UP2CIRC ONLINE WORKSHOP:
UNDERSTANDING CO_2 FOOTPRINTING FOR BUSINESSES AND PRODUCTS

20 MARCH 2024

SIRLI PEHME

SUSTAINABILITY SERVICES OÜ

SUSTAINABILITY EXPERT

+3725049636

s.pehme@gmail.com

LinkedIn

Funded by the European Union

Topics

- Why should companies address their climate impact?
- How to measure climate impacts? Examples
- How to start the process? Practical steps, tools available

Let´s get to know each other ☺

Why? What do you think?

Reasons driving companies to address their carbon footprint

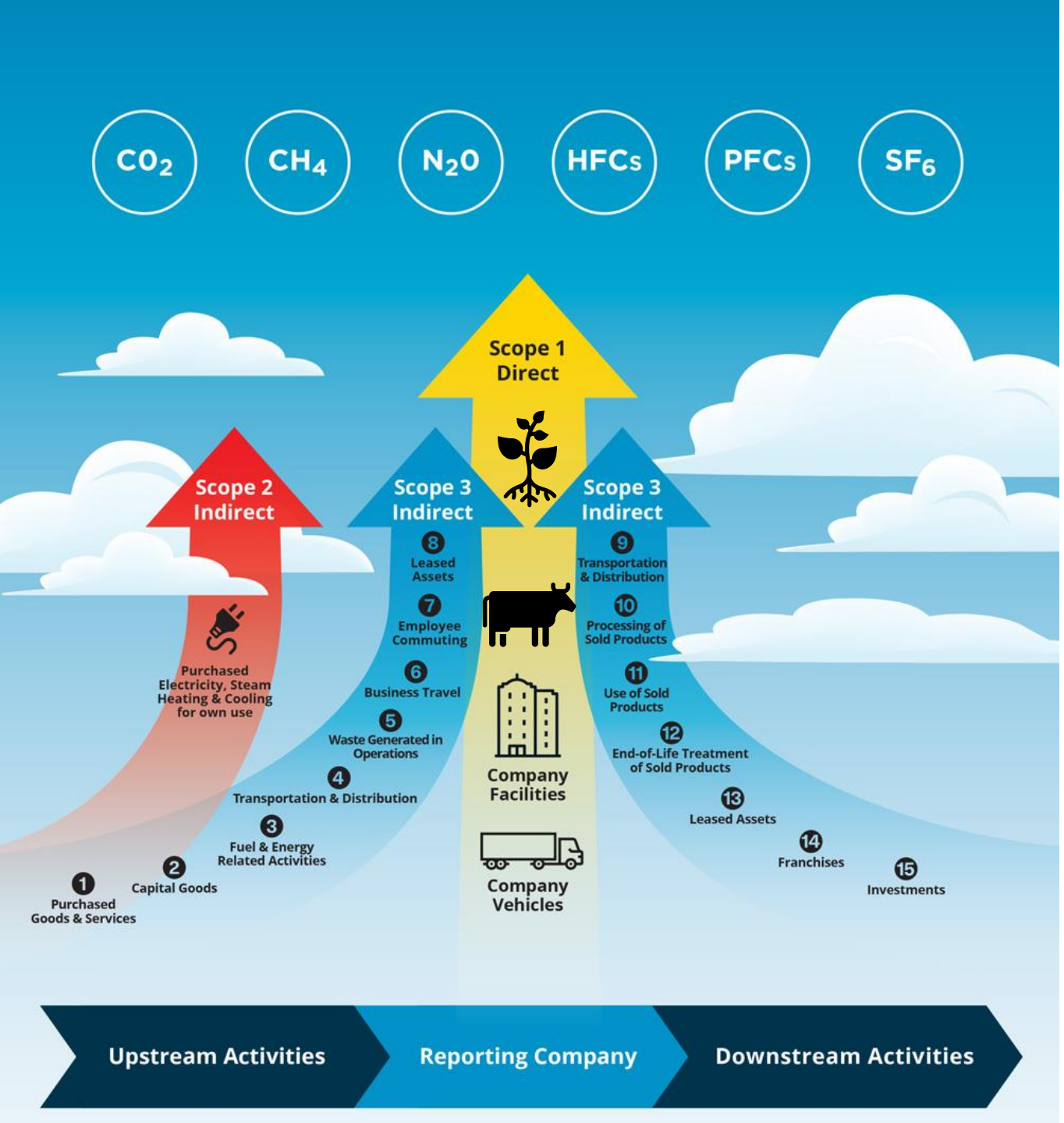
Society´s expectations

Benefit to the company

Regulations

MANAGING CLIMATE IMPACTS

How?



A company's carbon footprint

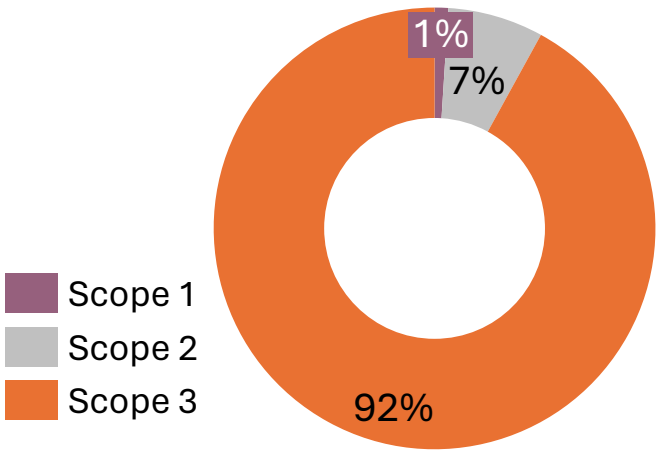
