ESU-services

fair consulting in sustainability

2024

Environmental report and product declaration 2021 (preliminary)

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Photo: ESU-services sponsored a new woodchips based heating in the Region of Schaffhausen for a community accommodation operated by Naturfreunde Schweiz.

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About us	ESU-services Ltd. was founded in 1998. Its core objectives are consulting, coaching, training, and research in the fields of life cycle assessment (LCA), carbon footprints, water footprint in the sectors energy, civil engineering, basic minerals, chemicals, packaging, telecommunication, food and lifestyles. Fairness, independence, and transparency are substantial characteristics of our consulting philosophy. We work in an issue-related manner and accomplish our analyses without prejudice. We document our studies and work transparently and comprehensibly. We offer fair and competent consultation, which makes it possible for clients to control and continuously improve their environmental performance. The company has worked for various national and international companies, associations, and authorities. In some areas, team members of ESU-services performed pioneering work such as development and operation of web-based LCA databases or quantifying environmental impacts of food and lifestyles.
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Abstract

Sustainability is at the core of our consulting activities. With this report, our customers are informed about the measures we take to reduce the environmental footprint of our own consulting services. Furthermore, we show how we work to improve our social and economic sustainability.

In this report, the environmental impacts of our services are calculated and shown in an environmental product declaration (EPD). Business trips are a decisive factor affecting the impacts of individual projects. Therefore, they are calculated separately from the general impacts of the service. Another key factor, which is seldom considered in this type of reporting, is the insurances (pension, accidents) we provide to our employees.

Using this data basis, we can also report the full environmental impacts of our services after finalization of a project.

Train travel is our preferred means of transportation, for both national and international business trips. If it is necessary to use a car, we rely on the car-sharing organization Mobility. Airplane trips are not compensated to avoid offering disadvantageous incentives (for further explanation, please see chapter 2.3.3).

Our suppliers are also chosen based on their sustainable performance. For example, we use Fairphones and either recycled or FSC-certified paper. We use naturemade star certified electricity “CleanSolution StarFlex” provided by SH power, our local provider.

The present Corona situation changed our work style considerable and home office or mobile office form now an important part of our working location. We offer all staff members the opportunity to work part time in order support families and work-life balance. Salaries are based on talent and not influenced by age or gender. Additionally, we actively discourage structural overtime.

We actively support our customers in developing sustainable business practices. There are special consultancy rates for NGOs. Furthermore, we support all types of media with scientific sound information on life cycle assessment results.

Kurzfassung

Die Schonung der natürlichen Ressourcen und eine nachhaltige Wirtschaftsweise stehen nicht nur im Mittelpunkt unserer Beratungsangebote. Auch für die Führung unseres Unternehmens sind dies wichtige Massstäbe.

Im vorliegenden Umweltbericht werden die Umweltbelastungen, der durch uns angebotenen Dienstleistungen, unter Berücksichtigung möglichst aller relevanten Aspekte untersucht. Im Bericht werden dazu die wichtigsten Verursacher der Umweltbelastungen aufgezeigt. Der Bericht dient dazu Verbesserungsmöglichkeiten festzulegen. Mit einer Umweltdeklaration werden die Belastungen für die angebotenen Dienstleistungen ausgewiesen.

Der Umweltbericht der ESU-services GmbH zeigt, dass die jetzt verursachten Umweltbelastungen pro Beratungsstunde vor allem über Geschäftsreisen beeinflusst werden können. Nach Möglichkeit versuchen wir alle Reisen in Europa mit der Bahn durchzuführen. Für unbedingt notwendige Autofahrten gibt es eine Mitgliedschaft beim Carsharing «Mobility». Flugreisen werden nicht kompensiert, um falsche Anreize zu vermeiden (Erklärung siehe Kapitel 2.3.3).

Andere Faktoren wie die Höhe des Energie- und Wasserverbrauchs und Infrastruktur sind nur begrenzt beeinflussbar. Für unseren Strombedarf kaufen wir eine entsprechende Menge Ökostrom, die mit dem naturemade star Label zertifiziert wurde, bei unserem lokalen Versorger SH Power ein.

Für die Rentenversicherung ist ESU-services Mitglied bei der Versicherung „Abendrot“, die eine nachhaltige Anlagepolitik betreibt.

Das Pendeln hängt vom Wohnort der Mitarbeiter ab und ist damit auch eine individuelle Entscheidung. Seit Beginn der Corona Epidemie arbeiten wir deutlich mehr im Homeoffice und reduzieren so die Anzahl von Arbeitswegen und Geschäftsreisen.

Wir unterstützen unsere Kunden bei der Reduktion von Umweltbelastungen. NGO’s wird bei Projekten ein zusätzlicher Rabatt gewährt. Ferner unterstützen wir qualitativ hochstehenden Journalismus in einer Vielzahl von Beiträgen für verschiedene Medien.

Contents

Abbreviations

	Deutsch	English
CH	Schweiz	Switzerland
EPD	Umweltproduktdeklaration	Environmental Product Declaration
ISO	Internationale Organisation für Normung	International Organization for Standardization
LCA	Ökobilanz	Life Cycle Assessment
GWP	Klimaänderungspotential	Global Warming Potential
PCR	Produktkategorie-Regeln	Product Category Rules
RER	Europa	Europe
SH	Schaffhausen	Schaffhausen
UBP	Umweltbelastungspunkte	Eco-points
PEF	Ökologischen Fußabdruck für Produkte	Product environmental footprint

1 About ESU-services Ltd.

ESU-services Ltd. was founded in 1998. Its core business is research, consulting, review, and training in the field of Life Cycle Assessment (LCA). This methodology investigates the environmental aspects of products and services from cradle to grave, from resource extraction to manufacturing, use, and end-of-life treatment. We also work with related methods such as carbon footprinting and Input-Output-Analysis.

Fairness, independence, and transparency are the main characteristics of our consulting philosophy. We work in an issue-related manner and carry out our analyses without prejudice. We document our studies and our work in a transparent and comprehensive manner. We offer fair and competent consultation, which enables our clients to control and continuously improve their environmental performance.

ESU-services covers several economic sectors such as energy, basic minerals, metals and chemicals, biomass, transportation, waste management, information technology, food, and lifestyles. ESU-services also contributes to the development of impact assessment methods such as ecological scarcity method. Since 2007, ESU-services has been the Regional SimaPro Competence Centre of Switzerland, Germany, Austria, and Liechtenstein.

The range of services offered by ESU-services GmbH comprises the following core areas:

- Project management in ground-breaking life cycle assessment projects such as ecoinvent and the "Life Cycle Assessment of Energy Products".
- LCA case studies on energy systems, biofuels, food, packaging, lifestyles, transport, electronics, materials, construction products, and many other sectors[1].
- Environmental extended input-output analysis.
- Other methods such as CO_2-balances (carbon footprint) and water balances, environmental footprint, energy analyses, ecological footprint, biodiversity footprint, or transport balances.
- Material and substance flow analyses (MFA and SFA).
- Balance of a company's total emissions including the flow of goods (organizational life cycle assessment).
- Consulting on life cycle and supply chain management.
- Environmental declarations and validation of EPDs (environmental product declaration)
- Product Environmental Profile (PEP) and verifications
- Development of Product Category Rules (PCR) for EPDs
- Simplified web tools and Excel parameter models
- Life cycle inventory analysis according to the ecoinvent methodology, e.g. for food or photovoltaics.
- Sales of life cycle inventory data for various areas.
- Development of impact assessment methods, e.g. method of ecological scarcity (environmental impact points).
- Critical review according to ISO 14040, 44, 67 and validation/verification according to other standards
- Advice on the development of standards for life cycle assessment.

