AUDIOVISUAL PRODUCERS FINLAND APFI

ALBERT International

THE ECOLOGY OF FINNISH AUDIOVISUAL PRODUCTIONS IN 2023

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SUMMARY

The first statistics on the sustainability of domestic productions were published in spring 2023, and this report is the second of its kind. The statistics are part of a comprehensive industry-wide collaboration to assess the current state of the sector's sustainability. The data has been compiled from the albert toolkit, with the UK team providing information on Finnish productions, which APFI has compiled and visualized.

In 2023, 255 Finnish industry professionals received training through albert training run by APFI, with the majority (44%) being from the Helsinki metropolitan area. By the end of 2023, 37 Finnish production companies had registered at albert.

The 2023 statistics include data on ecology of 14 productions: 10 TV programs/series, two TV broadcasts, one short film, and one in the "other" category. The statistics for 2022 and 2023 do not include any feature films. In 2023, the total emissions from productions were 755 tCO_2e (average 54 tCO_2e, median 11 tCO_2e). The hourly emissions remained the same as in 2022, at 6.5 tCO_2e/h. Emissions from productions in 2021–2023 (37 in total) were unevenly distributed: a quarter of the productions accounted for 85% of all emissions.

In 2023, the majority of emissions (78%) came from logistics, with most (73%) being from road travel. The smallest share came from waste, accounting for 0.1% of the total emissions. Energy consumption by productions remained relatively the same compared to 2022 figures, but the share of renewable energy nearly halved. The highest energy emissions were associated with accommodation. The most significant emissions from acquisitions were from catering, with 12,286 meals, nearly 70% of which contained meat (91% of catering emissions). In 2022, emissions per meal were 1.8 $kgCO_2e$, while in 2023, they nearly doubled to 3.2 $kgCO_2e$. This change was due to the near doubling of the number of meat-based meals.

Six productions achieved certification, meaning they not only calculated emissions but also made verified practical efforts to improve their sustainability. On average, productions scored 75/100 points (albert average 2022: 74/100, n=~2000). The most active eco-actions were related to energy, materials, and waste; communication and engagement received less attention. Actions focused on content and logistics fell in between. In 2022 only 1 out of 23 productions achieved a certification.

From 2021 to 2023, 37 productions reported their emissions, and with the larger sample size, productions can also be selectively examined based on genre and production methods. Individual categories are too small for generalizations, but the results indicate that regardless of what type of content is done and where, logistics account for at least half of the production's emissions (excluding animations and studio productions).

In short:
- The hourly emissions of productions have remained the same, at 6.5 tCO_2e/h.
- Emissions are very unevenly distributed among productions: a quarter of the productions accounted for nearly all emissions (n=37, 2021–2023).
- Logistics account for at least half of the emissions from Finnish productions, regardless of genre or production methods (excl. animations and studio productions).
- Acquisitions in productions are made in accordance with circular economy (excl. catering).
- Compared to 2022, the statistics are now more qualitative due to certifications, but the toolkit is no longer used as actively in terms of quantity.

BACKGROUND

Now for the second time using a unified toolkit, information on the ecology of Finnish film and TV productions from 2023 is being published. The statistics are part of The Strategy on Sustainability started in 2021 by the **Audiovisual Producers Finland APFI** and its partners. In spring 2024, the Finnish Ministry of Education and Culture granted support through the Recovery and Resilience Facility (RRF) for the renewal of the culture and creative sectors, funding the work until summer 2025. The stakeholders of the industry behind the strategy are:

- 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 summer of 2021 APFI started a collaboration 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 study and compare Finnish productions, internationally too. In 2022, tools were launched for the Finnish industry, leading to the training of hundreds of industry professionals in sustainable production and editorial, free of charge. In the spring of 2023, Finland's first production-related statistics on ecology were released.

All figures related to the ecology of productions are from albert from 2023 (appendix 1, p. 25). Albert's UK team has compiled the data (excel & e-mails) early 2024 and APFI has further refined them, 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, in terms of training, industry professionals, so they alone do not depict the entire industry. APFI is compiling a survey on the ecology of the Finnish audiovisual industry, which will be published by the end of 2024.

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 (CO_2e) in addition to energy and water consumption. A detailed breakdown of the areas of the calculation can be found in the appendices (appendix 3, p. 29).

Emissions are usually labeled carbon or tCO_2e, 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 one gas, 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 CAP is the process that demonstrates concrete actions taken by production to improve ecological sustainability.

The certification of a production is a process that demonstrates concrete actions taken by productions to improve their ecological sustainability. **Carbon Action Plan (CAP)** is the name of the process by albert. To obtain certification, production must create a plan to reduce negative environmental and climate impacts and demonstrate successful implementation of the plan in practice. Albert certification also requires emissions calculations. Productions that successfully complete the process are awarded a 1, 2, or 3-star certificate by albert. Further details on the certification process can be found at the end of the report (appendix 4, p. 30).

STATISTICS

Usage rate of the toolkit and sampling of statistics

By the end of 2023, 37 Finnish production companies had registered at albert. Of these, 24 companies calculated a total of 14 productions' carbon emissions during 2023, and six productions obtained certification (Table 1, below). Among the productions that reduced their emissions, there were 10 TV programmes/series, two events for broadcasts, one short film, and one categorized as "other" (appendix 1, p. 25). Both non-fictional and fictional productions numbered six each. More on emissions can be found on page 8 ("The carbon footprint of productions ") and on certifications on page 14 ("albert certifications").

Table 1 Carbon footprints and certifications of Finnish productions on Dec 31, 2023

Carbon footprint statuses	Carbon action plan statuses
14 completed	6 completed
4 almost complete	2 almost complete
18 in progress	4 in progress
-	1 rejected

There is no exact figure for how many productions are made in Finland each year but in 2023 alone the Finnish Broadcasting Company Yle acquired almost 100 TV programmes and around 50 films (Yle, 2024). In light of this the sample size of productions is small and when reading the statistics, it is important to note that the impact of a single production may be significant.

Internationally, albert statistics cover information on thousands of productions. In 2023, albert trained nearly 4,000 individuals, certified 2,451 productions, and compiled emissions data from 3,003 productions (albert, 2024). Finland's statistics are part of albert's international statistics.

Trainings

In 2023, APFI regularly organized free for all trainings, averaging once a month, on two different themes: sustainable production and editorial. Production-focused trainings began in 2022, and at the beginning of 2023, training expanded to include editorial as well. The free, 2-hour training sessions are based on albert trainings but have also been localized for Finland. The trainings cover climate science, the concept of ecological production and audiovisual industry, and the albert toolkit. Most of the training sessions were held online, in both Finnish and English.

During 2023, a total of 255 individuals attended both training sessions (Figure 1, below), with nearly half (44%) from the Helsinki metropolitan area. The training focused on sustainable production was more popular with 199 attendees, while 56 individuals attended the content-focused training.

APFI has also offered free toolkit trainings (1-2 hours) for production companies registered to albert, aiming to lower the threshold for adopting the tools. In 2023, there were seven company visits, with 59 individuals trained.

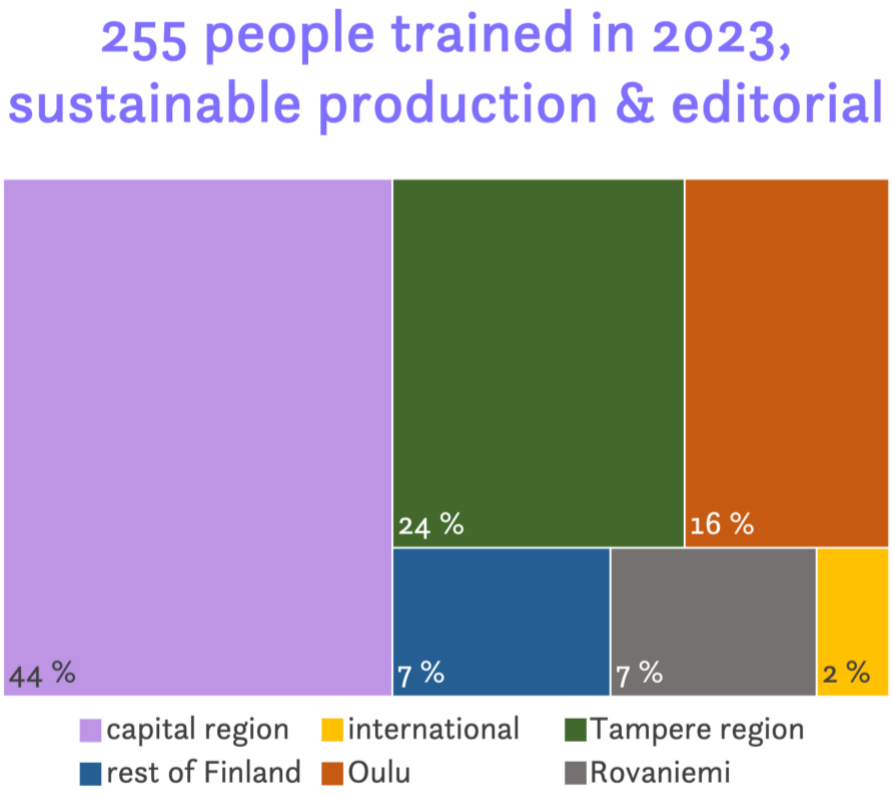

Figure 1 People trained, in Finland 2023 (sustainable production & editorial)

The carbon footprint of productions

Total carbon emissions

Total production emissions were 775 tCO_2e (Figure 2, below). The majority (78%) of emissions came from travel and transport, after which the emissions divided equally between accommodation, materials and different spaces (4-6% each). Emissions from waste and post-production were negligible.

