



ALBERT

International

**THE ECOLOGY OF
FINNISH AUDIOVISUAL
PRODUCTIONS
IN 2022**

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Published: 12.4.2023 [updated 31.5.2024, breakdown p. 16]

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BACKGROUND

In 2022, for the first time in Finland, information on the environmental impact of Finnish film and TV productions was collected using a unified toolkit. The statistics are part of [The Strategy on Sustainability](#) started in 2021 by the **Audiovisual Producers Finland APFI** and its partners. Majority of the most important stakeholders of the industry are behind the strategy:

- Ministry of Education and Culture
- Finnish Broadcasting Company YLE
- Promotion Centre for Audiovisual Culture AVEK
- Finnish Film Foundation
- The Finnish Television Academy
- Business Finland
- City of Helsinki
- City of Forssa
- Finnish Lapland Film Commission
- North Finland Film Commission
- West Finland Film Commission
- East Finland Film Commission
- South East Finland Film Commission
- Film Tampere
- Åland Film Commission
- Trade Union for Theatre and Media Finland
- Avate, Audiovisual authors and performers in Finland

In the first phase of the project the focus is on the ecology of productions and especially on what happens behind the camera. To achieve the goal, in the summer of 2021, collaboration was started with the UK-based [albert](#) which offers a toolkit for the use of film and TV productions such as a carbon calculator and a certification. The tools make it possible to compare Finnish productions internationally as well. In Finland the tools were piloted 01–05/2022, after which they were opened for the rest of the industry on June 7, 2022.

All figures related to the environmental impact of productions are provided by albert (found in Appendix 1, p. 17). [*The data is from 2021 and 2022.] Albert's UK team has compiled the data (excel & e-mails) early 2023 and APFI has further refined the data, made visualization, and analyzed the figures and the relationships between them. The report will not break down and identify productions or production companies in such a way that they are recognizable. In Finland, industry training has been provided by APFI, so the statistics regarding them are compiled by APFI.

The statistics only concern the productions, and not the production companies let alone other stakeholders, so they don't reflect the entire industry. In addition, only productions that have used the albert toolkit have been included in the statistics. Before compiling the statistics APFI gave its members (119) the opportunity to report productions outside the albert toolkit aiming to be ecological in 2022 or before, but no reports were received.

[*Update 05/2024: The data has been compiled from productions that have utilized the toolkit by the end of 2022 (2021: 7 productions, 2022: 16 productions). Since albert was officially released in Finland in 2022 and the sample from 2021 is small, the data from the two years has been combined.]

TERMINOLOGY

Calculating the ecology a production means breaking down the activities that take place in the different departments, from data collection to data entry into the albert toolkit, which registers data, e.g. carbon dioxide emissions (CO₂e) in addition to energy and water consumption. Calculations can be done without making a carbon action plan. A detailed breakdown of the areas of the calculation can be found in the appendices (Appendix 2, p. 19) In the toolkit, water consumption is a relatively new section, so there are no significant statistics in Finland for the year 2022.

Emissions are usually labeled carbon or tCO₂e, i.e. ton of carbon dioxide equivalent. A ton is 1,000 kg and an equivalent means more than one greenhouse gas, but the properties of all of them have been converted to correspond other gases, in this case to carbon dioxide.

Total emissions are either a single part of production or all emissions of all productions.

Emissions per hour are emissions as an average of one hour, i.e. total emissions divided by the amount of finished material. The calculation makes it possible to compare different productions with each other, regardless of their duration, genre, and production methods, both nationally and internationally.

The certification of a production means that, in addition to calculations, productions take actions to reduce negative environmental effects. Productions must make a carbon action plan, implement it, and provide evidence to show that the plans have been fulfilled.

STATISTICS

Usage rate of the toolkit and sampling of statistics

At the end of 2022, 24 Finnish production companies had registered at albert. The production companies had calculated the carbon footprint of a total of 23 productions, and one production had achieved a certification (table 1). All productions that had used the carbon calculator were TV shows. The 2022 statistics therefore do not include emissions from film productions. About half of the productions (12) were non-fiction, one-third fiction (7) and the rest other categories (4).