[1] Download of further information regarding the LCA methodology and how to start a study on https://www.esu-services.ch/address/tender/

- Sales of and training for the world's leading LCA software SimaPro, the web-based LCA tool e-DEA, or the simplest LCA solution EarthSmart.
- Articles for scientific journals, review, editor for the Int J LCA
- Education and training, lectures, support for journalists
- Organization of workshops such as the life cycle assessment discussion forum.

2 Environmental product declaration

2.1 Methodology

This implementation of an environmental product declaration is broadly based on the product category rules (PCR) for environmental science and engineering research and development services (PCR 2012). These PCR are based on ISO Standard 14025 for the implementation of environmental declarations (International Organization for Standardization (ISO) 2006a).

The PCR for “research and experimental development services in natural sciences and engineering” has not been updated since 2012 (due to lack of interest). Thus, it is not valid anymore and not available on the environdec webpage.

Deviating from the PCR, the latest versions of the indicators as described in the general programme instructions for the international system (EPD 2019) is used.

The life cycle assessment (LCA) method according to ISO 14072 was used to quantify the environmental impacts (International Organization for Standardization (ISO) 2014) for the whole organization. The impacts per consulting hour are recorded according to ISO 14040 (International Organization for Standardization (ISO) 2006b). This method is based on a life-cycle approach, whereby the environmental impacts of a product or organization are recorded and evaluated from the extraction of raw materials through production and use to the disposal phase (from cradle to grave).

No external review or verification of the report has been conducted to date. It is therefore currently an "Environmental Supplier Declaration according to ISO 14021" (International Organization for Standardization (ISO) 2016).

2.2 Goal

This environmental report examines the environmental impacts of the services we offer, considering as many relevant aspects as possible. The report identifies the main sources of environmental pollution. The purpose of the report is to inform our customers about environmental impacts caused by our services and identify potential areas for improvement. Our first annual environmental report was published in 2014.

2.3 Scope and system description

2.3.1 Functional unit

The functional unit of the EPD refers to 1 hour of consultancy services provided in 2021.

2.3.2 System boundaries

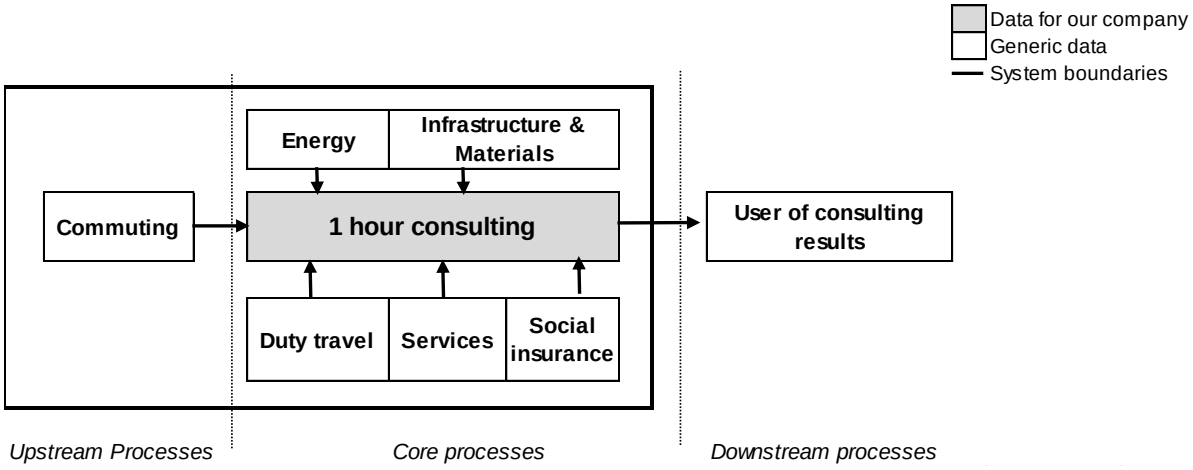
According to the product category rules used (PCR 2012), all environmentally relevant resource consumption and emissions for the investigated system are considered in the LCA as shown in Tab. 2.1. For the impact assessment, the latest implementation of the PEF method in SimaPro was used. A

distinction is made between upstream and core processes. The standard "upstream processes" include only individual commuting, as this is not causally related to the service sold. All environmentally relevant processes used for core services are reported under the category "Core processes".

In contrast to the requirements of the above-mentioned PCR, this life cycle assessment is prepared without cut-off criteria. This means that all processes are included, even if their contribution to the overall balance sheet is below a certain threshold. In addition, some processes, such as statutory social insurance, are also included in the balance sheet, although this is not required under the underlying PCR. The reported burdens are therefore higher (see result in chapter 2.5) than is the case for balance sheets that are carried out exactly in accordance with this PCR.

- Upstream process:
    - Individual commuting (not paid by ESU-services)
- Core processes:
    - Energy consumption (electricity and heating)
    - Infrastructure and material consumption (share of buildings, water consumption, paper, IT and electronic equipment, tea and coffee)
    - Business trips including hotel accommodation
    - Social security funds and insurances
    - Purchased services (telecommunications, training, and accounting)
    - Disposal of waste and wastewater

Tab. 2.1 System description for calculating the organizational LCA (PCR 2012)



ESU-services trades with the software SimaPro. There are no physical flows involved in this business (e.g. no CDs, etc.) and ESU does not gain ownership on the software, but only distributes the codes to the customers. But, in principle this could also be considered as a purchased service, which is further delivered to our customers. So far there are no data available on the impacts of the software development. Thus, this issue is excluded from the EPD (and also not mentioned in the PCR).

2.3.3 Offsetting / compensation of environmental impacts

Today many companies use carbon offsetting, compensation, or neutralization as a means of environmental management. They even claim to be carbon neutral.

A carbon offset is a reduction in emissions of carbon dioxide or other greenhouse gases made to compensate for emissions made elsewhere. Offsets are measured in tonnes of carbon dioxide equivalent. One tonne of carbon offset represents the reduction of one tonne of carbon dioxide or its equivalent in other greenhouse gases.

There are service providers and projects on the market that allow offsetting of greenhouse gas emissions related to e.g. travel by air or car or any other activity. It is tempting to simply pay a small amount of money to offset all the emissions related to one's own activities and claim that the business is carbon neutral.

However, in our point of view this is a misleading approach that lacks purpose. It is also not supported by the underlying standards applied for this EPD.

We, as a global community, not only need to reduce greenhouse gas emissions to net zero, but also must immediately capture climate gases that are already in the atmosphere. This is not possible if each company or individual only implements simple and cheap solutions or even tries to pass on the responsibility for their own shortcomings to others by purchasing offsets.

To slow down climate change, it is not sufficient to just burn fossil fuels more efficiently, it is necessary to completely stop using and burning them.

Further possible shortcomings of offsetting are:

- The reduction is achieved in future and not today. So, it does not support the prevention of tipping points in climate change. Furthermore, it might be difficult to ensure that the future capture is really achieved. So for example a forest fire can destroy a new planted tree and then no carbon capture will be achieved.
- The reduction is a theoretical value assuming that the compensation partner would have done business as usual (e.g. installing a natural gas heating instead of moving alone to a new technology like heat pumps).
- The storage time of carbon needs to be several thousands of years to avoid overstepping certain climate goals. Carbon capture and removal projects cannot always guarantee such a long-time frame.
- Pros and cons are not balanced. The owner of a heat pump or PV panel sells the declaration right to a compensation partner, but still profits from the green image of the installations in their premises (or might forget about accounting for the bought CO_2-pollution)
- Rebound effects are not considered. A compensated cruises seems to be fine for the climate and thus more people tend to buy a fully unsustainable holiday package.
- The income from selling climate certificates cannot be spent immediately and compensation measures are initiated much later than the initial emission to be compensated took place.

