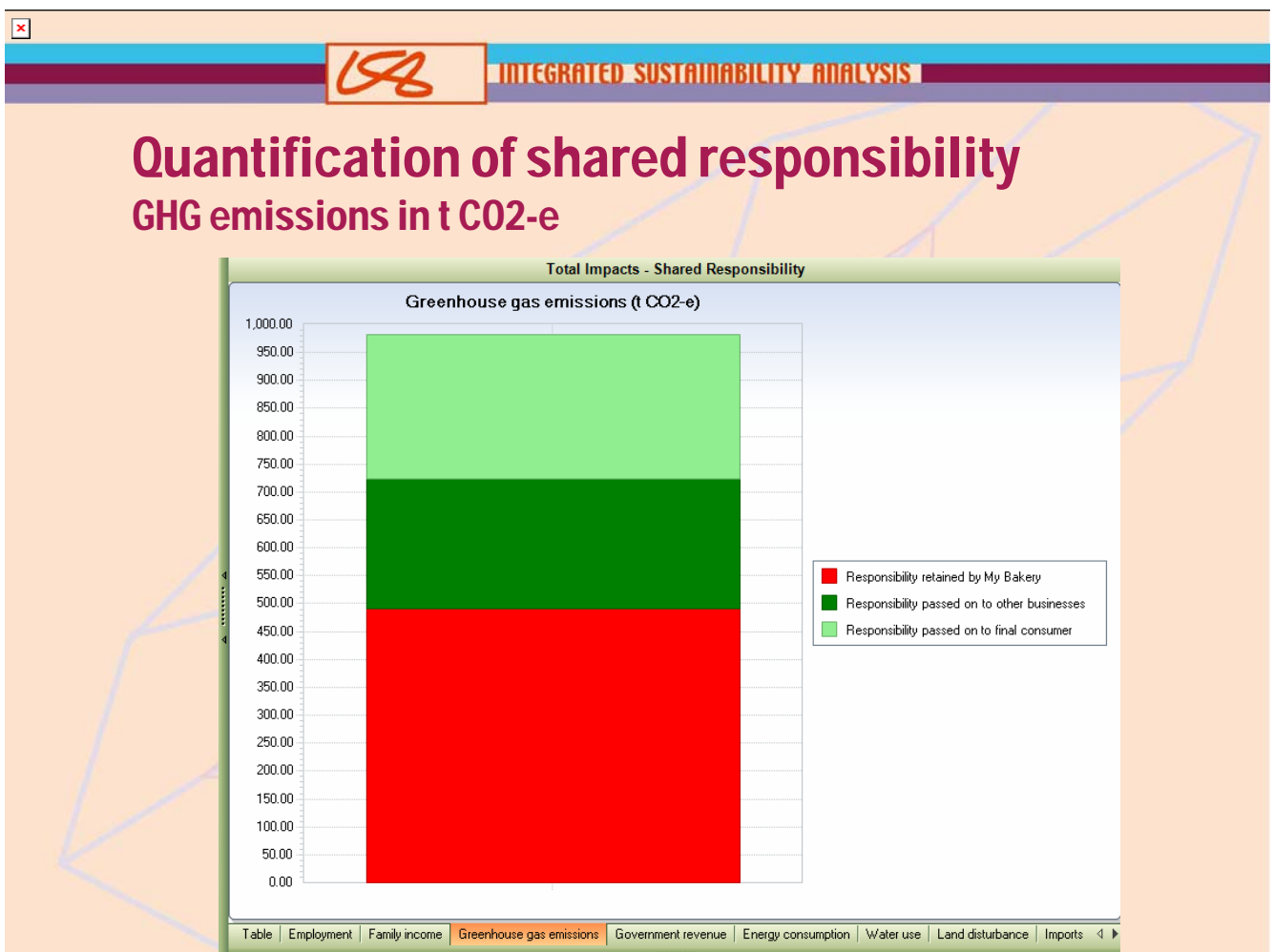