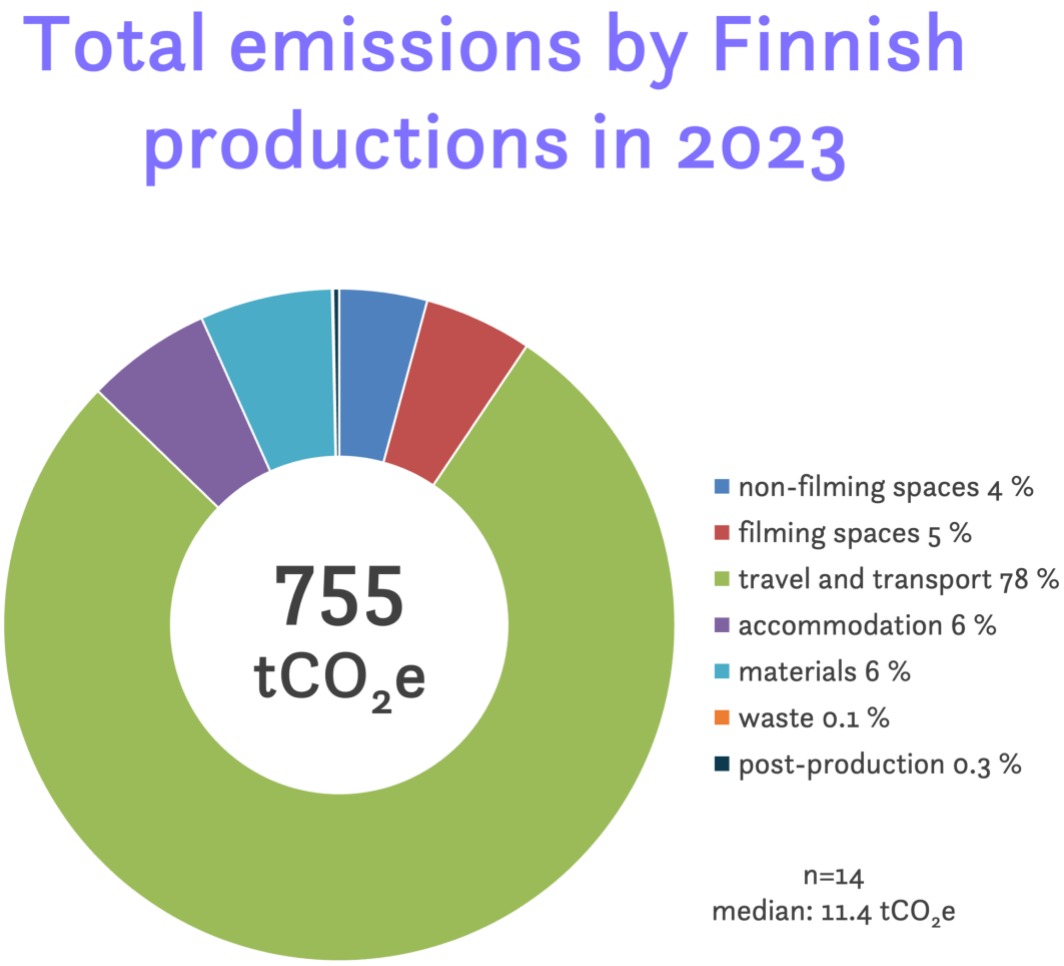

Figure 2 Carbon emissions of Finnish productions 755 tCO_2e

On average the emissions of one production were 54 tCO_2e. Still, it is more important to note the median, which tells the middle value of the total emission set of individual productions. The median of 14 productions was 11 tCO_2e meaning that productions with emissions at the median level are significantly smaller than the average of 54 tCO_2e.

In other words, emissions are not evenly distributed, with a small number of high-emission productions accounting for most of the emissions in 2023. The emissions per hour for Finnish productions averaged 6.5 tCO_2e/h (Figure 3, below), which is the same as in the 2022 statistics. The median hourly emissions were 2.5 tCO_2e/h.

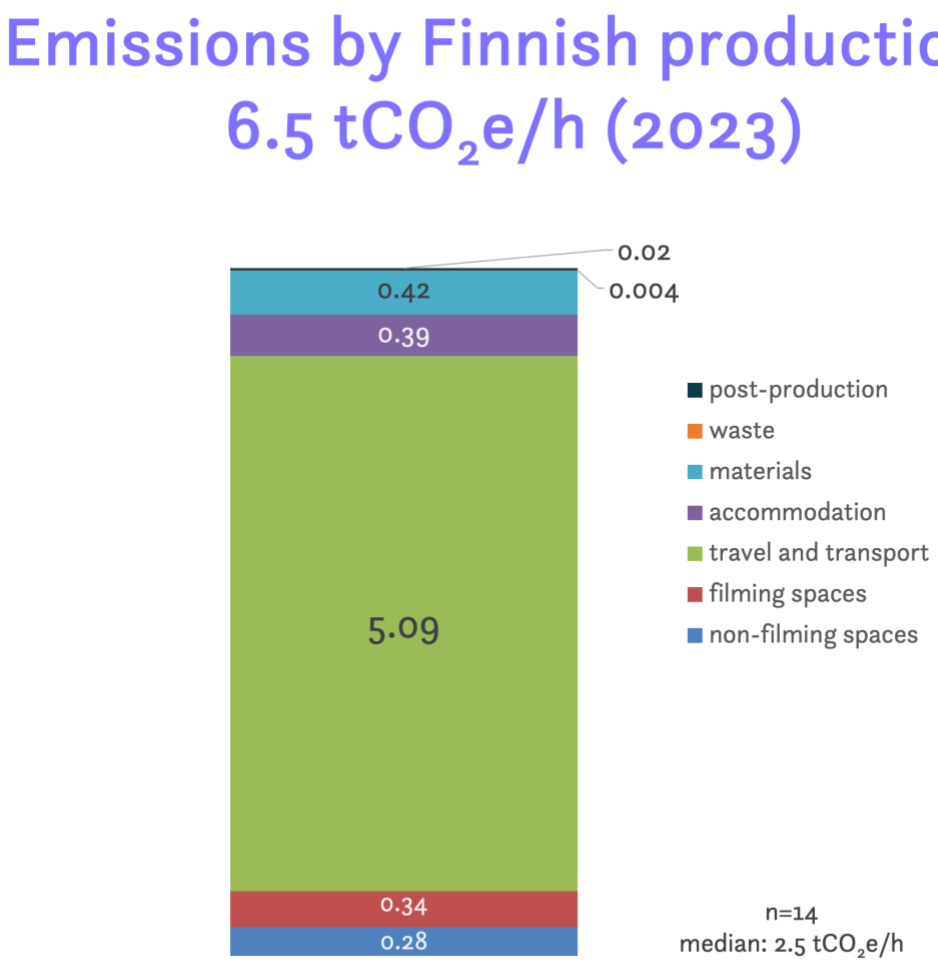

Figure 3 Production emissions 6.5 tCO_2e/h

Travel and transport

In productions, most emissions were created when people and goods move from one place to another. Logistics do not generate emissions if electric transportation is chosen.