With the option to offset, we tend to only improve the internal situation where the costs are higher than for the offset, e.g. by opting for a flight and missing the opportunity to travel by train, powered by green electricity. But, with climate compensation, the maximum reduction of total CO_2-emissions is limited to 50% which is not sufficient to reach climate goals.[2]

A good approach would be if all entities acted together and improved the situation regarding their individual, specific key contributors to their global warming potential.

[2] https://www.esu-services.ch/fileadmin/download/jungbluth-2009-DF37-7.pdf

Paying money to other companies or individuals can be done as a voluntary measure, e.g. by supporting so-called Gold Standard projects that also bring social benefits. In other words, carbon offsets or climate certificates are not suitable as a substitute for one's own actions.

If emissions already occurred, it is helpful if these previous emissions are offset. However, if a decision must be made regarding future emissions: No climate certificate in the world can undo one emitted ton of CO_2, regardless of if you offset it once, twice, or as many times as you want.

2.4 Life cycle inventory analysis (LCI)

Available information and own data (such as electricity, heating, and water billing, etc.) were primarily used to model the core processes.

The data for business trips (transport, overnight stays) was extracted from the expense reports. Information on social insurance is taken from the annual financial statements for the company. Only the employer's contribution to the insurance is considered.

The consumption of coffee, tea, and paper was recorded according to receipts and our own estimates. The environmental impacts caused by the manufacture of computers and printers have been broken down to the assumed total service life of a device of 7 years or longer if actual devises are older.

The ESU database was used as background data for transport and materials (ESU-services 2024a). Data for the production of coffee, tea and provision of overnight stays are taken from the company's own database (ESU-services 2024b). For purchased services and social security, expenditure data is linked to data from the Swiss environmental-extended input-output table to calculate environmental impacts (Jungbluth et al. 2011). The modelling and evaluation was carried out in the LCA software SimaPro 2024.

Data for the heating of the rented office were not yet available (and thus same data as in the last year are applied). Thus, the environmental report is published in a preliminary version.

The complete life cycle inventory for the environmental report is shown in Tab. 2.2.

Tab. 2.2 Unit process raw data per year of consulting services provided by ESU-services Ltd. in 2021

	Name	Location	Infrastructur	Unit	environmental report, 2021	Uncertainty type	StandardDeviation95%	GeneralComment
	Location				ESU			
	InfrastructureProcess				0			
	Unit				a			
	environmental report, 2021	ESU	0	a	1			
	environmental report, EE-IOT 2021	ESU	0	a	0			
heat	light fuel oil, burned in boiler 100kW, average	CH	0	MJ	1.36E+4	1	1.05	(1,1,1,1,1,1,BU:1.05); company data; from utility balance
electricity	electricity, low voltage, certified electricity, at grid	CH	0	kWh	0	1	1.31	(2,3,1,1,3,5,BU:1.05); direct electricity; own assumption
	electricity, low voltage, at grid	CH	0	kWh	1.58E+2	1	1.31	(2,3,1,1,3,5,BU:1.05); general electricity (staircase lighting); Kurt Peyer Nebenkosten
	electricity, low voltage, parameterized, at grid	KWM	0	kWh	1.89E+2	1	1.31	(2,3,1,1,3,5,BU:1.05); electricity use in the office; SH Power Rechnungen
	electricity, low voltage, ewz oekopower 2010, at grid	ZH	0	kWh	8.25E-1	1	1.12	(3,3,1,1,1,1,BU:1.05); Electricity consumption of internet server provider; Metanet.ch
	Heat, waste	-	-	MJ	1.25E+3	1	1.31	(2,3,1,1,3,5,BU:1.05); calculated from electricity uses; own assumption
Building	building, multi-storey	RER	1	m3	1.57E-1	1	3.00	(1,2,1,1,1,1,BU:3); 80 years life time, room height incl. Floor area about 3m; own calculation
Paper	paper, recycling, no deinking, at plant	RER	0	kg	4.80E+0	1	1.30	(4,1,1,1,1,5,BU:1.05); Use of recycling paper for printers; Balance sheet
	paper, recycling, no deinking, at plant	RER	0	kg	4.76E+1	1	1.30	(4,1,1,1,1,5,BU:1.05); Use of toilet paper, recycling quality; own calculation assuming annual usage of 21kg of toilet paper per pax
Beverages	ground coffee, in PET/EVOH/PE-bag, at household	RER	0	kg	0	1	1.30	(4,1,1,1,1,5,BU:1.05); 1 person à 40%; 1 person à 80%; own calculation
	black tea, Darjeeling, conventional, at regional storage	DE	0	kg	1.56E+0	1	1.30	(4,1,1,1,1,5,BU:1.05); 1 pax à 80%; own calculation
Waste	disposal, municipal solid waste, 22.9% water, to municipal incineration	CH	0	kg	1.60E+1	1	1.30	(4,1,1,1,1,5,BU:1.05); Estimation, 5 kg per week; own assumption
Water	tap water, unspecified natural origin CH, at user	CH	0	kg	2.05E+4	1	1.21	(4,1,1,1,1,1,BU:1.05); company data; property management
	treatment, sewage, to wastewater treatment, class 3	CH	0	m3	2.05E+1	1	1.21	(4,1,1,1,1,1,BU:1.05); calculated with water balance; own assumption
Computer	desktop computer, without screen, at plant	GLO	0	unit	2.73E-1	1	1.05	(1,1,1,1,1,1,BU:1.05); 3 PC, Average life time 11 years; own assumption
	laptop computer, at plant	GLO	0	unit	7.14E-1	1	1.05	(1,1,1,1,1,1,BU:1.05); 5, Average life time 7 years; own assumption
	LCD flat screen, 17 inches, at plant	GLO	0	unit	4.00E-1	1	1.05	(1,1,1,1,1,1,BU:1.05); 4, Average life time 10 years; own assumption
	printer, laser jet, b/w, at plant	GLO	0	unit	1.00E-1	1	1.05	(1,1,1,1,1,1,BU:1.05); 1, Average life time 10 years; own assumption
	toner module, laser jet, b/w, at plant	GLO	0	unit	3.00E+0	1	1.05	(1,1,1,1,1,1,BU:1.05); units used; expense accounts
Transports	transport, average train, SBB mix	CH	0	pkm	6.32E+3	1	2.00	(1,1,1,1,1,1,BU:2); Commuting; expense accounts
	transport, passenger car, fleet average	CH	0	pkm	0	1	2.00	(1,1,1,1,1,1,BU:2); Buisness trips; expense accounts
	transport, freight, light commercial vehicle	CH	0	tkm	0	1	2.00	(1,1,1,1,1,1,BU:2); Buisness trips; expense accounts
	transport, aircraft, passenger, Europe	RER	0	pkm	0	1	2.00	(1,1,1,1,1,1,BU:2); Business trips; expense accounts
	transport, aircraft, passenger, intercontinental	RER	0	pkm	0	1	2.00	(1,1,1,1,1,1,BU:2); Business trips; expense accounts
	transport, average train, SBB mix	CH	0	pkm	2.00E+2	1	2.00	(1,1,1,1,1,1,BU:2); Business trips by Swiss rail; expense accounts
	transport, average train	DE	0	pkm	1.00E+3	1	2.00	(1,1,1,1,1,1,BU:2); Business trips; expense accounts
	transport, average train	IT	0	pkm	0	1	2.00	(1,1,1,1,1,1,BU:2); Business trips; expense accounts
	transport, average train	BE	0	pkm	0	1	2.00	(1,1,1,1,1,1,BU:2); Business trips; expense accounts
	transport, average train	FR	0	pkm	0	1	2.00	(1,1,1,1,1,1,BU:2); Business trips; expense accounts
	transport, average train	AT	0	pkm	0	1	2.00	(1,1,1,1,1,1,BU:2); Business trips; expense accounts
Hotel	guest-night, average European hotel	RER	0	unit	0	1	1.05	(1,1,1,1,1,1,BU:1.05); Business trips; expense accounts
Financial services	G66, insurance and pension funding	CH	0	CHF2005	5.56E+4	1	1.05	(1,1,1,1,1,1,BU:1.05); Social insurance, share of company; Balance sheet
	G80, education	CH	0	CHF2005	0	1	1.05	(1,1,1,1,1,1,BU:1.05); Training; Balance sheet
	G71u74, other business activities	CH	0	CHF2005	3.40E+3	1	1.05	(1,1,1,1,1,1,BU:1.05); Accounting; Balance sheet
	G64, post and telecommunications	CH	0	CHF2005	1.40E+3	1	1.05	(1,1,1,1,1,1,BU:1.05); Telecommunication services; Balance sheet

2.5 Life cycle impact assessment

In this chapter the environmental impacts are presented according to the different environmental indicators.