GREENHOUSE GAS PROTOCOL

- https://ghgprotocol.org/
- Greenhouse Gas Protocol Corporate Accounting and Reporting Standard[1]
- Annual data
- 3 scopes
- Result: absolute GHG emissions (CO2e) divided into 3 scopes and relevant categories
- Possible to convert per revenue, turnover, employees, m2 – but not a perfect approach for division

[1] https://ghgprotocol.org/corporate-standard
Image modified based on: https://www.scsglobalservices.com/services/carbon-footprint-calculation

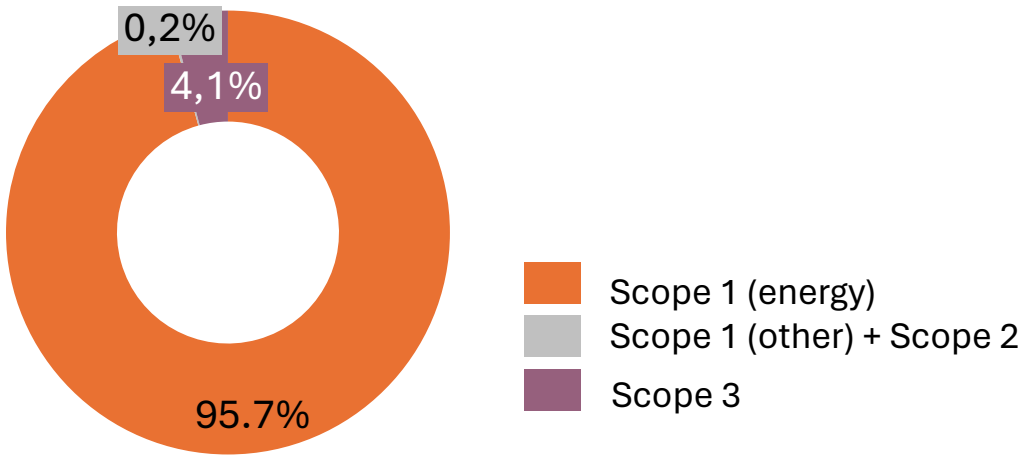
Examples of results: depending on sector

INDUSTRY CASE: NORDIC MILK, %



- **Scope 1:** fuels and energy
- **Scope 2:** purchased electricity
- **Scope 3:** purchased goods (mainly milk)