Travel and transport produced 588 tCO_2e (Figure 4, below). The majority (73%) of emissions stemmed from road travel. Category "other" includes freight and travel by train and boat. The emissions from road travel are calculated based on either the distance traveled or the purchased fuel. Of the 14 productions, 12 drove a total of 142,400 kilometers and consumed 136,915 liters of gasoline, 5,275 liters of diesel and 1,216 liters of renewable diesel. Together, road travel accounted for 432 tCO_2e of total emissions. Emissions from air travel (139 tCO_2e) occurred from seven productions, with flights totaling 1.06 million kilometers. One of the flights was a charter flight, alone contributing 33 tCO_2e. One production generated no emissions from travel and transport.

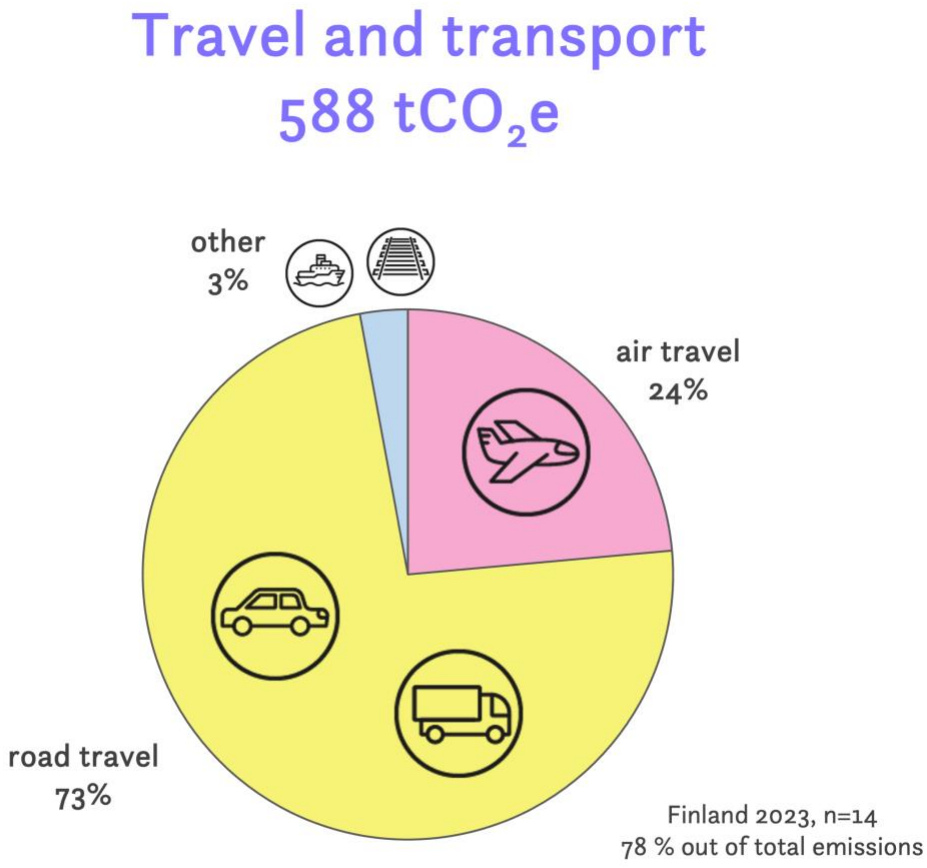

Figure 4 Share of different types of travel and transport, in total 588 tCO_2e

Facilities: consumption of energy and water

Regarding facility usage, emissions mostly arise from energy consumption. If the energy used is renewable, no emissions occur.

Energy consumption was monitored in four different areas, and the 14 productions consumed approximately 600,000 kWh of energy (Table 2, below). One-third (32%) of the energy used came from renewable sources. The combined emissions from the facilities used by the productions were 119 tCO_2e, accounting for 16% of the total emissions. The most energy was consumed in accommodation (60%), where the proportion of renewable energy was moderate (42%). The second-highest energy consumption occurred in office spaces, where over half of the energy used was renewable. Although the kWh amounts for remote work and other spaces are known, they include not only energy consumption but also other options (such as "gas" and "heat & steam"), so there is no breakdown of the proportion of renewable energy used.

Table 2 Productions energy usage, emissions, and shares

Finland 2023 n = 14	**total 601,284 kWh**			**total 755 tCO_2e**		
	kWh	%	renewables 32 %	tilat 119 tCO_2e (16 %)	% spaces	% total emissions
non-filming spaces	148,873	24.8	15	31.9	-	4.2
office spaces	144,654	24.0	57	17.3	54.3	-
remote working, other	4,219	0.8	unknown	9.9	45.6	-
filming spaces	71,796	11.9	6	39.3	-	5.2
accommodation	361,053	60.1	42	45.6	-	6.0
post-production	19,562	3.3	61	2.2	-	0.3

The emissions from filming locations accounted for five percent of the total, with six percent of the energy used being renewable. For nine productions, emissions occurred in five studios (27 tCO_2e) and five locations (11 tCO_2e) (appendix 1, p. 25). None of the studios used renewables. The highest proportion of renewable energy was in post-production (61%).

As part of emissions calculations, production water consumption is also monitored, including both wastewater and drinking water. Productions used a total of 26,851 liters of water across various locations. The calculator's benchmark for water usage is 50 liters per person per day, and if productions have used this benchmark, according to albert, an average crew size was 38.4 people.

Materials and disposal

The share of emissions from materials was six percent i.e. 48 tCO_2e (appendix 1, p. 25). If a production borrows or acquires materials/products second-hand and they re-enter circulation, no emissions are generated.

All but one production made emission-producing acquisitions in at least one category, and none of the productions made purchases in all categories. The most purchased items were food, paper, and batteries, while glass was purchased the least (Table 3, below). The lifecycle of the materials was good, as they did not end up as waste (accounting for 0.4 tCO_2e or 0.1% of total emissions). Nearly half (40%) of the waste was mixed waste. The second most common type of waste was paper (34%), followed by food waste (21%).

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

	tCO_2e	**number of productions that made acquisitions**	**amount in waste tCO_2e**
Food	38.7	11	0.09
Plastic	2.9	8	0.007
Textile	2.3	6	0.0003
Paper	2.2	10	0.14
Cardboard	0.2	4	
Timber	0.6	6	0.01
Metal	0.5	4	0.003
Paint	0.5	6	-
Batteries	0.1	9	0.00002
Glass	0.03	2	0.003
Waste: electronics	-	-	0
Waste: construction	-	-	0.006
Waste: mixed/general	-	.	0.17

Catering

Materials also included catering. A total of over 12,000 meals were served to crews (Figure 5, below). The emissions from food were a total of 39 tCO_2e, with nearly 70% of the meals containing meat. The most popular dish included pork (50% of the meals), and one in four plates were vegetarian (26%). Pork dishes accounted for over half of the total emissions (62%), while the combined emissions from vegetarian and vegan meals were only 9%. The least consumed food were lamb, beef, and fish (making up 9% of the meals, but contributing double the emissions at 18%). Nearly all productions made food acquisitions (Table 3, p. 12)