2.5.1 Category indicators according to environmental footprint method

Tab. 2.3 shows the environmental impacts of upstream and core processes according to the environmental indicators in the environmental footprint method. Results are presented for the 16 different environmental indicators according to EU-JRC recommendation (Sala et al. 2018). The share of the processes on every environmental indicator is highlighted by a coloured scale, in which the highest value is purple and the lowest is light blue.

The process social insurance has the highest share on the total impact of all indicators.

Even though the total number of person kilometres travelled for commuting is higher than for business trips, the process business trips is responsible for a higher share of the total impact of the indicators. This is not only due to hotel stays (which are included in business trips), but also due to the country-specific electricity mixes used for train travel abroad, which often have a higher environmental impact than the Swiss electricity mix used for commuting by train in Switzerland.

As the only upstream process, commuting contributes relatively little to the impact for all indicators. Furthermore, commuting is in the responsibility of the staff and not paid by ESU-services. With the possibility of home office it became less relevant.

Both commuting and business trips decreased significantly compared to previous years because of the corona crisis.

The process with the lowest contribution to the overall impact for all indicators is disposal. Since consultation is a service and uses only small quantities of material goods (compared to production), the disposal of materials is responsible for only a small share to the overall impacts.

The PEF category “Human toxicity, cancer – inorganics” had a value equal to 0, therefore it was not shown in the table.

It should be noted that environmental product declarations and reports from different programmes or initiatives cannot be compared with each other or can only be compared to a limited extent.

Tab. 2.3 Life cycle impact assessment per hour of ESU-services consulting in 2021 according to different environmental indicators.

Indicator	Unit	*UPSTREAM*	*Core processes*						TOTAL	TOTAL without travel
		Commuting	Energy	Infrastruct. & Materials	Buisness trips	Social insurance	Services	Disposal		
Climate change	kg CO2 eq	9.2E-03	2.7E-01	9.3E-02	2.1E-02	8.0E-01	1.3E-01	3.2E-03	1.3E+00	1.3E+00
Share	%	*1%*	*20%*	*7%*	*2%*	*61%*	*10%*	*0%*	*100%*	*98%*
Ozone depletion	kg CFC11 eq	5.4E-10	6.5E-09	2.6E-09	7.7E-10	1.3E-06	1.9E-07	9.5E-11	1.5E-06	1.5E-06
Share	%	*0%*	*0%*	*0%*	*0%*	*87%*	*12%*	*0%*	*100%*	*100%*
Ionising radiation	kBq U-235 eq	1.3E-02	5.6E-02	2.5E-02	1.6E-02	2.8E-01	4.1E-02	7.4E-04	4.3E-01	4.1E-01
Share	%	*3%*	*13%*	*6%*	*4%*	*65%*	*9%*	*0%*	*100%*	*96%*
Photochemical ozone form	kg NMVOC eq	3.0E-05	6.4E-04	3.0E-04	7.7E-05	3.3E-03	5.3E-04	7.4E-06	4.9E-03	4.8E-03
Share	%	*1%*	*13%*	*6%*	*2%*	*68%*	*11%*	*0%*	*100%*	*98%*
Particulate matter	disease inc.	4.7E-10	2.1E-09	4.0E-09	8.8E-10	4.0E-08	6.0E-09	1.3E-10	5.3E-08	5.2E-08
Share	%	*1%*	*4%*	*7%*	*2%*	*75%*	*11%*	*0%*	*100%*	*98%*
Human toxicity, non-cancer	CTUh	3.9E-10	1.6E-09	7.1E-09	5.6E-10	1.7E-08	2.9E-09	2.9E-10	3.0E-08	2.9E-08
Share	%	*1%*	*5%*	*24%*	*2%*	*57%*	*10%*	*1%*	*100%*	*98%*
Human toxicity, cancer	CTUh	1.3E-11	4.1E-11	8.4E-11	1.9E-11	6.3E-10	1.1E-10	7.5E-12	9.1E-10	8.9E-10
Share	%	*1%*	*5%*	*9%*	*2%*	*70%*	*12%*	*1%*	*100%*	*98%*
Acidification	mol H+ eq	3.7E-05	3.8E-04	6.0E-04	7.9E-05	3.0E-03	4.9E-04	1.7E-05	4.6E-03	4.5E-03
Share	%	*1%*	*8%*	*13%*	*2%*	*65%*	*11%*	*0%*	*100%*	*98%*
Eutrophication, freshwater	kg P eq	5.3E-06	2.7E-05	1.4E-04	1.2E-05	3.5E-04	6.2E-05	4.4E-06	6.0E-04	5.9E-04
Share	%	*1%*	*4%*	*24%*	*2%*	*58%*	*10%*	*1%*	*100%*	*98%*
Eutrophication, marine	kg N eq	8.2E-06	9.8E-05	1.9E-04	2.4E-05	6.7E-04	1.1E-04	8.0E-05	1.2E-03	1.2E-03
Share	%	*1%*	*8%*	*16%*	*2%*	*57%*	*9%*	*7%*	*100%*	*98%*
Eutrophication, terrestrial	mol N eq	8.2E-05	9.3E-04	1.0E-03	2.5E-04	6.9E-03	1.1E-03	4.7E-05	1.0E-02	1.0E-02
Share	%	*1%*	*9%*	*10%*	*2%*	*67%*	*10%*	*0%*	*100%*	*98%*
Ecotoxicity, freshwater	CTUe	1.7E-01	2.1E+00	3.5E+00	2.8E-01	1.4E+01	2.5E+00	1.1E+00	2.4E+01	2.4E+01
Share	%	*1%*	*9%*	*14%*	*1%*	*60%*	*10%*	*5%*	*100%*	*99%*
Land use	Pt	3.3E-01	1.7E-01	6.1E-01	3.9E-01	7.0E+00	9.2E-01	2.7E-03	9.4E+00	9.0E+00
Share	%	*3%*	*2%*	*6%*	*4%*	*74%*	*10%*	*0%*	*100%*	*96%*
Water use	m3 depriv.	8.8E-03	3.7E-03	6.2E-02	1.2E-02	3.2E-01	5.2E-02	1.5E-03	4.6E-01	4.5E-01
Share	%	*2%*	*1%*	*13%*	*3%*	*70%*	*11%*	*0%*	*100%*	*97%*
Resource use, fossils	MJ	2.1E-01	3.7E+00	1.1E+00	3.8E-01	1.4E+01	2.1E+00	1.9E-02	2.1E+01	2.1E+01
Share	%	*1%*	*18%*	*5%*	*2%*	*64%*	*10%*	*0%*	*100%*	*98%*
Resource use, minerals an	kg Sb eq	4.4E-08	1.0E-07	1.7E-05	5.5E-08	3.8E-05	7.3E-06	5.7E-09	6.2E-05	6.2E-05
Share	%	*0%*	*0%*	*27%*	*0%*	*61%*	*12%*	*0%*	*100%*	*100%*
Climate change - Fossil	kg CO2 eq	9.0E-03	2.7E-01	9.3E-02	2.1E-02	7.9E-01	1.2E-01	3.1E-03	1.3E+00	1.3E+00
Share	%	*1%*	*20%*	*7%*	*2%*	*61%*	*10%*	*0%*	*100%*	*98%*
Climate change - Biogenic	kg CO2 eq	5.1E-05	8.1E-05	1.5E-04	2.3E-04	5.4E-03	5.5E-04	7.5E-05	6.5E-03	6.3E-03
Share	%	*1%*	*1%*	*2%*	*4%*	*83%*	*8%*	*1%*	*100%*	*96%*
Climate change - Land use	kg CO2 eq	9.9E-05	4.8E-05	4.9E-05	1.2E-04	1.3E-03	1.7E-04	8.7E-07	1.8E-03	1.7E-03
Share	%	*6%*	*3%*	*3%*	*7%*	*73%*	*10%*	*0%*	*100%*	*93%*
Human toxicity, non-cancer	CTUh	9.6E-12	1.2E-10	3.5E-09	5.0E-11	8.3E-10	1.4E-10	8.7E-13	4.6E-09	4.6E-09
Share	%	*0%*	*3%*	*75%*	*1%*	*18%*	*3%*	*0%*	*100%*	*99%*
Human toxicity, non-cancer	CTUh	5.3E-11	2.3E-10	7.5E-10	8.3E-11	3.1E-09	4.9E-10	1.5E-11	4.7E-09	4.6E-09
Share	%	*1%*	*5%*	*16%*	*2%*	*66%*	*10%*	*0%*	*100%*	*98%*
Human toxicity, non-cancer	CTUh	3.3E-10	1.3E-09	2.9E-09	4.3E-10	1.3E-08	2.3E-09	2.8E-10	2.1E-08	2.0E-08
Share	%	*2%*	*6%*	*14%*	*2%*	*64%*	*11%*	*1%*	*100%*	*98%*
Human toxicity, cancer - or	CTUh	1.1E-12	1.6E-11	1.4E-11	4.6E-12	1.3E-10	2.1E-11	1.4E-13	1.9E-10	1.9E-10
Share	%	*1%*	*9%*	*7%*	*2%*	*70%*	*11%*	*0%*	*100%*	*98%*
Human toxicity, cancer - me	CTUh	1.2E-11	3.0E-12	2.2E-11	1.5E-12	8.3E-12	5.8E-11	9.5E-13	7.2E-10	7.1E-10
Share	%	*2%*	*0%*	*3%*	*0%*	*1%*	*8%*	*0%*	*100%*	*100%*
Ecotoxicity, freshwater - or	CTUe	9.6E-04	1.5E-04	4.4E-02	6.5E-05	6.1E-04	4.0E-02	8.5E-02	5.9E-01	5.9E-01
Share	%	*0%*	*0%*	*7%*	*0%*	*0%*	*7%*	*14%*	*100%*	*100%*
Ecotoxicity, freshwater - inc	CTUe	1.7E-02	8.4E-03	9.4E-01	8.3E-03	1.3E-02	3.2E-01	1.0E-02	4.8E+00	4.8E+00
Share	%	*0%*	*0%*	*20%*	*0%*	*0%*	*7%*	*0%*	*100%*	*100%*
Ecotoxicity, freshwater - me	CTUe	1.5E-01	1.9E-01	9.5E-01	5.9E-02	4.1E-01	2.4E+00	8.1E-02	1.9E+01	1.9E+01
Share	%	*1%*	*1%*	*5%*	*0%*	*2%*	*13%*	*0%*	*100%*	*100%*