ENERGY PRODUCTION CASE: UTILITAS, %

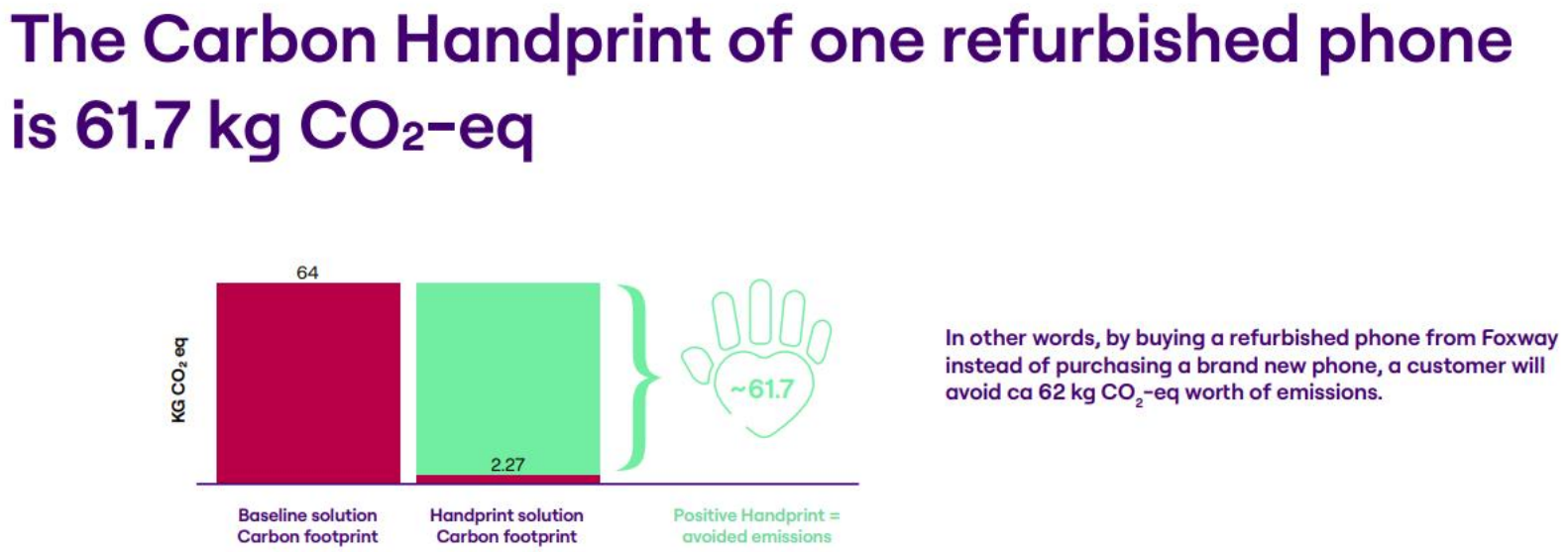


- **Scope 1:** combustion of energy sources

Source: https://nordicmilk.eu/sustainable-future/
https://www.utilitas.ee/wp-content/uploads/2022/07/Utilitas_aruanne-2021_ENG_FINAL.pdf

But what about Scope 4?

- Relatively new concept
- Similar as “handprint” approach
- Similar as consequential LCA
- Emissions reductions achieved through the use of a company’s products or services
- Very important for communication, communicated separately