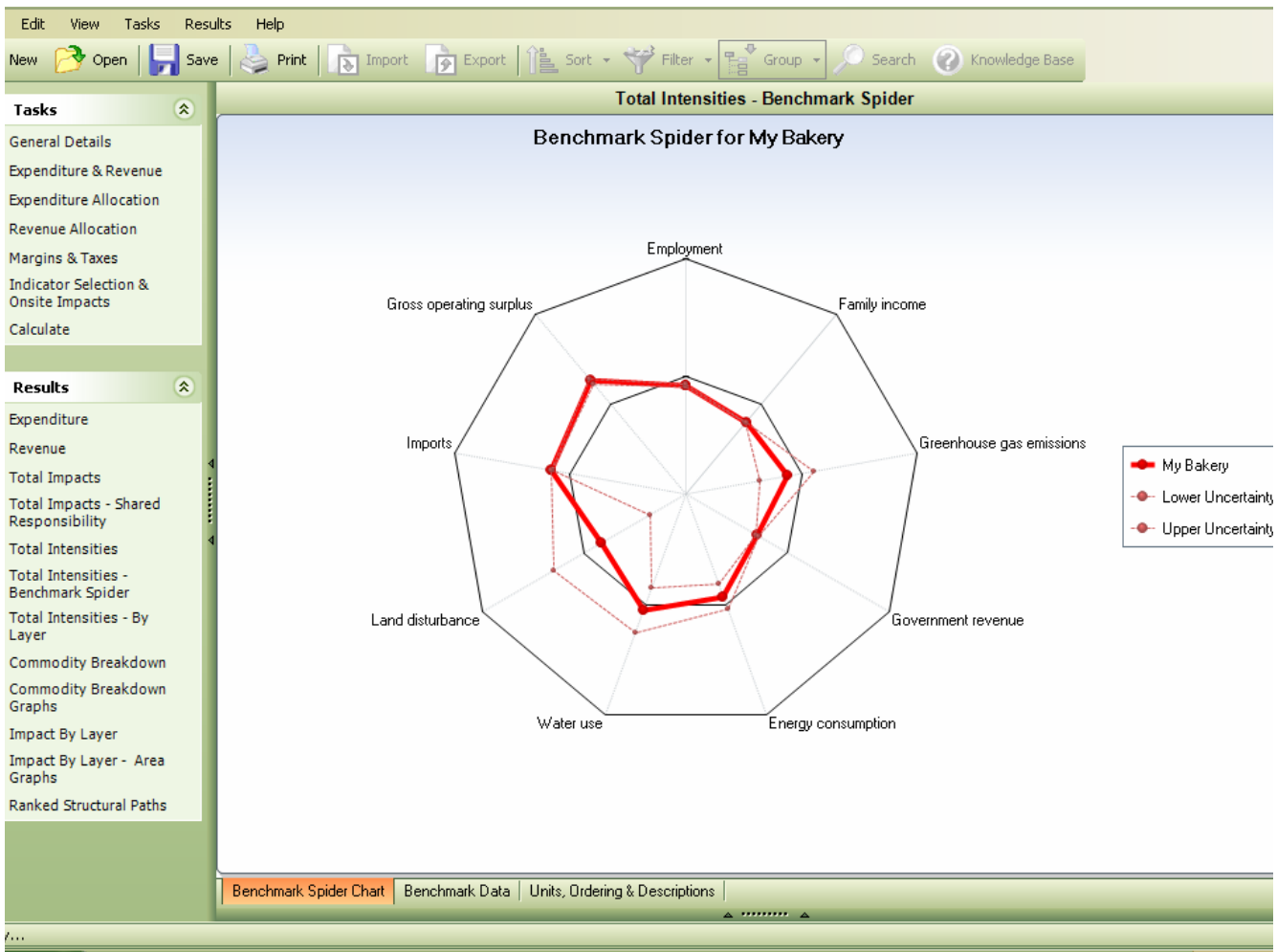
Outputs