2.5.2 Carbon footprint

An analysis for the global warming potential can be found in Fig. 2.1. The energy use for heating and electricity is the major impact in the core balance. If considering social insurances as well these are most relevant for the carbon footprint caused by ESU-services.

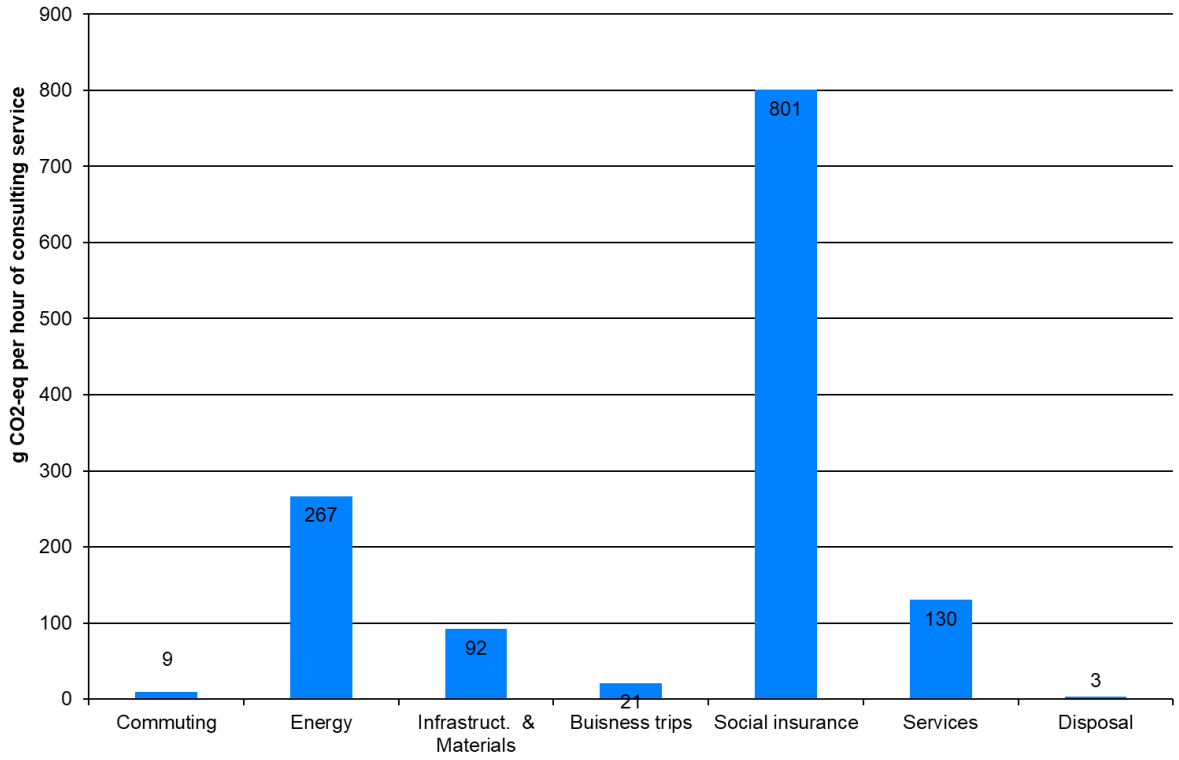


Fig. 2.1 Carbon footprint in kg CO_2-equivalents per hour of consulting service in 2021

2.5.3 Total environmental impacts according to ecological scarcity method

For our Swiss customers, information on the environmental impact points (UBP) calculated according to the ecological scarcity method 2021 (BAFU 2021) might also be of interest. These impacts are shown in Tab. 2.4 and Fig. 2.2.