There is no exact figure for how many productions are made in Finland each year but in 2022 alone the Finnish Broadcasting Company Yle acquired more than 100 TV programs and slightly more than 50 films ([Yle, 2023](#)). In light of this the sample size of productions is extremely small and when reading the statistics, it is important to note that the impact of a single production may be significant.

Table 1 Carbon footprint and certifications of productions, completed and in progress, Dec 31, 2022.

Carbon footprint statuses	Carbon action plan statuses
23 completed	1 completed
2 almost complete	1 almost complete
30 in progress	14 in progress

Trainings

In 2022 APFI organized monthly trainings open to everyone on the theme of sustainable production. The free trainings (á 2h) are based on albert trainings, but many country-specific elements have been implemented. The training covers climate science, the concept of ecological industry and productions, and the albert toolkit. The trainings were mainly online in both Finnish and English. During 2022 275 people attended the trainings, the majority of whom were from the capital region in Finland (72%) (Figure 1).

APFI has also created and offered production companies registered at albert a free system training (á 1–2h) to lower the threshold for the introduction of the toolkit. In 2022 there were eight company trainings and 63 trained people.

Trained people 275, sustainable production (2022)

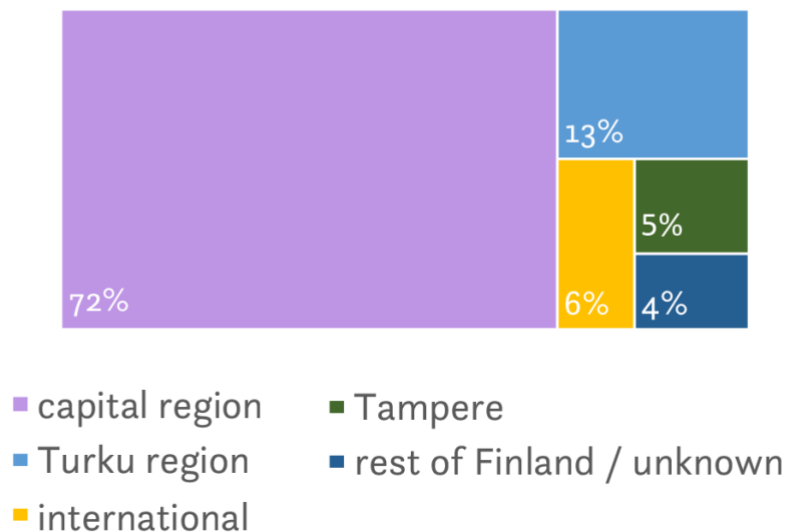


Figure 1 People trained, in Finland 2022 (sustainable production)

The carbon footprint of productions

Total carbon emissions

Total production emissions were 886.7 tCO₂e (figure 2). The vast majority (77.5%) of emissions came from travel and transport, followed by the non-filming spaces (14%) and materials (7%). The other areas of production were almost emission-free, with their combined share being less than 2%.