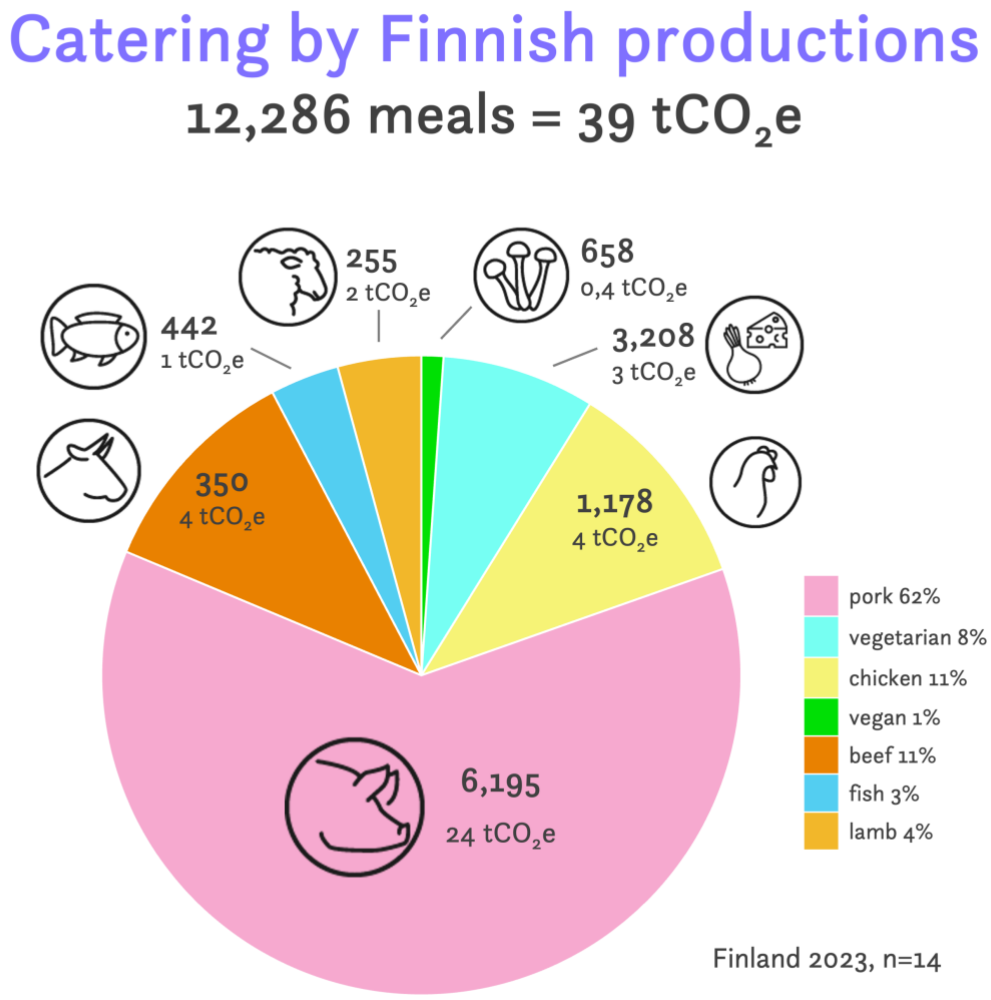

Figure 5 Catering 12,286 meals: content and emissions

Albert certificate

To receive certification, production must calculate its emissions and take practical steps to improve its ecological sustainability. The albert certification (Carbon Action Plan) is briefly explained at the end (appendix 4, p. 30) and more comprehensively on albert's website.

In 2023, six domestic productions achieved certification (Table 1, p. 6). On average, the productions received 1.75 out of 3 stars and scored 75 out of 100 points. One production received the full 3 stars. Out of the 14 productions, nine (64%) pursued a certification, with one failing to achieve it. A rejection could occur if a production answered "no" to a mandatory question or failed to reach the required minimum score (55 out of 100). To obtain a certification, productions had to answer numerous questions about their operations, with the framing of these questions guiding them towards more ecological choices. The questions were divided into four categories, with the distribution of "yes" responses as follows:

- Communication and engagement: 33%
- Content: 50%
- Production energy, materials, and waste: 66%
- Travel and transport: 50%

Table 4 (below) provides a selected sample of questions to which productions most frequently responded with "yes" and "no". All productions undergoing the CAP process reported taking actions to improve the ecological sustainability of production and post-production facilities. Additionally, they favored responsible food choices and recommended meatless options to the crew. None of the productions shared their crew with another production to reduce travel, or selected accommodations that used renewable energy.

Table 4 Selected CAP questions and the frequency of yes & no -answers in Finnish productions

YES		NO	
100%	Are there measures in place to reduce the environmental impact of your building? (LED lights, lighting sensors, visual reminders on energy savings and waste management, etc)	100%	Has the production reduced travel by sharing crew across more than one production?
	Are there measures in place to reduce the environmental impact the post-production facilities? (lighting sensors, visual reminders on energy savings and waste management, etc)		Does the accommodation use electricity from a 100% renewable energy source?
	Are you prioritizing restaurants/products with consideration for their environmental impact? (i.e. low carbon and/or fairtrade, locally sourced, meatless days, etc)	83%	Will the production create audience or industry-facing communications about the production's approach to sustainability?
	Are you encouraging your crew to choose vegetarian or vegan options more often?	80%	Is mains power in post-production used from a 100% renewable sourced energy tariff?
67%	Is all your crew local or within 50 miles of filming location? (exception for senior roles)	67%	Are you asking your cast and crew to bring their own re-usable water bottles and/or cups?
	Is there a zero-waste to landfill policy in your production office?		Have you reduced and/or eliminate travel by using significant stock or archive footage to limit location filming?

Production methods and genres 2021–2023

Albert categorizes productions by genre and production method. Genre defines what the production is about (content), and production method describes how the production is made (location, studio, other). Albert defines 12 different categories for both (breakdown found in appendix 3, p. 29). This categorization enables for a more detailed analysis of emissions. In Finland, such comparisons were not made in the 2022 statistics due to the sample size being too small. From 2021 to 2023, a total of 37 Finnish productions have calculated their emissions, allowing for the comparison of hourly emissions in categories where the sample size (at least 3 productions) ensures production anonymity (appendix 2, p. 27).

Five genre categories were selected for analysis (Figure 6, below). The category "other" includes one comedy, one children's program, two factual entertainment programs, and two productions that do not fit into any of the genres defined by albert. Factual entertainment programs (12.8 tCO_2e/h) generated more than double the emissions compared to drama productions (5.4 tCO_2e/h). The genres with the lowest emissions were sports (0.2 tCO_2e/h).

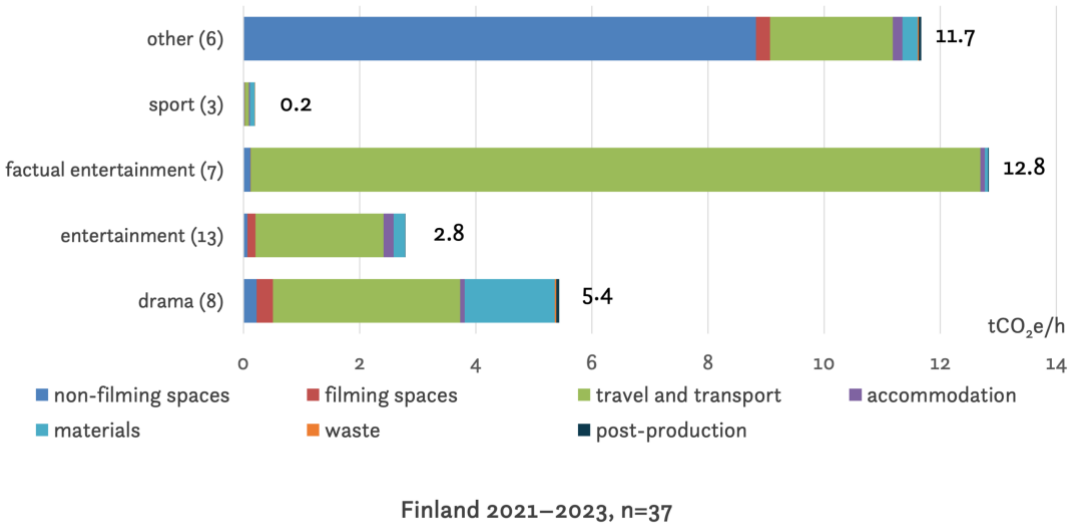

Figure 6 Emissions by genre (tCO_2e/h)

When examining production methods, productions are first divided into three main categories: fictional and non-fictional productions filmed in studios and/or on location, and other (incl. events, outside broadcasts, and animations) (Figure 7, p. 16). Ten fictional productions (4.2 tCO_2e/h) had slightly lower emissions compared to twenty non-fictional productions (6.3 tCO_2e/h). The seven productions in category "other" had the highest emissions (10.4 tCO_2e/h).

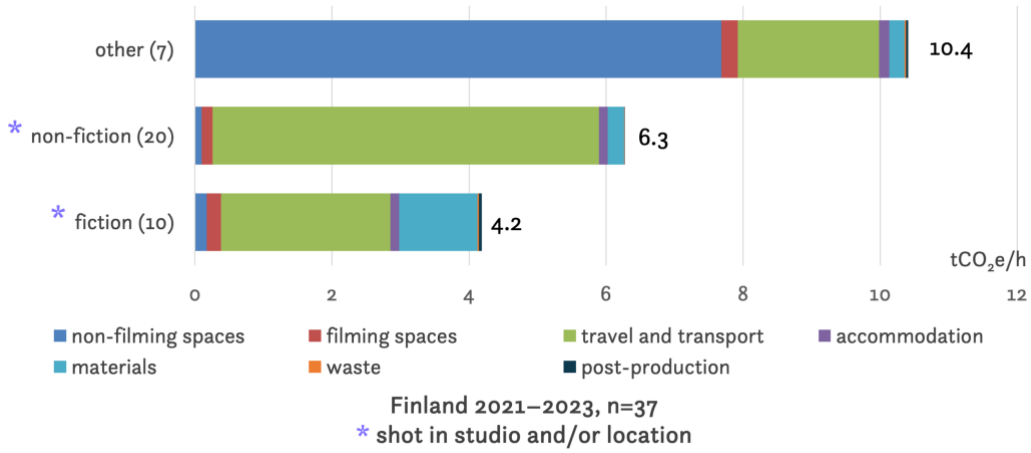

Figure 7 Emissions by production method, general (tCO_2e/h)

The productions from 2021–2023 can be further subdivided into a few subcategories based on where they were produced (Figure 8, below). The category "other" includes one fictional production shot in a studio and two non-fictional productions shot both in studio and location. The highest emissions were generated in animations (23.1 tCO_2e/h). The production methods with the lowest emissions were events and productions requiring an outside broadcast (OB) vehicle (0.9 tCO_2e/h) and non-fiction productions filmed in studios (0.6 tCO_2e/h). Between these were fictions filmed on location (6.2 tCO_2e/h) and non-fictions filmed on location (8.9 tCO_2e/h), as well as fictions filmed both on location and in studio (2.4 tCO_2e/h).