The ecological scarcity method considers several types of environmental impact and resource use, which are weighted differently according to the objectives of Swiss environmental policy. The single score result reflects the results of most indicators assessed in the PEF method. Once again, the highest share is caused by the process social insurance. As already seen in chapter 2.4, commuting contributes less than business trips according to this method, due to the aforementioned reasons. Again, disposal contributes the smallest share of the overall impact.

Tab. 2.4 LCIA with the ecological scarcity method 2021. Eco-points per hour of consulting (BAFU 2021) in 2021

	Unit	*UPSTREAM*	*Core processes*						TOTAL	TOTAL without travel
		Commuting	Energy	Infrastruct. & Materials	Buisness trips	Social insurance	Services	Disposal		
Ecological scarcity 2021	UBP	3.9E+01	3.5E+02	2.5E+02	6.0E+01	2.0E+03	3.3E+02	1.3E+01	3059	2998
Shares		*1%*	*12%*	*8%*	*2%*	*66%*	*11%*	*0%*	*100%*	*98%*

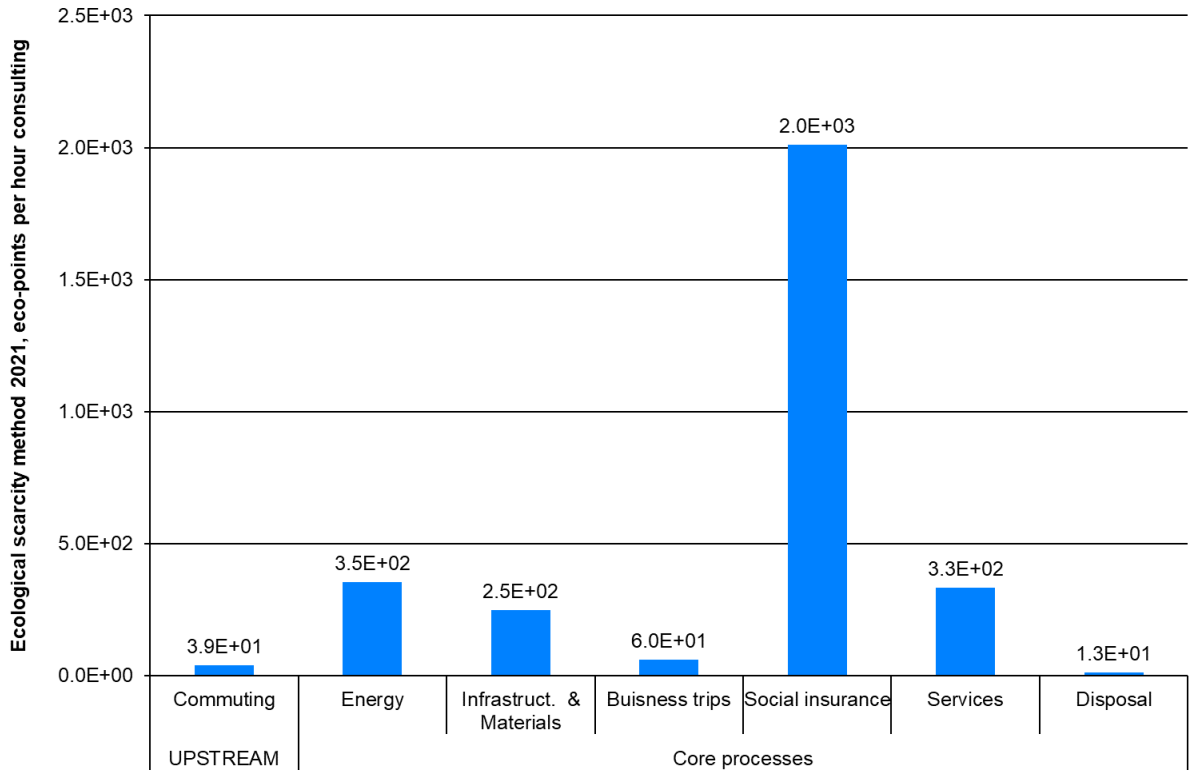


Fig. 2.2 LCIA with the ecological scarcity method 2021. Eco-points per hour of consulting (BAFU 2021) in 2021

2.5.4 Indicator results for use of resources and waste

If waste treatment is not included within the system boundaries, the EPD PCR require listing indicators for the use of resources and waste directly taken from the life cycle inventory. As this LCA includes the whole life cycle of all required products and services, it is not necessary to carry out this step.[3] All the related impacts are assessed.

2.6 Discussion of results

According to the product category rules (PCR 2012) for this type of service, it is possible to neglect materials in the balance sheet if they contribute less than 1% to the total environmental impacts. Practically, it seems almost impossible to determine. Our balance sheet neglects certain material inputs such as ballpoint pens. It was not possible to quantify the consumption of materials purchased only in insignificant quantities. In some cases, there is also an overlap in terms of which contributions can be better recorded through monetary annual accounts and which materials can be recorded directly.

In the product category rules (PCR 2012), social security and external services such as accounting are not explicitly mentioned. Our balance shows that they account for a quite relevant share of the environmental impacts caused. Therefore, it is recommended to include them in the EPD of consulting services.

[3] Updated clarification regarding indicators for use of resources and waste: https://www.environdec.com/News-archive/#15922, online 27.07.2020

3 Our commitment to sustainability

The environmental reports published for the consulting services of ESU-services Ltd. show that the environmental impacts caused per consulting hour can be highly influenced by the number of business trips involving air travel. Air travel depends on the projects carried out and on visits to international congresses. In 2021, we were able to make all trips by train.

The number of business trips and commuting was reduced substantial in 2021 compared to previous years because of the corona crisis.

For travel by car, the company has a subscription with the car-sharing provider Mobility, which, however, hardly had to be used. The possibility of online telephone conferences has been intensively used to avoid travelling abroad.

Our suppliers are also chosen based on their sustainable performance. For example, we use recycled or FSC-certified paper. We use the naturemade star certified electricity “CleanSolution StarFlex” provided for this region by SH power. The electricity mix consists of 97.5 % hydropower and 2.5 % new renewable energies.

Other factors, such as energy and water consumption and infrastructure, can only be influenced to a limited extent.

For staff pensions, ESU-services is a member of the "Abendrot" insurance company, which pursues a sustainable investment policy. Other insurance used by the company, such as AHV, are required by law and therefore cannot be influenced. So far it is not possible for us to assess and compare the environmental impact of obligatory accident insurance.

Commuting depends on where employees live and is therefore an individual decision. Since beginning of the corona crisis we work at home for a considerable share of working time and therefore avoid commuting.

We offer all staff members the opportunity to work parttime and in homeoffice to support families and work-life balance. Salaries are based on performance and not influenced by age or gender. Additionally, we actively discourage structural overtime.

We actively support our customers in developing sustainable business practices. There are special consultancy rates for NGOs.

ESU-services cooperates closely with the global SimaPro network. With a wide range of expertise available, we can offer unparalleled services and facilitate large international or multi-client projects. Within the partner network, we have developed and expressed our ethical core values. Collaborating with partners all over the world is crucial for ESU-services as we work to meet the precise needs of our customers.

We strengthen our commitment to provide all types of media with reliable and transparent information about environmental aspects. The main topics presented were requests concerning sustainable food consumption. Many media outlets took advantage of our services and based their articles partly on contributions by ESU-services. A full list of articles can be found here: https://www.esu-services.ch/de/publications/media/.