- > 100 TBL indicators
- Quantification of total (direct and indirect) impacts
- Sector benchmarking
- Quantification of shared responsibility
- Production layer analysis
- Structural path analysis



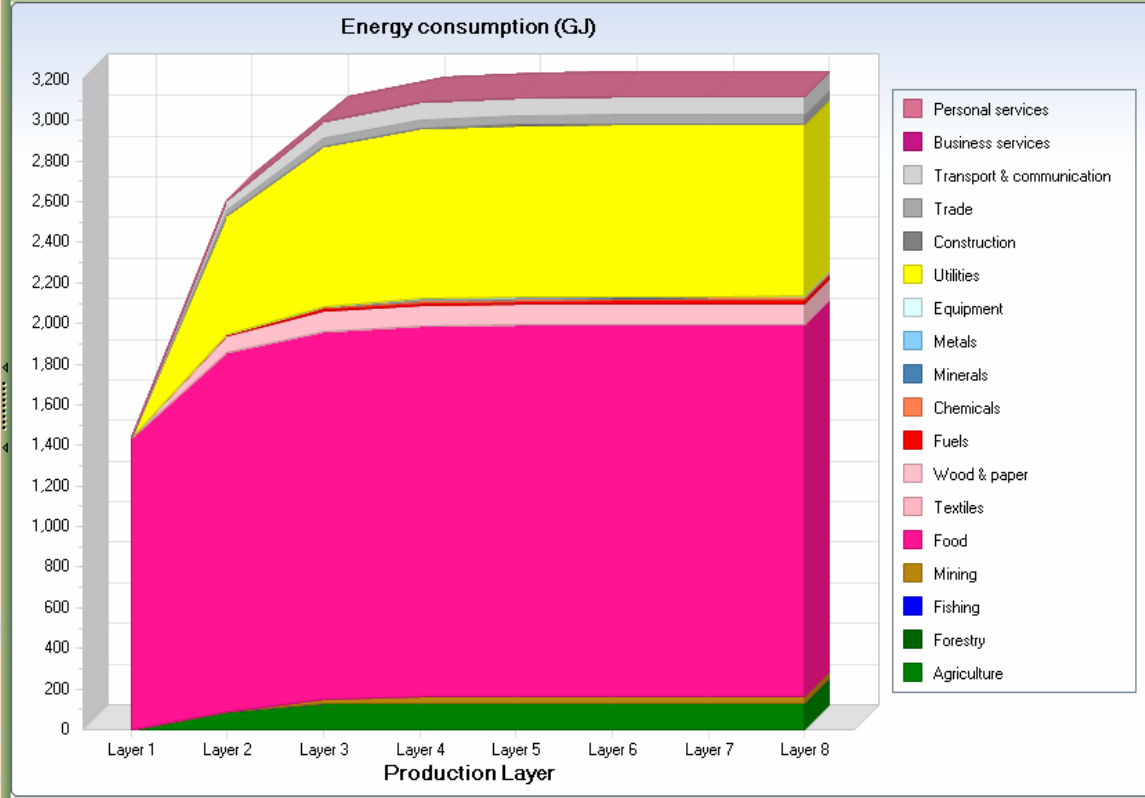
Typical TBL results

Item	MyBakery Absolute Impact	My Bakery Intensity	Total Sector Intensity
Employment	18.1 emp-y	1.69 emp-min/\$	1.41 emp-min/\$
Family income	584,340 \$	47.4 ¢/\$	29.9 ¢/\$
Greenhouse gas emissions	491 t CO ₂ -e	398 g CO ₂ -e/\$	519 g CO ₂ -e/\$
Government revenue	70,277 \$	5.70 ¢/\$	2.88 ¢/\$
Energy consumption	3,120 GJ	2,532 kJ/\$	2,941 kJ/\$
Water use	32.1 ML	26.0 L/\$	22.4 L/\$
Land disturbance	220 ha	1.78 m ² /	2.62 m ² /
Imports	153,454 \$	12.5 ¢/\$	8.43 ¢/\$
Gross operating surplus	129,222 \$	10.5 ¢/\$	19.2 ¢/\$