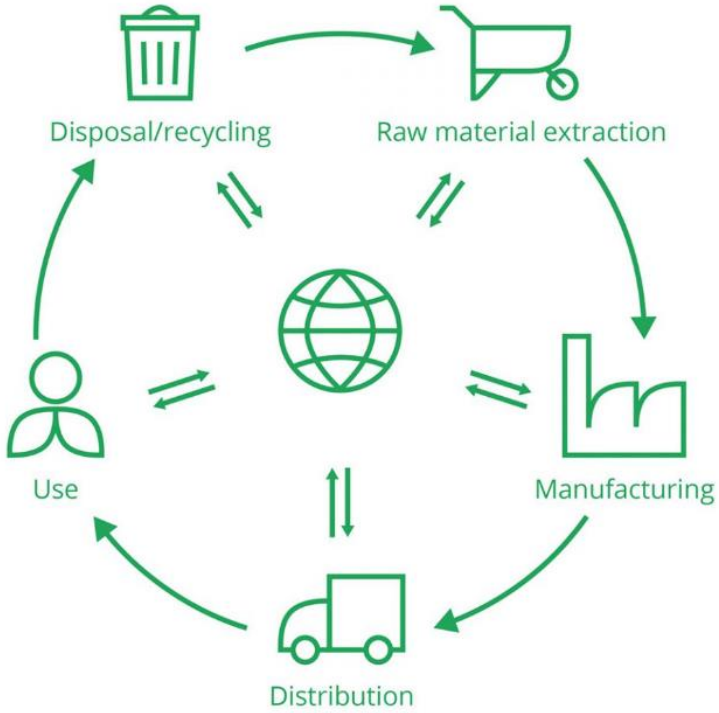


Source: https://www.foxway.com/wp-content/uploads/2021/06/foxway-handprint-report-mobile-eng.pdf

Carbon footprint of product or service Life Cycle Assessment (LCA)

- ISO standards: ISO 14000 series, mainly 14040 ja 14044, 14067 + additionally sectorial standards may apply
- System boundaries: Cradle to gate, cradle to grave or cradle to cradle – depending on the purpose of the analysis
- Various impact categories (not necessarily only CO2e)

Important steps:
1. Goal and scope definition
2. Inventory analyses
3. Impact assessment
4. Interpretation



Source of the image: https://pre-sustainability.com/articles/life-cycle-assessment-lca-basics/

Result: CO2e per product/service unit Identification of hot-spots

A good understanding of product performance
More detailed assessment = more work, in case of large variety of different product

Environmental Product Declaration

- Based on LCA + additional specific standards and methodological rules
- Standardized format of results
- Especially important for building sector
- Verified reports are published by EPD program operators

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Geography, by two-letter ISO country code or regions. The International EPD System only.																		
EU	EU	EU	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./dem	Transport	Waste processi	Disposal	Reuse	Recovery	Recycling

EPD

ETS NORD

ENVIRONMENTAL IMPACT DATA

The result is valid for the declared unit, 1 meter of circular ventilation duct dimension 125mm.
LCA results for other dimensions is presented in Annex I "LCA results for different product variations".