Title	Media	Date	Theme	Type
Der Fußabdruck der Feiertage	Rheinische Post	25.12.2021	Wie gross die Umweltbelastung verschiedener Weihnachtsbäume von der Aufzucht bis zur Entsorgung ist, hat das Schweizer Umweltbüro ESU Services ermittelt.	Zeitung
Ernährung: Warum vegane Alternativen nachhaltiger sind	annabelle	21.11.2021	Ratgeber zum Thema ökologischer Konsum	Zeitschrift
Es wird ungemütlich	PferdeRevue	20.12.2021	Für den einzelnen Pferdehalter können die Umweltbelastungen ein entscheidender Faktor für seinen persönlichen Fußabdruck sein.	Zeitschrift
Die Welt wird immer absurder. Nun sind Hund und Katz am Klimawandel schuld und dürfen nur noch Tofu und Soja essen	Die Weltwoche	13.12.2021	Die Weltwoche zitiert ohne jemals mit uns gesprochen zu haben. Leider kein guter Journalismus	Zeitschrift
Weihnachtsbäume nachhaltig kaufen, leihen oder gleich ersetzen?	Watson	12.12.2021	watson zeigt mit Hilfe von ESU-services umweltfreundliche Möglichkeiten	Online
Schweizer Christbäume gewinnen Marktanteile	Schweizer Bauer	11.12.2021		Online
50 Prozent der Christbäume stammen aus der Schweiz	Telebasel	10.12.2021		Online
Luna und Rocky als Klimakiller	SRF Wissenschaftsmagazin	07.12.2021	Mit Tipps von Niels Jungbluth, wie sich die Umwelteinwirkung von Katz und Hund verringern lässt	Radio
Profuture - description of the project and the ESU tasks	EU projects	16.11.2021		
Der Kanton Zug wird zu einem Klimakiller-Hotspot	zentralplus	16.11.2021	Dass den Rohstofffirmen eine grosse Verantwortung zukommt, zeigte 2018 eine Studie von Niels Jungbluth und Christoph Meili im Vorfeld der Konzernverantwortungsinitiative	Online
Mondi: Papier für Palettenverpackungen	Gabot.de	16.11.2021		Online
Verpackung: Mondi lässt papierbasierte Lösung zum Umwickeln von Paletten testen	Logistik Heute	16.11.2021		Online
Paper pallet wrapping is a thing now!	Mondi	09.11.2021		Online
Mondi: Papierbasierte Lösung zum Umwickeln von Paletten	Fruchthandel Online	05.11.2021		Online
Graue Energie – Abfall und Verluste, Weltmarktlogik und Verteilungskämpfe	Agrar Info	01.11.2021		Online
Grüner Reiten	Reiter Revue International	01.11.2021	Pferde haben einen ökologischen Hufabdruck, verbrauchen Ressourcen, verursachen klimaschädliches CO2. Wir zeigen euch, wie ihr euren Stallalltag Stück für Stück nach haltiger gestalten könnt.	Zeitschrift
Hundefutter: Für den Hund darf es auch vegan sein	Deutschlandfunk Nova	20.10.2021		Radio
Ökologischer Pfotenabdruck: Hunde und Katzen sind schlimme Klimasünder	Der Spiegel	14.10.2021		Zeitschrift
«Regionale Lebensmittel schonen die Umwelt»	NZZ	01.10.2021	Das stimmt nicht immer. Aber es gibt andere Wege, wie Konsumenten ihre Ökobilanz tatsächlich verbessern können	Zeitung
Besser Bio aus dem Ausland oder Konventionelles aus der Region?	SRF Kassensturz - Espresso	23.08.2021	Nur auf Bio beziehungsweise nur auf regionale oder Schweizer Produkte zu setzen, hält Niels Jungbluth nicht für ganz korrekt.	Radio
Klimawandel: Das können Sie dagegen tun	NAU.ch	15.08.2021		Online
Pimp Your Pawprint - Greenify our future	Green Petfood	07.06.2021		Online
Wie stark schadet ein Hund der Umwelt?	Stuttgarter Nachrichten	07.06.2021	Haustiere beeinflussen die Ökobilanz ihrer Besitzer erheblich.	Zeitung
Erdoel und Erdgas Importe in die Schweiz belasten das Klima immer stärker	Klimaschutz Ja	01.06.2021		Online
Erdöl schneidet noch schlechter ab, als bisher gedacht	Heute Morgen, SRF Radio	01.06.2021	Bisher habe man nur grob schätzen können, wie viel Methan auf Öl- und Gasfeldern entweicht. Die neuesten Daten seien genauer.	Radio
Fraises suisses et espagnoles. Que racontent les écobilans?	Fédération romande des consommateurs	04.05.2021		Zeitschrift
Faux poulet, vrais avantages	Bon à Savoir	01.05.2021		Zeitschrift
Elf Tipps für ein nachhaltigeres Leben	Radio SRF 1	24.03.2021	Nachhaltigkeit im Alltag	Radio
Klimabelastung und Netto-Null-Ziel	Morgengast SRF 1	24.03.2021	Fragen rund um unsere persönliche Ökobilanz	Radio
CAP-Podcast #6 - Mobilität	You Tube	21.03.2021	In der 6. Episode zum Klima-Aktionsplan sprechen wir über Mobilitätsinfrastruktur und die Zukunft der Mobilität	Online
Mythos oder Realität?	Migros Magazin	15.02.2021	Fact Sheet von ESU-services zum Thema Erdbeeren im Frühjahr im Auftrag der Migros	Zeitschrift
Talk "Erdbeeren und importierte Früchte im Winter?"	Chrut und Rüebli	11.02.2021		Podcast
Ein Bulle sieht grün	Dossier	15.02.2021	Umweltbelastungen eines Energy Drinks basierend auf einer Studie von ESU-services.	Zeitschrift
Was ist drin im klimafreundlichen Katzenfutter?	Neue Westfälische	06.02.2021		Zeitung
Vegane Ernährung	Radio Top	12.01.2021		Radio
Klimaaktionsplan	Klimastreik Schweiz	08.01.2021	Ein Jahr lang haben Wissenschaftler*innen, Expert*innen und Klimastreikende gemeinsam einen umfangreichen Plan ausgearbeitet, welcher Lösungen für die Klimakrise vorschlägt.	Online

4 Your partner ESU-services Ltd.

On the following pages we present us as your project partner for projects in the field of life cycle assessment.

4.1 Experienced project team

Different experts who are all experienced in the field of ecological assessment of life cycles and profit from a network of renown experts in the fields work for ESU-services.

4.1.1 Dr. Niels Jungbluth, chief executive officer (CEO)

Dr. Niels Jungbluth studied environmental engineering at the Technical University of Berlin. He started working with LCA in 1994 and prepared his diploma thesis during a six month stay at the TATA Energy Research Institute in New Delhi, where he elaborated a life cycle assessment for cooking fuels in India. Between 1996 and 2000 he worked on a Ph.D. Project at the Swiss Federal Institute of Technology (ETH) in Zurich at the chair of Natural and Social Science Interface. His Ph.D. thesis on the environmental consequences of food consumption has been awarded with the Greenhirn Prize 2000 by the German Öko-Institut. In this thesis, he investigated food consumption patterns by means of life cycle assessment.

He started working with ESU-services in 2000. Since 2006 he has been the owner and managing director. Since 2000 he has worked on more than 250 consultancy projects in the areas food, biomass, energy systems, input-output-analysis, sustainable consumption, as well as several other topics. He is responsible for the SimaPro centre and the data-on-demand service of ESU. Besides the work on LCA case studies he also conducts critical reviews, verification, and validation according to different standards.

Dr. Niels Jungbluth is in the editorial board of the “Int. Journal of LCA” and works as reviewer for several other scientific journals. He worked as a special expert for several organizations as e.g. Deutsche Bundesstiftung Umwelt, CEN TC 383 standard (GHG accounting of biofuels), UNEP-SETAC life cycle initiative, Swiss law on tax exemption for biofuels.