Total emissions of Finnish productions in 2022

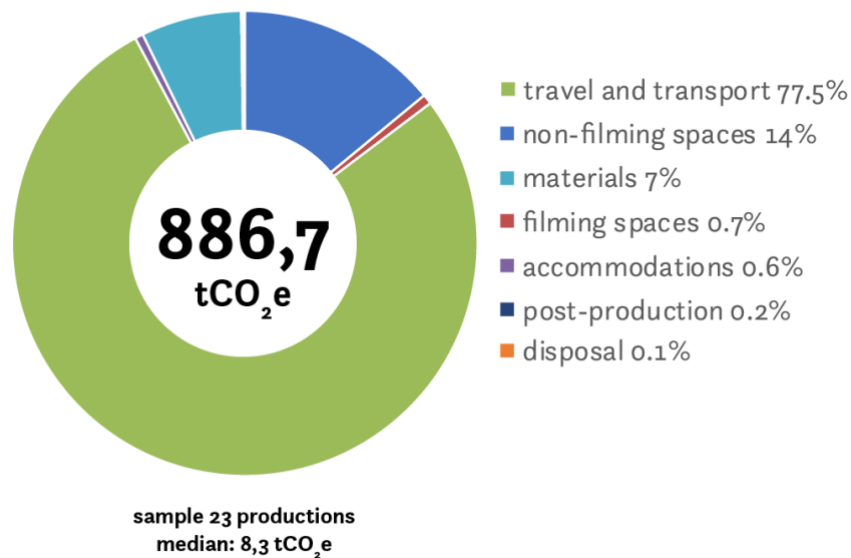


Figure 2 Total emissions of Finnish productions 886.7 tCO₂e

Although the average that one production emits can be calculated as 38.6 tCO₂e, it is more important to note the median. It tells the middle value of the total emission set of individual productions. The median of 23 productions was 8.3 tCO₂e, i.e. productions in the middle group in terms of emissions are significantly lower than the calculated average of 38.6 tCO₂e. In other words, the emissions are not evenly distributed, but the group with the highest emissions produces most of the total emissions in 2022.

Finnish productions emitted an average of 6.5 tCO₂e/h (Figure 3, p. 8). The emissions of the different departments are distributed in the same proportion as the total emissions presented earlier. The median hourly emissions were 0.4 tCO₂e /h.

Finnish productions, emissions per hour 6.5 tCO₂e

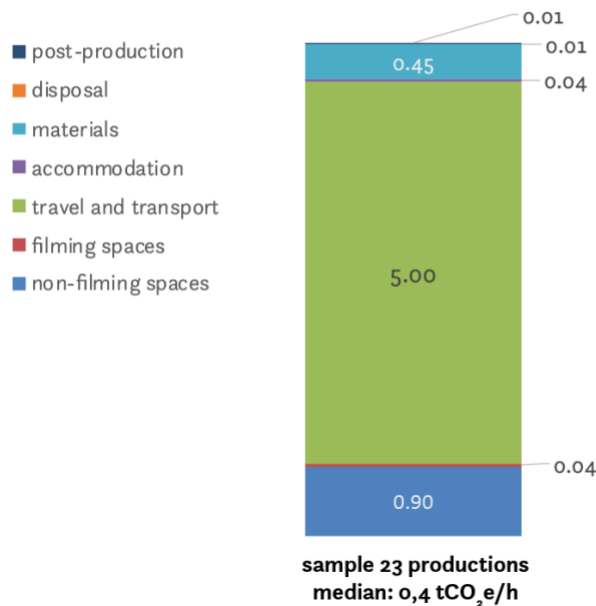


Figure 3 Production emissions 6.5 tCO₂e/h

Facilities: emissions and consumption of energy

Regarding the use of different types of spaces, the most important issue affecting emissions was related to energy. The total share of renewable energy in productions was at least 52%. If remote working and other facilities with an unknown share of renewables are excluded from the total energy consumption the share of renewables was 92%. If renewables are used, no emissions are recorded from the activity.

The 23 productions consumed a total of 1,342 MWh of energy (Table 2, p. 9). The combined emissions of the various facilities were 137 tCO₂e, or 15.4% of the total emissions. Energy consumption was monitored in four different areas, and more than half of the consumption was in non-filming spaces. Emissions from production offices were 4.5 tCO₂e and 12.7% of total electricity consumption, of which renewables accounted for 94%. Although the amounts of kWh for remote working and other facilities are known, they include not only energy consumption but also other options (e.g., gas and heat & steam), so there is no breakdown of the share of renewables. It can be assumed that the energy was not renewable, as remote working accounted for 96% of the emissions in non-filming spaces (120 tCO₂e).

Table 2 Productions energy usage, emissions, and shares

Finland 2022 n=23	total 1,341,522 kWh			total 886.7 tCO ₂ e		
	kWh	%	renewables >52 %	spaces 136.8 tCO ₂ e (15.4%)	%	
				spaces	total emissions	
non-filming spaces	752,541	56.0	unknown	124.3	-	14.0
office spaces	169,737	22.6	94 %	4.5	3.6	-
remote working, other	582,804	77.4	unknown	119.8	96.4	-
filming spaces	246,879	19.1	95 %	6.1	-	0.68
accommodation	298,804	22.3	91 %	5.0	-	0.09
post-production	33,298	2.5	76 %	1.4	-	0.16

The share of emissions from filming spaces was less than one percent of the total, and the largest emissions occurred in 11 locations, a total of 4 tCO₂e. Filming spaces covered 0.7% of total emissions, and 95% of the energy was renewables. Accommodations were usually run by renewable energy (91%). In post-production, 13 productions used renewables, which accounted for 76% of the total consumption.