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	4,29E0	1,85E-1	-1,91E-1	4,28E0	9,17E-2	2,5E-1	MND	MND	MND	MND	MND	MND	MND	3,3E-3	1,37E-2	1,62E-1	4,22E-4	-2,67E0
GWP – fossil	kg CO_2e	4,25E0	1,85E-1	5,91E-2	4,49E0	9,25E-2	0E0	MND	MND	MND	MND	MND	MND	MND	3,3E-3	1,37E-2	1,64E-1	4,21E-4	-2,68E0
GWP – biogenic	kg CO_2e	3,32E-2	6,2E-5	-2,5E-1	-2,17E-1	4,94E-5	2,5E-1	MND	MND	MND	MND	MND	MND	MND	9,17E-7	0E0	-2,15E-3	8,35E-7	8,48E-3
GWP – LULUC	kg CO_2e	4,34E-3	1,02E-4	2,22E-4	4,66E-3	3,28E-5	0E0	MND	MND	MND	MND	MND	MND	MND	2,79E-7	4,85E-6	4,28E-5	1,25E-7	-6,76E-4
Ozone depletion pot.	kg CFC_{11}e	3,35E-7	3,94E-8	8,12E-9	3,82E-7	2,1E-8	0E0	MND	MND	MND	MND	MND	MND	MND	7,12E-10	3,11E-9	5,5E-9	1,73E-10	-8,81E-8
Acidification potential	mol H^+e	1,37E-1	2,19E-3	4E-4	1,39E-1	3,78E-4	0E0	MND	MND	MND	MND	MND	MND	MND	3,45E-5	5,59E-5	4,71E-4	4E-6	-1,32E-2
EP-freshwater[3)]	kg Pe	2,78E-4	1,73E-6	2,65E-6	2,82E-4	7,74E-7	0E0	MND	MND	MND	MND	MND	MND	MND	1,33E-8	1,15E-7	2,6E-6	5,09E-9	-1,61E-4
EP-marine	kg Ne	8,16E-3	5,96E-4	9,89E-5	8,85E-3	1,12E-4	0E0	MND	MND	MND	MND	MND	MND	MND	1,52E-5	1,66E-5	1,08E-4	1,38E-6	-2,55E-3
EP-terrestrial	mol Ne	5,59E-1	6,61E-3	1,09E-3	5,67E-1	1,24E-3	0E0	MND	MND	MND	MND	MND	MND	MND	1,67E-4	1,83E-4	1,25E-3	1,52E-5	-2,9E-2
POCP ("smog")	kg NMVOCe	2,04E-2	1,8E-3	3,92E-4	2,26E-2	3,8E-4	0E0	MND	MND	MND	MND	MND	MND	MND	4,59E-5	5,62E-5	3,38E-4	4,4E-6	-1,38E-2
ADP-minerals & metals	kg Sbe	8,98E-5	5,61E-6	7,56E-7	9,62E-5	2,5E-6	0E0	MND	MND	MND	MND	MND	MND	MND	5,03E-9	3,7E-7	2,1E-6	3,85E-9	-4,81E-5
ADP-fossil resources	MJ	4,08E1	3E0	1,08E0	4,48E1	1,39E0	0E0	MND	MND	MND	MND	MND	MND	MND	4,54E-2	2,06E-1	5,31E-1	1,18E-2	-2,23E1
Water use[2)]	m^3e depr.	2,69E0	9,78E-3	1,49E-2	2,71E0	4,49E-3	0E0	MND	MND	MND	MND	MND	MND	MND	8,46E-5	6,64E-4	7,61E-3	5,45E-4	-1,25E0

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionising radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Source: https://www.etsnord.fi/wp-content/uploads/NTO-spiral-duct-EPD-ETS-NORD.pdf