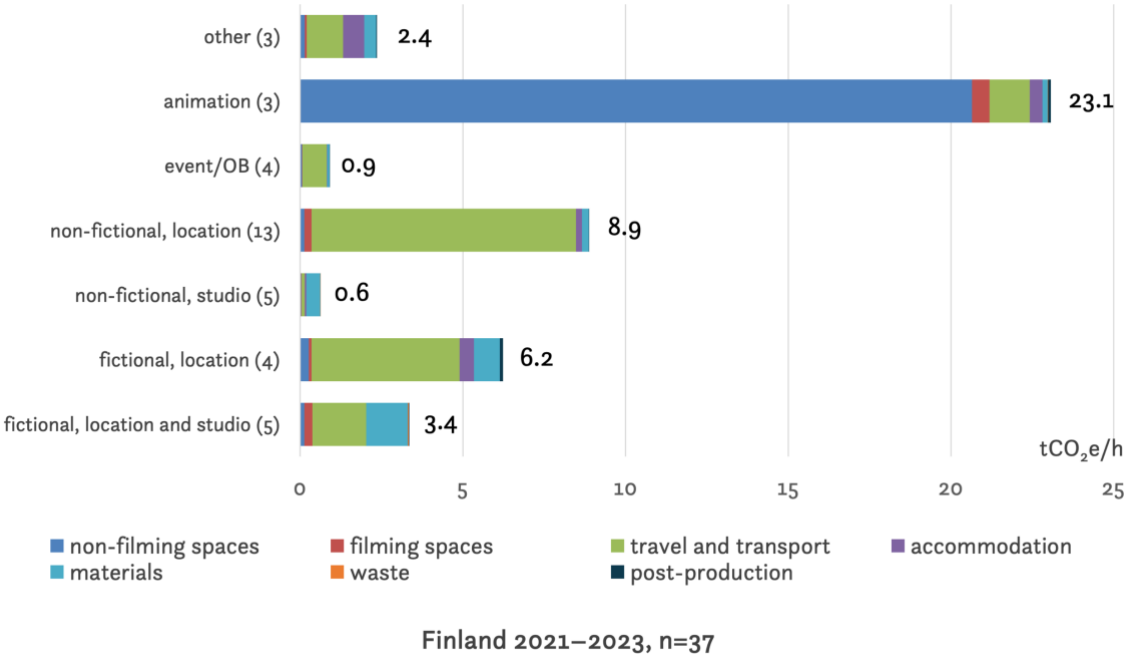

Figure 8 Emissions by production method (tCO_2e/h)

Given the small sample sizes, a detailed breakdown of the different components of each emission bar is not essential. However, one key observation is that regardless of genre or production method, logistics generally account for at least half of the emissions (except for animations and studio productions). Based on the sample, animations are the most energy-intensive form of productions.

Analysis

This analysis includes a selected breakdown of various aspects of the 2023 productions and comparisons to the statistics from 2022.

The reliability of the statistics is influenced by several variables. The data in the statistics is based on trust: all information is entered by the production companies themselves, and not all submitted information is verified by a third party. Due to the small sample size, a single high-emission production can significantly impact the averages. Production emissions can also depend on the trends of each year; for example, a production focusing on Finnish craftsmanship will have very different emissions compared to its international counterpart.

Statistics in general

The 37 domestic production companies registered in the system represent a small fraction of all production companies in Finland. By the end of 2023, APFI had 121 members, primarily production companies. Training over 300 people is a reasonable achievement, and the direct feedback to APFI has been positive. The trainings have been perceived as necessary, and APFI's role as a national leader in ecological themes has been recognized as essential.

The albert toolkit was officially launched in Finland in 2022, and the first nationally compiled statistics on the ecology of 23 Finnish film and TV productions were published in 2023. They were a combination of 2021 and 2022 productions (7+16), providing an overview of the use of the albert toolkit in Finland up until December 31, 2022. The 2023 statistics represent 14 productions, a number consistent with the productions that calculated their emissions in 2022.

At the end of 2022, 32 productions had their carbon calculations either in progress or nearly completed, and 15 productions were in the certification process. For 2023, the corresponding numbers were significantly lower at 22 and 6, respectively. By the end of 2022, 24 production companies had registered to albert, and a year later, this number had increased by 13, reaching 37 companies. This suggests that while the current statistics are more qualitative due to the certifications, the toolkit is not being used or tested as actively as before.

Between 2022 and 2023, the hourly emissions have remained the same, at 6.5 tCO_2e/h (Figure 9, below). However, the average emissions have increased: the current average per production is 54 tCO_2e, compared to 39 tCO_2e a year earlier. The median hourly emissions also increased, from 0.4 tCO_2e/h in 2022 to as much as 2.5 tCO_2e/h in 2023. As observed internationally, logistics and travel associated with productions are the major sources of emissions also in Finland, regardless of production type, genre or method. Still, larger generalizations should not be made as the two statistics pertain to only 37 domestic productions, mostly TV shows and series.

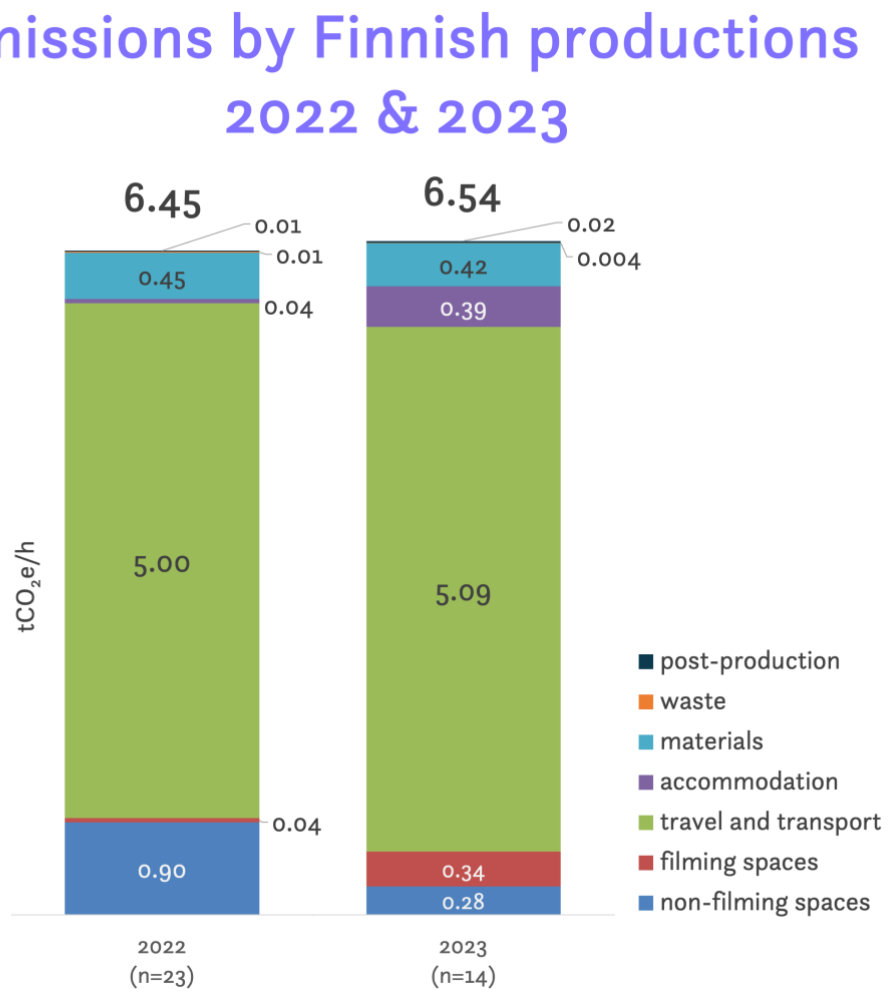

Figure 9 Emissions by Finnish productions in 2022 and 2023

In 2023 internationally albert production emitted 16.6 tCO_2e/h (albert, 2024). The Finnish statistics published in the spring 2023 included a section of international comparison of the emissions. Since the hourly emissions in Finland have not changed and the distribution among different emission categories is not significantly different, the observations from 2022 report can still be considered relevant; please see APFI's 2022 report for more.