Materials and disposal

The material emissions were 7%, or 62 tCO₂e. All productions made acquisitions in at least one category, and there were only two productions that made purchases in all categories. The most popular items were batteries, food, paper, and textiles (table 3). Disposal accounted for 0.1% of total emissions, i.e., 0.8 tCO₂e. Half of the disposal was mixed waste.

Table 3 Material categories, emissions from purchases, and frequency of acquisitions

	tCO ₂ e	number of productions that made acquisitions
Food	17.2	12
Timber	14.3	8
Textile	10.1	10
Plastic	7.7	6
Metal	7.0	5
Paper	3.5	12
Paint	1.5	5
Batteries	0.2	17
Glass	0.2	2
Carbon	0.2	7

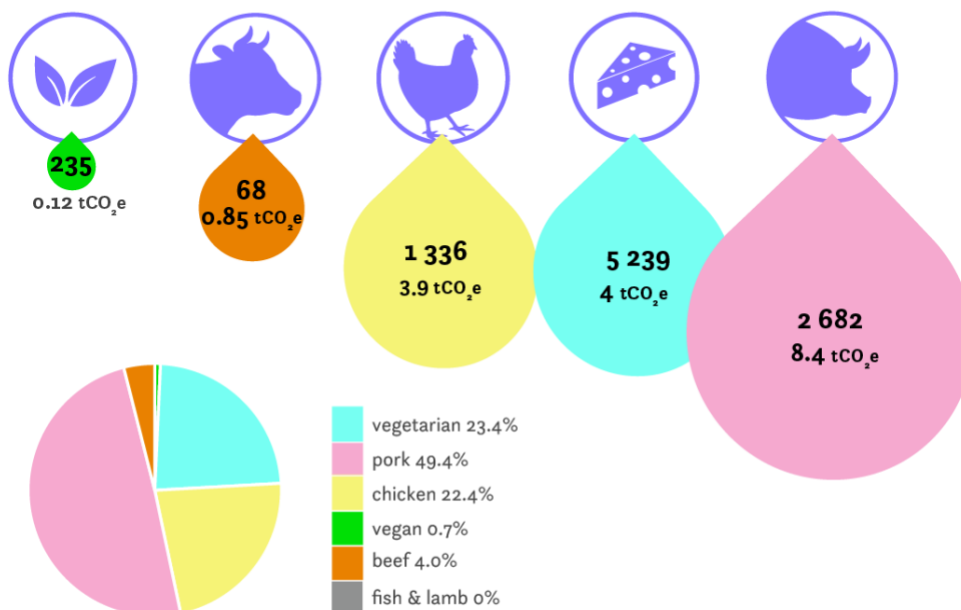
Catering

Around half of the productions had catering, a total of 9,560 meals (Figure 4). Most of catering did not contain meat (57.3%). Of the meat dishes, pork and chicken were eaten the most. Fish and lamb were also alternatives, but their share was 0.

Food emissions were a total of 17 tCO₂e. Although the number of meals containing pork was only one third, they accounted for half of the emissions. A quarter of the emissions came from vegetarian meals, which accounted for half of all food. The same number of emissions was produced by chicken meals, although they were only a quarter of the amount of vegetarian food. Relatively, the largest emissions were produced by the beef meals (68), which produced 5% of the catering emissions. The emission of 235 vegan meals was less than one percent.