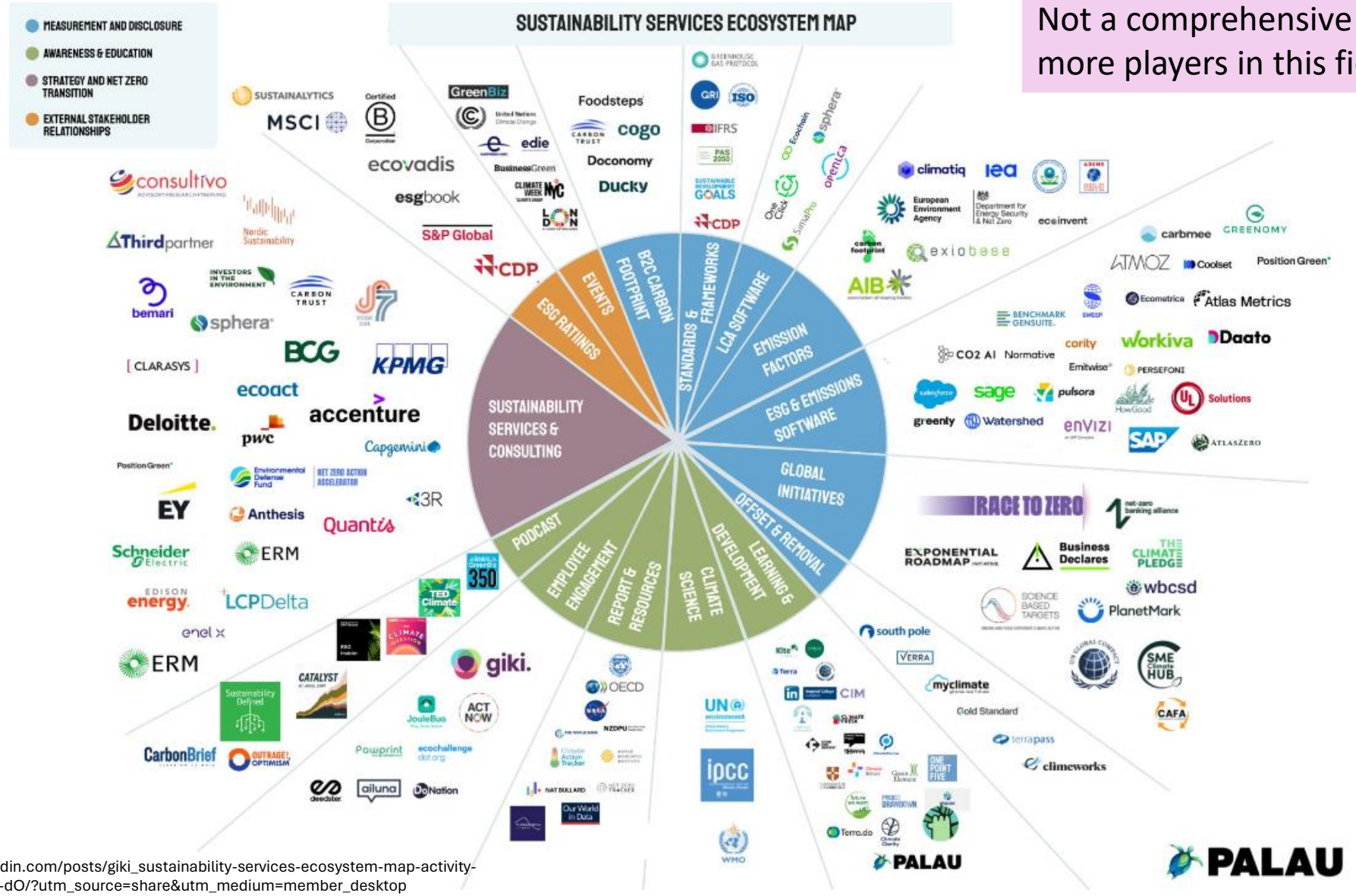
Questions?

Practical challenges?

How to start managing the carbon footprint?

Measuring

- **Preparations**
- Understand your purpose, main requirements of relevant standards, assessment scope, identify questions and challenges, ask external advice if needed
- Identify what data you have and where it is (preliminary mapping by categories/processes)? Where are the data gaps and how to solve it?
- Identify the tools and databases needed for the process (operational data units should match with the emission factors later)
- Set the plan and timeline (who is doing what and when)
- Get all parties involved to the process “around the same table” – especially the people who collect operational data!
- **Data collection**
- **Impact assessment calculations**
- **Results report**
- **Strategy and impact reduction plan**



Not a comprehensive list, much more players in this field!

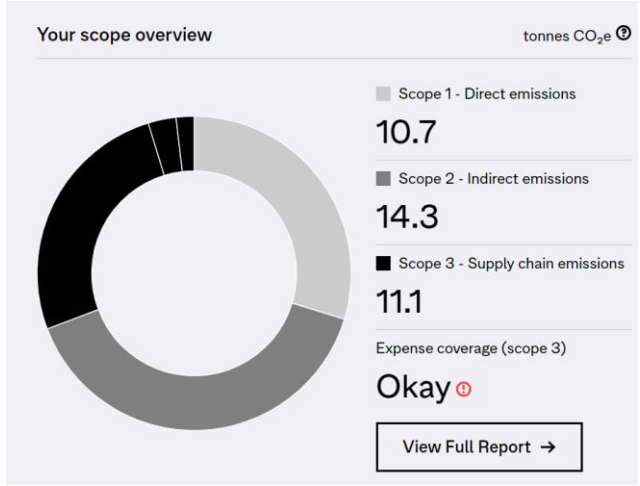
Source: https://www.linkedin.com/posts/giki_sustainability-services-ecosystem-map-activity-7171146961264349185-O-dO/?utm_source=share&utm_medium=member_desktop

These are just a few examples!