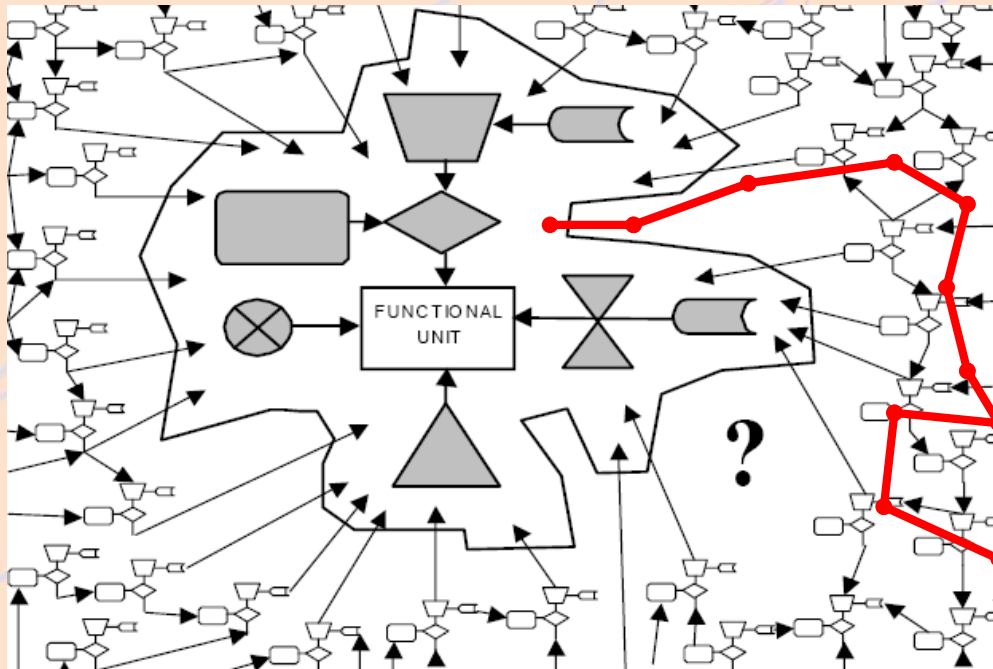
Impact Production Layer - Area Graphs



Family income | Gross operating surplus | Government revenue | Imports | Employment | **Energy consumption** | Water use | Land disturbance | Greenhouse g



Structural Path Analysis





Structural path analysis (energy)

Rank	Path Description	Path Value	Path Order	Percentage in total impact
1	My Bakery	1,438 GJ	1	46.1 %
2	Electricity supply > My Bakery	568 GJ	2	18.2 %
3	Refined sugar > My Bakery	189 GJ	2	6.05 %
4	Vegetables > My Bakery	56.0 GJ	2	1.79 %
5	Paper products > My Bakery	49.1 GJ	2	1.57 %
6	Electricity supply > Fresh meat > My Bakery	47.3 GJ	3	1.52 %
7	Road freight > My Bakery	39.0 GJ	2	1.25 %
8	Paper containers > My Bakery	34.4 GJ	2	1.10 %
9	Flour mill products > My Bakery	32.2 GJ	2	1.03 %
10	Fresh meat > My Bakery	26.6 GJ	2	0.85 %
11	Electricity supply > Electricity supply > My Bakery	25.0 GJ	3	0.80 %
12	Raw sugar > Refined sugar > My Bakery	24.4 GJ	3	0.78 %
13	Wholesale trade > My Bakery	23.3 GJ	2	0.75 %
14	Gas supply > My Bakery	20.3 GJ	2	0.65 %
15	Electricity supply > Poultry, slaughtered > My Bakery	19.1 GJ	3	0.61 %
16	Electricity supply > Flour mill products > My Bakery	18.9 GJ	3	0.60 %
17	Eggs > My Bakery	18.9 GJ	2	0.60 %
18	Gluten > My Bakery	17.0 GJ	2	0.55 %
19	Dairy products > My Bakery	15.5 GJ	2	0.50 %
20	Electricity supply > Offal, hides, skins, blood meal > My Bakery	13.3 GJ	3	0.43 %



BL³ Germany

ISA Europe has a German model

- see flyer



The ISA approach

We undertake research, applications development and consulting on broad sustainability issues.

Our aim is to develop scientifically rigorous, quantitative, consistent and comprehensive approaches for Integrated Sustainability Analysis.

The research framework can be applied to:

- quantitative triple bottom line (TBL) / sustainability reporting
- ecological footprint analysis
- carbon footprinting
- life-cycle assessment (LCA) of products/processes
- environmental impact assessment (EIA)
- industry and population studies
- supply chain analysis



The University of Sydney

<http://www.isa.org.usyd.edu.au>



For further information ...

ISA @ The University of Sydney



<http://www.isa.org.usyd.edu.au>
www.bottomline3.com