Travel and transport

Most emissions from Finnish productions were generated by travel and transport. In the 2022 statistics, 83% of the emissions were from air travel, and when removed from the calculations, the total hourly emissions were only a third of the actual figure (APFI, 2023). When conducting similar calculations for the 2023 statistics, the hourly emissions decrease to only a fifth (Figure 10, below), as the majority (74%) of the emissions were from road travel.

There is no information on how many of the 14 productions were partly or entirely shot abroad, but it can be assumed that at least seven as they had emissions from air travel. While it is common knowledge that flying poses a significant threat to the climate, the compiled statistics now also indicate that road travel can account for a significant portion of production emissions too. **With a sample of 37 productions, it can be concluded that travel and transport was the most emission-intensive area of productions, regardless of whether travel was by air or land.**

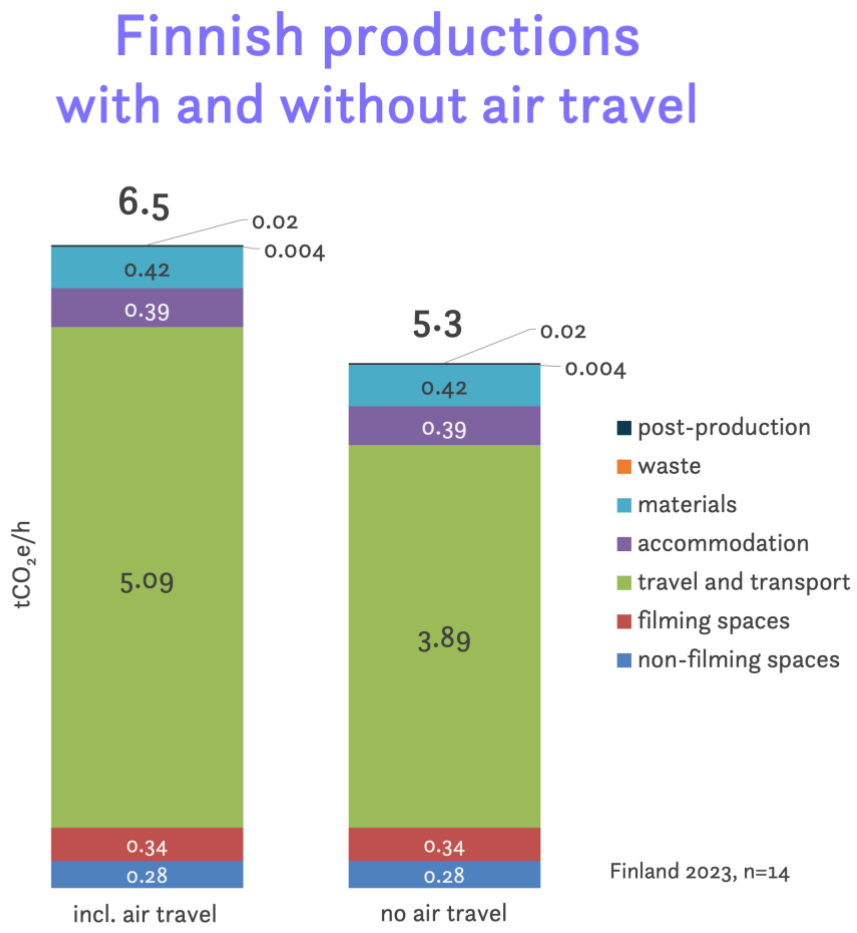

Figure 10 Emissions per hour in 2023 with and without air travel

Energy consumption and water usage

The second highest portion (16%) of emissions originated from various spaces and energy consumption. Only a third (32%) of the energy used was renewable, which falls below national figures: in Finland, the share of renewable energy sources in total consumption was 42% (Statista, 2024). Half of the energy was consumed in accommodation, with renewables at 42%. Productions could somewhat easily improve the sustainability of their choices: typically, accommodations are outsourced services, and especially in urban environments, there is a good selection of more ecological accommodation services in Finland. Over half (57%) of the energy used in office spaces was renewable, which is a decent figure. If it is possible to influence the energy used in office spaces, it is worth doing so, as these spaces remain the same from one production to another, thereby affecting the sustainability of all productions.

Water consumption was also monitored, amounting to 26,851 liters. On average, Finns use 100 liters of water per day (Motiva, 2020). The average water consumption by albert is 50 liters per person, and assuming an average work time of 8–10 hours, the benchmark likely aligns well with Finland. The usage was approximately 1,918 liters per production, meaning one production used water equivalent to about 19 times the daily consumption of an average Finn. Water was not included in the 2022 statistics as its tracking was added to the toolkit later.

Compared to the 2022 statistics, the energy consumption was a little bit less per production (2022: 51 MWh, 2023: 43 MWh), but the share of renewables was almost halved (Figure 11, below). The proportion of renewable energy decreased the most concerning filming locations (shares in 2022: 95%, 2023: 6%). Compared to 2022, the overall share of emissions from locations remained the same (2022: 15%, 2023: 16%), but this time emissions from different locations were distributed more evenly (Table 2, p. 11).

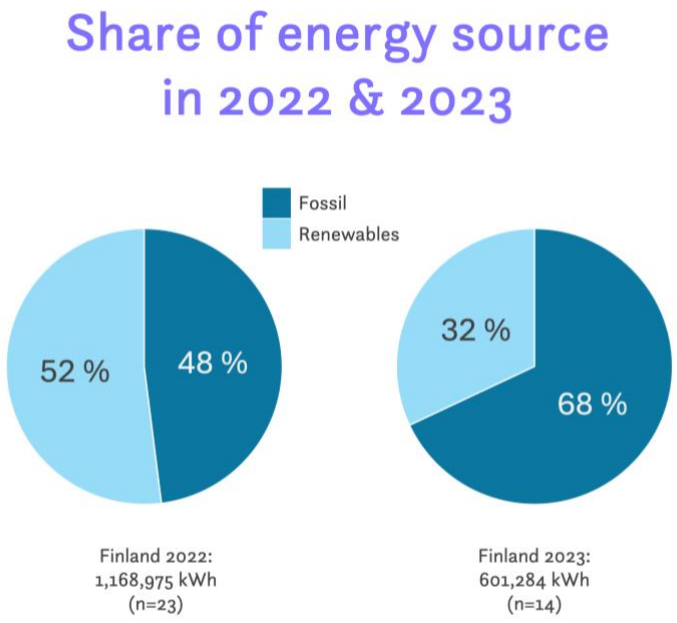

Figure 11 Share of energy source in 2022 & 2023

Materials and waste

Emissions resulting from materials were primarily from food (38.7 tCO_2e), and practically none of it ended up as waste (0.1 tCO_2e). These figures reinforce the analysis from the 2022 report: "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." However, the statistics mainly represent non-fictional productions and still do not include traditionally resource-intensive feature films.

Productions acquired over 12,000 meals, of which 69% were animal-based (Table 5, below). 8,420 meat servings accounted for 91% of all emissions from meals. Emissions reductions could theoretically be easy: if half of the meat dishes had been vegetarian or vegan (dividing the meat dish into these categories 50-50), the total emissions would have been 37% lower (meat servings accounting for 34%, share of total emissions 72%).

Table 5 Catering: amount and emissions of meals (A), and a scenario (B) with 50 % less meat

		Meals, total 12,285		**Meal emissions**		**A = 2022, total emissions**	**B = emissions, if 50 % of meat replaced with vegetarian/vegan**
		lkm	**%**	**tCO_2e**	**%**		
vegetarian	A:	3 208	26.1	30	7.7	38.7 tCO_2e	24.4 tCO_2e (–37 %)
	B:	5 313	43.2	5.0	20.3		
pork	A:	6 195	50.4	23.9	61.7		
	B:	3 097.5	25.2	12.0	48.9		
chicken	A:	1 178	9.6	4.2	10.8		
	B:	589	4.8	2.1	8.6		
vegan	A:	658	5.4	0.4	1.1		
	B:	2 763	22.5	1.8	7.3		
beef	A:	350	2.9	4.3	11.0		
	B:	175	1.4	2.1	8.7		
fish	A:	442	3.6	1.4	3.5		
	B:	221	1.8	0.7	2.8		
lamb	A:	255	2.1	1.6	4.2		
	B:	127.5	1.0	0.8	3.4		

Compared to the statistics from 2022, the proportion of emissions from materials and waste did not change significantly. In 2023, emissions from materials amounted to 48 tCO_2e (2022: 62 tCO_2e), with waste accounting for only 0.4 tCO2e (2022: 0.1 tCO_2e). This time, the number of meals was one-third higher (2022: 9,560, 2023: 12,286), but emissions were more than double (2022: 17.2 tCO_2e, 2023: 38.7 tCO_2e). When viewing these in emissions per dish, they were 1,8 $kgCO_2e$ in 2022 and in 2023 3,2 $kgCO_2e$ in 2023. The change was primarily due to the doubling of meals containing meat.