Tools and emission factors databases

Free sources -> usually scope 3 is limited (suitable for service company) or based on monetary emission factors

- UK Emission factors database (not a tool, but long list of EFs)
- Estonian GHG calculation tool for organisations (in Estonian)
- Business Carbon Calculator
- Sustaxo Tool for organisations
- Tallinn University of Technology (TalTech) carbon footprint calculator for organisations
- Lots of tools for agriculture (free for the farmer), i.e Farm Carbon Toolkit, Cool Farm Toolhttps://coolfarm.org/

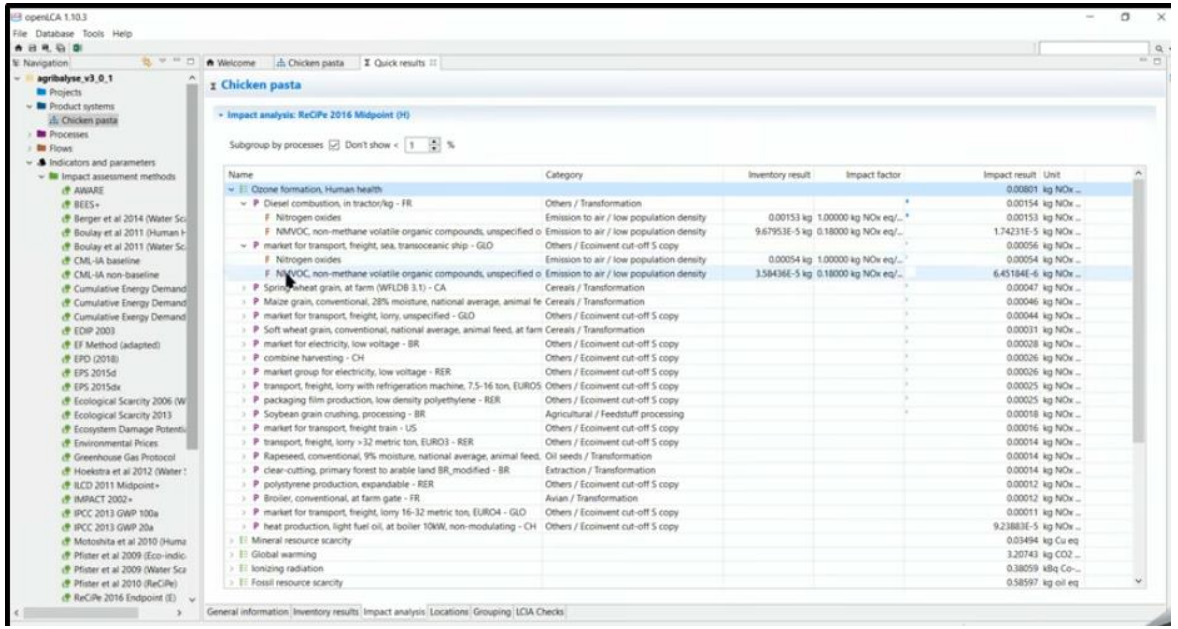


Tools for purchase:

- https://www.climatiq.io/
- https://greenspect.eu/
- etc

LCA tools:

1. Software: SimaPro, GaBi, OpenLCA
2. Databases: Ecoinvent + others. NB Must fit with the Software! E.g https://nexus.openlca.org/databases



Tips and tricks for your measurement journey

GENERAL SUGGESTIONS

- In the long term it is wise to build up internal capacity, but mostly external help is used at least at the first time
- If you intend to purchase a tool usage license, be critical what you actually get (1 demo is may not be enough)
- Industries and services that include physical materials/products -> freely available tools not suitable for Scope 3 based on my experiences

SPECIFIC QUESTIONS

- Scope 2 – electricity/heat emission factors -> are they specific for your country?
- Scope 3 included – what is specifically included (sometimes only business travel and wastes; if materials needed – what exactly is available in tool)
- Scope 3 – is calculation based on monetary units or physical/volume units?
- How are the final results presented? Too aggregated is not good.

Remember - it's a journey not a destination ☺

Questions?