Catering 9 560 meals = 17 tCO₂e

amount of meals and emissions

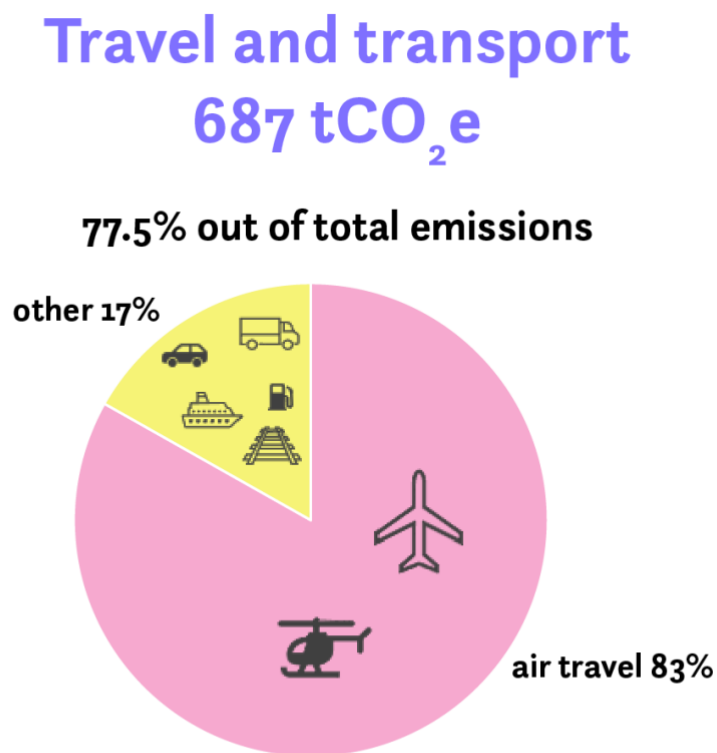


Finland 2022, sample 23 productions

Figure 4 Catering 9,560 meals: content and emissions

Travel and transport

In productions, most emissions were created when people and goods move from one place to another. The logistics produced 687 tCO₂e, of which the most significant part (83%) came from travelling by air (Figure 5). Commercial flights in total were 233,700 km, but their share of the total emissions was only 7%, as most flight emissions came from the fuel of charter flights and helicopters. The share of road travel was 102 tCO₂e (15%), and rail travel 2.3 tCO₂e (less than 1%). One production did not have any emissions in travel and transport.



Finland 2022, sample 23 productions

Figure 5 Share of different types of travel and transport, in total 687 tCO₂e

Analysis

Statistics in general

There has never been any national statistics focusing on the ecology of the film and TV industry or its productions in Finland. Thus, we do not have basic information on what direction the data collected now is trending towards. There are interesting examples with the given sample of productions (Figure 6), but the data can only be viewed as independent facts and figures, and especially international comparisons should be made with caution.

The sample of the statistics is small, so the impact of one production that has used a lot or few resources overall is significant, and generalizations cannot be made from the statistics. The statistics do not include any movies. The statistics consider only productions, so the figures do not extend to a broader industry overview. However, the statistics are the first and most comprehensive of their kind, so the first step towards regular statistics on the ecology of the Finnish industry has been made. The 24 domestic production companies registered at APFI are a rather small share of all production companies in Finland. At the end of 2022, APFI had 119 members, who are mainly production companies. Around 350 trained people is a reasonable achievement and the direct feedback that APFI has been commendable.

Summary

Finland: 6.5 tCO₂e/h



Number of renewables at least 52%



Vegetarian meals more than 50%



Majority, 3/4 emissions created when people and things move



Well done in recycling: emissions 7% materials, 0.1% disposal

- **Small sample, only 23 TV productions = can't be generalized**
- **Relationship between emissions are consistent with international figures**

Figure 6 Statistics 2022, summary with selected examples

About the environmental effects of productions

Since only one production has completed their carbon action plan and received a certification, a more detailed analysis of the process and the challenges related to achieving it cannot be made. However, it has been brought to APFI's attention that since learning ecological methods of operation is a new thing and takes time, combining calculation and actions is for many an almost impossible equation with current resources. Certification requires both calculations and concrete actions so if the production is trying to be more ecological, most often just a calculation is chosen.

Based on the sample, it can be concluded that a significant part of the emissions of Finnish TV productions comes from travel and transport. [*If all air traffic is taken out of the Finnish figures, both the average emissions and the share of travel and transport would have been a third from the original (Figure 7)]. There are no statistics on how many Finnish productions have also been filmed abroad, but it could be generalized that at least six productions that traveled by air were international. International production itself does not produce emissions, but flying does, and when striving for a more environmentally conscious production, efforts should be made to minimize flight kilometers. Finland's location is internationally challenging, and distances can be long even within our own borders. This might explain the share of road travels, which was up to 11.5% of total emissions. According to albert, rail traffic produced 2.3 tCO₂e. There are no statistics on where rail traffic occurred. The Finnish national railway company [VR](#) is largely carbon neutral.