4.1.2 Maresa Bussa, project manager

M.Sc. in Energy and Environmental Engineering

Maresa Bussa studied energy and environmental engineering at École des Mines de Nantes and the Technical University of Madrid. In her master thesis, she analysed options to adapt to climate change on the Koh Rong Archipelago in Cambodia.

Between 2017 and 2020 she worked for the Weihenstephan-Triesdorf University of Applied Sciences as a research associate in an EU project on the utilisation of cyanobacteria. She was responsible for the environmental and economic assessment of the developed product system. Since 2018, she is a doctoral candidate at the Technical University of Munich. As part of her doctorate, she conducted life cycle assessments on different microalgae cultivation systems and extraction methods. Maresa Bussa started working for ESU-services in 2020. In her first projects she is investigating alternatives to cow's milk as a drink and is leading the life cycle assessment work in the European PROFUTURE project on algae.

4.1.3 Christoph Meili, project manager

M.Sc. ETH in Environmental Engineering

Christoph Meili studied environmental engineering at ETH Zurich with major in ecological system design, air quality control and waste management, and in soil protection. In his master thesis he did a material flow analysis and LCA for hydrothermal gasification of biomass.

Christoph Meili works as project manager for ESU-services since 2016. Here he is responsible for software sales and support in the Regional SimaPro Centre for Switzerland, Germany, Austria, and Liechtenstein. Since starting at ESU he conducted several LCA projects on extraction of energy carriers, local energy systems, several different electronic devices, packaging materials and food recipes. Furthermore, he evaluated the quality of cotton labels and developed characteristic value models for run-of-river power plants, lifestyle analyses, transport routes and raw material extraction. He leads software training courses as well as introductory courses and lectures on various life cycle assessment topics.

Since 2012 he has also been working part-time for WWF Switzerland. In the Markets department, he is responsible for the Footprint Calculator, environmental tips for everyday life, as well as scientific work and external enquiries on consumer issues.

4.1.4 Martin Ulrich, project manager

M.Sc. ETH in Environmental Engineering

Martin Ulrich studied environmental engineering at ETH Zurich with major in ecological system design about resources management. In his master thesis he evaluated the relation between cost and environmental impact of products and services throughout the broad spectrum of consumption in Switzerland.

In 2020 Martin had his first experiences with ESU-services during a 6-month internship and returned to the company in 2021. Martin also worked as the team leader of a bicycle courier team of the Familie Wiesner Gastronomie AG. There he remains a bicycle courier which he sees as a good sporting balance.

4.1.5 Samuel Solin, project manager

B.Sc. ZFH in environmental engineering

Samuel Solin did an apprenticeship as a chemical laboratory assistant at Dottikon ES and worked there in the wastewater laboratory. He then studied environmental engineering at the ZHAW Wädenswil, specializing in natural resources and renewable energies. In his bachelor thesis, he conducted a feasibility study on a possible power-to-gas plant at a sewage treatment plant in the canton of Zurich.

From 2017 to 2022 he worked as a research assistant at the University of Applied Sciences Northwestern Switzerland. As part of this activity, he carried out life cycle assessments for various products, services, and companies, such as edible insects, Swiss shrimp, and all locations of the University of Applied Sciences Northwestern Switzerland. Samuel Solin has been working for ESU-services since 2022.

4.2 Global Partner Network

ESU-services cooperates closely with partners in the global SimaPro network.[4] With a wide range of expertise available, we can offer you unparalleled services and facilitate large international or multi-client projects. We can easily contact these partners to get access to data or information in all regions of the world. Collaborating with partners all over the world is crucial for ESU-services as we work to meet your precise needs. Furthermore, we share the following ethical values and commitments[5] with this network.

Science-based sustainable solutions are for everybody:

- We love our planet, it's our home.
- We work to restore its resilience through sustainable practices and metrics.
- LCA is at the heart of sustainability metrics and must be accessible for everybody.
- SimaPro and LCA-based practices will be pivotal in a vibrant ecosystem that connects a diversity of worlds, systems, people.
- Within that ecosystem we will co-create solutions together with clients, partners, fellow companies, and each other.

Our commitments:

- We commit to quality, accuracy, and transparency.
- We commit to the fact-based results. We won't engage in facts-distortion.
- We use our experience and knowledge to inform our customers and to facilitate sustainable development and practices (co-create better solutions).
- We take every opportunity to maximise our positive impact.
- We welcome everybody to embrace a sustainable transition and see them as a collaborator.

4.3 More than 25 years of experience

Niels Jungbluth started working on LCA in 1994. ESU-services has provided consultancy in the field since 1998. See Tab. 4.1 for a list of the most recent and relevant projects conducted in the last year. A full list of about 350 project references can be found on the internet (www.esu-services.ch/projects/fulllist/).

4 https://www.esu-services.ch/network-customers/partner/
5 Download on https://www.esu-services.ch/address/tender/

Tab. 4.1 Selection of recent and relevant projects done by ESU-services in 2021

Year	Project title	Commissioned by
Since 1996	Presentations about the food production, consumption and environmental impacts	Various
Since 2000	Data-on-Demand: life cycle inventory database for energy, biomass, chemicals and other commodities	Own development
Since 1995	World LCA database for food consumption and production (agriculture, food processing, distribution, consumption)	Own development
Since 1999	Peer Reviews of papers	www.publons.com/researcher/488732/niels-jungbluth
Since 2001	Subject Editor "LCA for Energy Systems and Food Products"	The International Journal of LCA
Since 2006	Training workshops in LCA and SimaPro	Various
Since 2007	SimaPro Competence Centre Switzerland, Germany, Austria and Liechtenstein	PRé Sustainability
Since 2008	Member of the Scientific Committee and reviewer of abstracts and papers (Dr. Niels Jungbluth)	International Conference on Life Cycle Assessment of Foods
Since 2008	Key parameter models for labelling of electricity, heat, biomethane and cooling from renewable resources with the naturemade star certification	naturemade - Association for environmentally sound energy (VUE)
2011-2018	Editorial Board ecoinvent for the themes: 06 Extraction of crude petroleum and natural gas, 19 Coke and refined petroleum products, 27 Electrical equipment and several other themes	ecoinvent Centre
Since 2014	Individual verifier for the international EPD® System	On request
2019-2023	PROFUTURE: Microalgae Protein-Rich Ingredients for the Food And Feed of the Future	Horizon 2020
2021-22	Swiss dietary recommendations: Scientific basis and statistical model	BLV
2021	Ecological payback calculation for heating systems	WWF Switzerland
2021	Manual for naturemade key parameter models: Life cycle assessment for the labelling of electricity, heat, biomethane, biogas and cooling from renewable resources with the naturemade star certification	naturemade - Association for environmentally sound energy (VUE)
2021	LCA of pet food	Barkyn
2021	LCA of waxes	Clariant
2021	Environmental impacts of travel scenarios	BMW, DE
2021	EPD verification	Pleiades, AU
2021	Critical review: LCA of rail track equipment	Denkstatt, AT
2021	Critical review: LCA of a male catheter	Anthesis
2021	LCA of paper and other products (panel peer review)	Confidential
2021	Seasonal calendar for products imported to Switzerland	Gebana
2021	Critical Review, chair: LCA of denim garment and jeans	Confidential
2021	Critical Review, chair: LCA of paper and alternative paper products made from Silphie	Confidential
2021	Environmental impacts of strawberries and other fruits in spring: A fact sheet	MIGROS
2021	LCA of hemp drink, vegan drinks and cow milk	AlpenPionier AG
2020-21	Update and harmonization of life cycle inventories of crude oil and natural gas extraction and supply for Switzerland	Federal Office for the Environment (FOEN) Verband der Schweizer Gasindustrie (VSG)

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