Genre and production method

The analysis of genre and production method over the three-year period (2021–2023) allowed for the examination of 37 productions broken down into smaller subcategories, ensuring anonymity (appendix 2, p. 27). However, the sample size of individual categories is so small that emissions should not be generalized to all Finnish productions of the same category or to the relationships between different categories.

The most notable observation from dissecting genres and production methods is the emissions from transportation. Their dominance has been consistent across all productions. The subdivision of productions into subcategories, particularly in logistics, reinforces one undeniable fact: **regardless the genre or production method, travel and transport are the most significant contributor to carbon emissions in productions, even in Finland.**

Internationally, the highest emissions are generated by drama and fictional productions shot in studios and locations (albert, 2023). In Finland, these categories have emissions that are at most mid-range, with the highest emissions coming from animation productions. As previously mentioned, making specific generalizations for Finland is still not advisable.

With a sample of 37 productions the biggest quarter accounts for 85 % of all emissions (Figure 12, below). The lowest emissions came from a non-fiction TV production shot in a studio at 0.004 tCO_2e/h, while the highest emissions came from a factual entertainment program shot on location at 67.2 tCO_2e/h. The figures highlight the importance of understanding the ecological impact of different types of productions in order to develop the industry's sustainability.

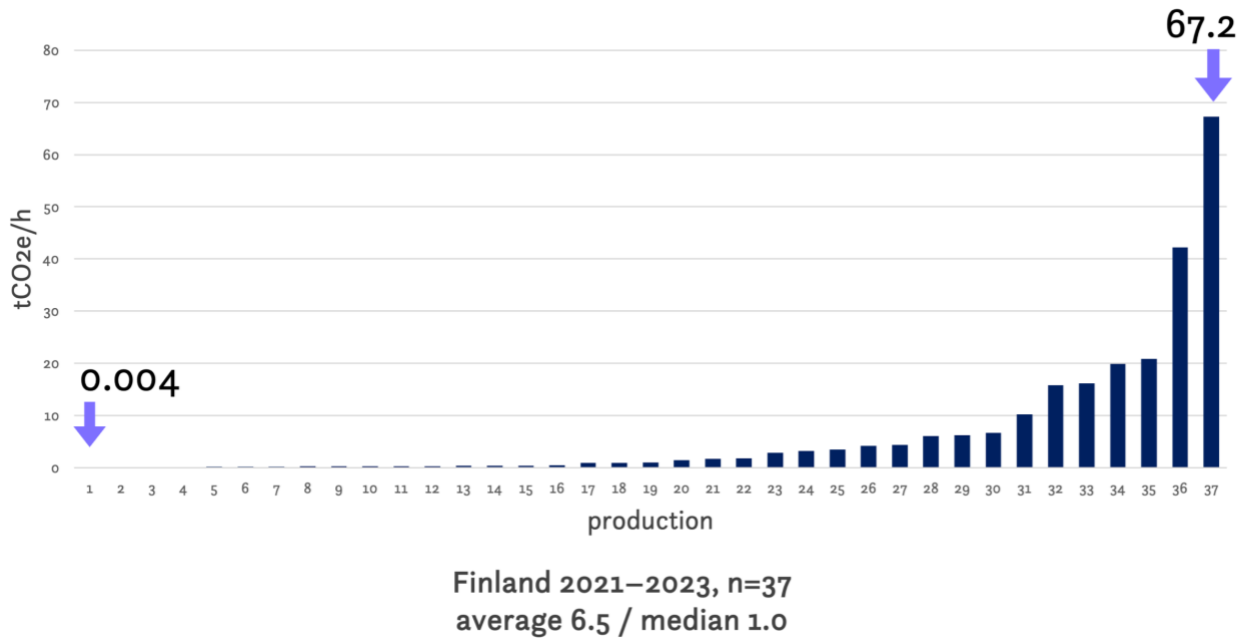

Figure 12 Emissions by Finnish productions

About certificates

Albert's international statistics for the year 2022 indicate an average certification score of 73.8 out of 100 (albert, 2023). Finnish productions, scoring 75 points, slightly outperformed this. However, it's essential to consider that the international statistics comprise nearly 2,000 certified productions, while Finland has less than ten.

Feedback received by APFI often highlights that learning ecological practices is new and time-consuming, making it challenging for many to combine calculation and actions, especially for the first time. Since certification requires concrete actions, it's common for productions to opt for calculations alone. However, in 2023, only five productions chose this path and nine productions aimed also for a certification. The statistics from 2022 included 23 calculated carbon footprints (2021–2022) and only one certification. Hence, it's reasonable to assume that the 2023 productions have made significant strides in practical ecological efforts. Pursuing certification may have been driven by funding criteria or requirements from international conglomerates.

The Carbon Action Plan process involves nearly 100 questions assessing production actions aimed at improving their ecological sustainability. Finnish productions most frequently answered "yes" to questions regarding energy consumption, materials, or waste, and least frequently to questions related to communication or engagement. The proportion of "yes" answers was 50% for questions about content and logistics.

The ability to answer "yes" depends entirely on the production; not all actions are feasible for all productions. For example, if incorporating ecology into editorial feels unnatural, it shouldn't be done, and if shooting takes place in a forest, energy options are limited. However, communication and engagement actions aren't inherently dependent on editorial or execution methods, yet the number of "yes" responses in this category was the lowest. The positive aspect, however, is that change in these categories requires "only" a shift in the general work culture rather than e.g. the construction of new infrastructure. This cultural shift will likely require time, information, training, communication, and adjustments to established working practices.

FUTURE

The collaboration between APFI and albert began in the summer of 2021 with a three-year agreement, which was extended until the end of 2024. This means that productions can continue to use the toolkit for free until the end of the year (carbon calculation and certification). With the extension of the collaboration, Finland will receive the third set of statistics on the ecological aspects of productions for 2024.

Since 2021, the goal of Finland's audiovisual industry has been to understand the environmental and climate impacts of domestic productions and assess the current ecological state of the industry. To achieve this, data has been collected from two sets of production statistics and APFI has started a review the current ecological state of the whole industry.

During the fall of 2024, APFI will lead industry-wide discussions on what will happen in Finland from 2025 onwards. The next step is to plan how the information from the statistics will be utilized and what the next concrete steps are for developing the industry. Albert's statistics focus solely on productions and particularly on carbon emissions, so they represent only one aspect of ecological sustainability and do not consider factors such as biodiversity. A more comprehensive understanding of the ecological state of productions, production companies, and the entire audiovisual industry requires a more diverse and extensive study than is currently available.