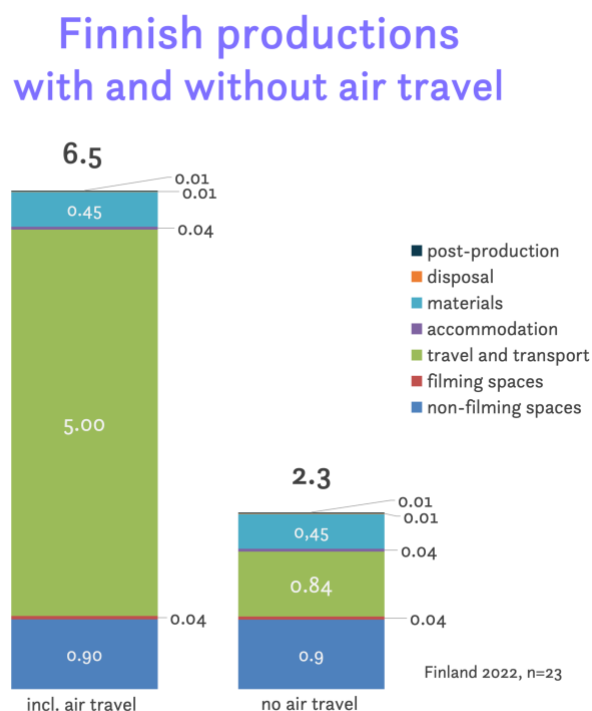


Figure 7 Emissions per hour in 2022 with air travel and a scenario without air travel [updated 2024]

[*Update 05/2024: text edited and figure 7 changed due to an error in calculations.]

At least half of the energy used by productions were renewables, which is in line with the national figures: in Finland the share of renewable energy sources of total energy consumption was 42%

(Statista, 2021). The environmental impact of filming space, accommodation, and office spaces was remarkably small, which is mostly thanks to renewable energy (over 90%). Not all data required in the toolkit is relevant for Finland (e.g. as and heat & steam) and they also make it impossible to get an accurate figure for the total amount of renewables.

The Finnish production culture is accustomed to borrowing, renting, and buying second hand, so in terms of acquisitions, productions with scarce resources already know the principles of circular economy. It can be assumed that this was also reflected in the statistics as small emissions from materials. Only newly acquired items, i.e. virgin materials, are registered in the calculations. The statistics also lacked feature films that usually tend to use more materials than TV productions. However, the acquisitions were not reflected in large amounts of disposal (share 0.1%). Even though the amount of mixed waste was half of the disposal, it could be concluded that Finnish productions are good at recycling: 62 tCO₂e of purchases were only 0.8 tCO₂e in disposal.

Considering the emissions, acquisitions in terms of food were good. The productions bought nearly 10,000 meals, of which about 4,000 were meat portions, and it was particularly commendable that choices were made not to eat beef that has the highest emissions (only 68 portions in total). Although only half of the productions had catering, 9,560 servings is not an insignificant number and climate-friendly choices have their effect: if only half of the meat portions are replaced with beef, the total food emissions would almost double as the beef meals emissions would be over 20 times bigger (Table 4).

Table 4 Catering: amount and emissions of meals in 2022 (A), and a scenario (B) if 50% of meat dish were beef

		Meals, total 9,560		Meal emissions		A = 2022, total emissions	B = 50 % meals with meat replaced with beef, total emissions
		n:o	%	tCO ₂ e	%		
vegetarian	A:	5,239	54.8	4.0	23.2	17.2 tCO ₂ e	30.7 tCO ₂ e
	B:	5,239	54.8	4.0	13.0		
pork	A:	2,682	28.1	8.4	48.9		
	B:	1,403	14.7	4.4	14.3		
chicken	A:	1,336	14.0	3.9	22.4		
	B:	700	7.3	2.0	6.6		
vegan	A:	235	2.5	0.1	0.7		
	B:	235	2.5	0.1	0.4		
beef	A:	68	0.7	0.9	4.9		
	B:	2,043	21.4	20.2	65.8		
fish, lamb		0	0	0	0		

Comparison of statistics internationally

The UK-based albert has been compiling data on emissions since 2011. The toolkit is being used in numerous countries and thousands of productions use it every year. In Finland, the number is a few dozen. [*In 2022 the average emissions of international productions were 12.8 tCO₂e/h, while Finnish productions produced 6.5 tCO₂e/h in 2022 (Figure 8)].

Emissions by Finnish and international productions in 2022

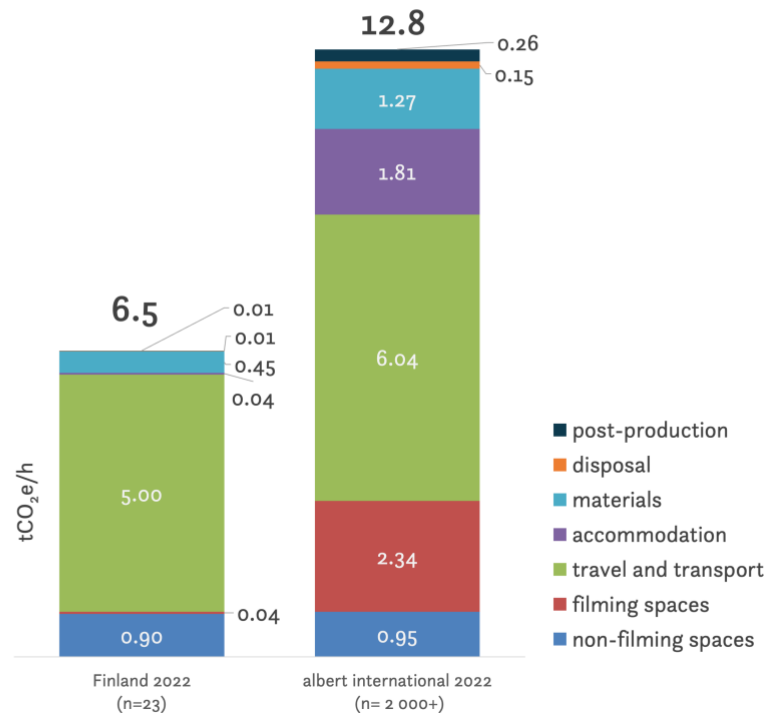


Figure 8 Emissions per hour in Finland and internationally (2022) in albert productions

When comparing Finnish statistics to albert's international figures, the small size of the Finnish sample should be noted. While Finland has now recorded the carbon footprints of 23 productions, albert's average emissions came from more than 2,000 productions. There's a significant similarity in the columns, because in both, travel and transport produce most emissions regardless the sample size.

Albert also compiles statistics by production methods and different genres. Since the Finnish sample is modest, none of the methods or genres were adequately represented to make a direct comparison.

[*Update 05/2024: texts edited and figure 8 changed to albert international from 2022 (prior 2021)]

FUTURE

The use of albert toolkit will continue and expand during 2023, and the 2023 statistics will be published in early 2024. Free trainings will be expanded from the current sustainable production to editorial, and the trainings will be organized at least once a month in both Finnish and English for people living in Finland. Trainings will continue mainly online, which makes them nationally accessible to everyone. Also, free training regarding the concrete use of albert toolkit will continue to be offered to all registered production companies (1–2 h, live/online).

The aim of the free trainings has been and will be to lower the threshold for adopting the free toolkit and make a more ecological way of thinking a part of the decision-making and practical everyday work. The more people are being trained in a uniform way and have read, e.g., the [Ekosetti](#) guidebook, the faster the industry has a common understanding of what the themes mean, which in turn will promote the transition to a more sustainable work culture.

A broader understanding and statistics of the ecology of the entire industry, outside the productions, requires further studies.

Updates 05/2024:

- Frontpage: placement of headline changed
- Page 3: an explanation added that the 2022 figures consist of productions from both 2021 and 2022.
- Page 13: texts edited, and Figure 7 replaced due to a calculation error; the correct share of travel and transport is 0.84 tCO₂e/h (former share 1.09 tCO₂e/h).
- Page 15: texts edited, and Figure 8 replaced with updated data albert international in 2022. New albert emissions are 12.8 tCO₂e/h (formerly 5.7 tCO₂e/h). Albert updated the toolkit between 2021 and 2022, so the two years weren't directly comparable.
- Minor word adjustments, no impact on content.