APPENDICES

APPENDIX 1 The ecology of film and TV productions, Finland 2023 (albert, 2024)

FILM & TV PRODUCTIONS tCO_2e	FINLAND 2023 (n=14*)		
total tCO_2e	755.26		% of total emissions
tCO_2e/h	6.54		
non-filming spaces	**31.90**		**4.22 %**
production offices	17.33	54.3 %	2.3 %
remote work	9.90	31.0 %	1.3 %
other	4.67	14.6 %	0.02 %
filming spaces	**39.31**		**5.20 %**
studio	27.50	70.0 %	3.6 %
location	11.34	28.9 %	1.5 %
gallery	0.47	1.2 %	0.06 %
travel and transport	**587.73**		**77.82 %**
air travel	138.51	23.6 %	18.3 %
road travel	432.12	73.5 %	57.2 %
rail travel	16.83	2.9 %	2.2 %
boat travel	0.27	0.1 %	0.004 %
couriers &excess baggage	0	0	0
freight	0	0	0
accommodation	**45.58**		**6.03 %**
economy hotel	0.70	1.5 %	0.1 %
midscale hotel	3.28	7.2 %	0.4 %
upscale hotel	17.71	38.9 %	2.3 %
luxury hotel	0	0	0
apartment/condo/flat	23.88	52.4 %	3.2 %
average-size house	0	0	0
large house	0	0	0
materials	**48.11**		**6.37 %**
batteries	0.12	0.3 %	0.02 %
cardboard	0.21	0.4 %	0.03 %
food	38.73	80.5 %	5.1 %
glass	0.03	0.1 %	0.004 %
metal	0.55	1.1 %	0.1 %
paint	0.45	0.9 %	0.1 %
paper	2.23	4.6 %	0.3 %
plastic	2.90	6.0 %	0.4 %
textiles	2.90	4.8 %	0.3 %
timber	0.60	1.3 %	0.1 %

waste	0.42		0.06 %
general/mixed	0.17	39.5 %	0.02 %
food/compostable	0.09	20.5 %	0.01 %
timber	0.01	1.4 %	0.001 %
textile	0.0003	0.1 %	0.00004 %
electric waste	0	0	0
batteries	0.00002	0.01 %	0.000003 %
paper and cardboard	0.14	34.1 %	0.02 %
plastic	0.01	1.6 %	0.001 %
metal	0.003	0.6 %	0.0004 %
glass	0.003	0.8 %	0.0004 %
construction	0.01	1.4 %	0.001 %
post-production	**2.21**		**0.29 %**
post-production	2.21	100 %	0.3 %

*10 TV programmes/series, 2 events for broadcast, 1 short, 1 other, 0 adverts, corporate videos, feature films, online content, or radio programmes

USE OF ENERGY	FINLAND 2023 (n=14)		
total kWh	**601,284**		**renewables 32 %**
non-filming space	**148,873**	**24.8 %**	**15 %**
office spaces	144,654	24.0 %	57 %
remote work. other spaces	4,219	0.8 %	unknown
filming spaces	**71,796**	**11.9 %**	**6 %**
accommodation	**298,804**	**60.1 %**	**42 %**
post-production	**19,562**	**3.3 %**	**61 %**

CATERING. meal types	FINLAND 2023 (n=14)			
	Amount		Emissions tCO_2e	
	12 286	%	38.7	%
vegan	658	5.4	0.35	1.11
vegetarian	3,208	26.1	3.00	7.74
chicken	1,178	9.6	4.17	10.76
pork	6,195	50.4	23.90	61.71
beef	350	2.9	4.25	10.98
fish	442	3.6	1.35	3.49
lamb	255	2.1	1.63	4.22

APPENDIX 2 The ecology of Finnish productions in 2021–2023 (albert, 2023 & 2024)

Genre	FINLAND 2021–2023 Division of productions (n=37*)				
	2021 (n=7)	2022 (n=16)	2023 (n=14)	average tCO_2e/h	
continuing drama	0			-	
current affairs	0			-	
drama	8			5.43	
entertainment	13			2.79	
factual entertainment	7			12.84	
learning	0			-	
news	0			-	
sport	3			0.20	
comedy	1			cens.	11.67
factual	2			cens.	
children	1			cens.	
other	2			cens.	
*31 TV programmes/series, 5 events for broadcast, 2 others, 1 short, 0 adverts, corporate videos, feature films, online content, or radio programmes					

Production method	FINLAND 2021–2023 Division of productions (n=37*)				
	2021 (n=7)	2022 (n=16)	2023 (n=14)	average tCO_2e/h	
archive	0			-	
animation	3			23.08	
event/OB	4			0.91	
remote production	0			-	
scripted (VFX based)	0			-	
scripted (studio)	1			cens.	2.36
unscripted (studio and location)	2			cens.	
scripted (location)	4			6.23	
scripted (studio and location)	5			3.35	
unscripted (location)	13			8.87	
unscripted (studio)	5			0.63	
other	0			-	
*31 TV programmes/series, 5 events for broadcast, 2 others, 1 short, 0 adverts, corporate videos, feature films, online content, or radio programmes					

FINLAND 2021–2023 Emissions from logistics in productions (n=37)	
Genre	
drama (8)	59.3 %
entertainment (13)	79.2 %
factual entertainment (7)	97.9 %
sport (3)	36.8 %
other (6)	18.1 %
Production method (general)	
fiction (10)	59.1 %
non-fiction (20)	89.9 %
other (7)	19.8 %
Production method (breakdown)	
non-fiction, location (13)	91.6 %
non-fiction, studio (5)	15.6 %
fiction, location (4)	72.8 %
fiction, location & studio (5)	49.4 %
animation (3)	5.4 %
other (3)	47.3 %
events / OB (4)	82.8 %

APPENDIX 3 Calculating a production's carbon footprint

The albert toolkit defines productions by different categories:

Production type:

1. advert
2. corporate video
3. event for broadcast
4. feature film
5. online content
6. radio programme/series
7. short
8. tv programme/series
9. other

Genre:

1. children
2. comedy
3. continuing drama
4. current affairs
5. drama
6. entertainment
7. factual entertainment
8. factual
9. learning
10. news
11. sport
12. other

Production method:

1. animation
2. archive
3. event/OB
4. remote production
5. scripted (studio)
6. scripted (location)
7. scripted (studio & location)
8. scripted (VFX based)
9. unscripted (studio)
10. unscripted (location)
11. unscripted (studio & location)
12. other

Calculation of a production's carbon footprint 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, renewable energy?
- **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, renewable energy?
- **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 considered in the calculator (circular economy). If the material is not recovered for further use but becomes waste, the material must be entered as disposal.

APPENDIX 4 Carbon Action Plan (summary)

Carbon Action Plan (CAP) refers to the process by which a film or TV production aims to achieve the albert certification. Carbon calculation involves representing actions as carbon dioxide equivalents, but it does not require sustainable actions in practice. Obtaining the certification demonstrates that the production has not only calculated its emissions but also taken practical steps to reduce the negative climate and environmental impacts of the production. While carbon calculation is about compiling data into numbers, the CAP process also covers production aspects that cannot be quantified (e.g., communication). Below is a simplified breakdown of the process; more detailed information and additional material can be found on albert's website.

CAP questions are divided into four categories (table below), and the questions guide productions on how to improve the ecological aspects of that category. There are approximately 100 questions, but not all questions are relevant to every production:

- some questions are filtering and non-scoring, used to determine what is relevant for each production
- about a quarter of the questions are mandatory, meaning their corresponding actions must be implemented to obtain the certification
- about half of the questions are optional, meaning they are not required but implementing them increases the production's overall score

Carbon Action Plan Questions (Aug, 2023)		
Category	Examples of questions (selected)	
communication & engagement	Is there a senior person accountable for implementing agreed sustainable goals? (i.e. HOP, PE, producer)	mandatory & scoring
	Will everyone on the production (i.e. HOD's, crew) be sent a "green memo" prior to filming to make them aware of the production's environmental goals?	mandatory & scoring
	Will the production take note of any costs incurred or savings made as a result of implementing environmentally positive action?	scoring
editorial content	Does climate, sustainability, or the environment feature in the dialogue or commentary of the program?	scoring
	How have you ensured that any substantial components of this production are not normalizing unsustainable behavior?	non scoring
production energy, materials & waste	Production office: is mains power in production used from a 100 % renewable sourced energy tariff?	scoring filtered question
	If building sets: has the construction company and art department primarily used low VOC (volatile organic compound) or water-based paint?	mandatory scoring filtered question
	Are you asking your cast and crew to bring their own reusable water bottles and/or cups if they have one?	scoring filtered question
travel	Are phone or video-conferencing facilities being used in place of physical meetings that require extensive travel?	mandatory & scoring
	Is all crew within 50 miles of filming location? (exception for senior roles)	scoring
	Does the production or any of its members (incl. on-screen talent) need to travel 200+ miles?	non scoring

Based on the production’s responses, albert selects 10–15 parts for which the production must provide evidence (e.g., a photo or a copy of a receipt). Based on the emissions calculation and the provided evidence, albert assesses the production's ecological performance, scores the production (max 100 points), and awards a 1, 2, or 3-star certification to those that achieve at least 55 points and fulfill all mandatory items (table below).

Carbon Action Plan Score		
Star Rating	Score	Explanation
...	below 55%	The production needs a minimum of 55 % actions in the carbon action plan to gain certification. If you score below, your CAP will be sent back to you. You will be able to change your answers at this stage, in order to score higher.
*	55%	This is the minimum compliance with the CAP, including all mandatory questions.
**	70%	The higher your score, the more evidence questions will be required.
***	85%	Anything above 85 % will be rewarded with 3 stars and is the highest achievement for your production.