APPENDICES

Appendix 1: The ecology of film and TV productions, Finland 2022 (albert, 2023)

FILM & TV PRODUCTIONS tCO ₂ e	FINLAND 2022 (n=23)		
total tCO ₂ e	886.709		% of total emissions
tCO ₂ e/h	6.457		
non-filming spaces	124.251		14.01 %
production offices	4.455	3.6 %	0.5 %
remote working	119.673	96.3 %	13.5 %
other	0.123	0.1 %	0.01 %
filming spaces	6.060		0.68 %
studio	1.522	25.1 %	0.2 %
location	4.027	66.5 %	0.5 %
gallery	0.174	2.9 %	0.02 %
travel and transport	687.279		77.51 %
air travel	571.662	83.2 %	64.5 %
road travel	101.950	14.8 %	11.5 %
rail travel	2.296	0.3 %	0.3 %
boat travel	0.029	0.004 %	0.003 %
couriers & excess baggage	11.337	1.6 %	1.3 %
freight	0.006	0.001 %	0.001 %
accommodation	5.035		0.57 %
economy hotel	0.607	12.1 %	0.07 %
midscale hotel	2.704	53.7 %	0.3 %
upscale hotel	0.195	3.9 %	0.02 %
luxury hotel	0	0	0
apartment/condo/flat	1.530	30.4 %	0.2 %
average-size house	0	0	0
large house	0	0	0
materials	61.826		6.97 %
batteries	0.174	0.3 %	0.02 %
cardboard	0.170	0.3 %	0.02 %
food	17.229	27.9 %	1.9 %
glass	0.171	0.3 %	0.02 %
metal	7.007	11.3 %	0.8 %
paint	1.482	2.4 %	0.2 %
paper	3.494	5.7 %	0.4 %
plastic	7.726	12.5 %	0.9 %
textiles	10.102	16.3 %	1.1 %
timber	14.272	23.1 %	1.6 %

disposal	0.826		0.09 %
general/mixed	0.442	53.6 %	0.05 %
food/compostable	0.010	1.3 %	0.00 %
timber	0.588	71.2 %	0.1 %
textile	0.003	0.4 %	0.0004 %
electric waste	0.0002	0.02 %	0.00002 %
batteries	0.0001	0.01 %	0.00001 %
paper and cardboard	0.187	22.6 %	0.02 %
plastic	0.102	12.4 %	0.01 %
metal	0.012	1.4 %	0.001 %
glass	0.004	0.5 %	0.0005 %
construction	0.006	0.7 %	0.001 %
post-production	1.431		0.16 %
post-production	1.431	100 %	0.16 %

USE OF ENERGY	FINLAND 2022 (n=23)		
total kWh	1,341,522		renewables > 52 %
non-filming space	752,541	56.0 %	unknown
office spaces	169,737	22.6 %	94 %
remote work, other spaces	582,804	77.4 %	unknown
filming spaces	246,879	19.1 %	95 %
accommodation	298,804	22.3 %	91 %
post-production	33,298	2.5 %	76 %

CATERING. different meal types	FINLAND 2022 (n=23)			
	Amount		Emissions tCO₂e	
	9,560	%	17.2	%
vegan	235	2.5 %	0.12	0.7 %
vegetarian	5,239	54.8 %	3.99	23.2 %
chicken	1,336	14.0 %	3.85	22.4 %
pork	2,682	28.1 %	8.42	48.9 %
beef	68	0.7 %	0.85	4.9 %
fish	0	0	0	0
lamb	0	0	0	0

Appendix 2:

Calculating a production's carbon footprint

Calculation of the carbon footprint of production means e.g. the following things:

- **(Home) office spaces, post-production, and non-filming spaces:** how many people work in the premises and for how long, how much water and energy are consumed, is the energy renewable?
- **Filming spaces:** does the filming take place in a studio or on location, and/or is a gallery being used, how much energy, water and/or fuel is needed, is energy renewable?
- **Travel and transport:** do people and goods travel by air, land, rail, or water? The distance travelled and fuel used?
- **Accommodation:** number of nights and accommodation types, is the energy renewable?
- **Materials and disposal:** what is bought and how much, what happens to the materials after production?
 - categories: batteries, cardboard, glass, metal, paint, paper, plastic, textiles, timber, food
 - NOTE: if the material is received for free, borrowed, rented, or bought second hand, it does not need to be taken into account in the calculator (circular economy). If the material is not recovered for further use but becomes waste, the material must be entered as disposal.