Supplementary Information 1 for

Life Cycle Assessment of a Generative Artificial Intelligence System: The Case of a Radio Application

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S1. Input data and life cycle inventory results for the baseline scenario

S1.1. Computer hardware production

Table S1. Computer hardware specifications for KSPR provided by the KSPR team and applied to obtain further information on size (e.g. weight) from other sources. Note that the values for the category "size" are presented with two significant figures.

Component	Specifications from the KSPR team			Collected information based on specifications	
	Brand	Name	Size	Size	Comment
GPU	NVIDIA	GeForce GTX TITAN X	-	940 g	The weight of the GPU was obtained from msi (2025) (at 942 g) based on the specifications provided by the KSPR team. Note that the unit of grams was not stated by msi (2025) but it was assumed by the authors based on that Amazon (2025) stated a total weight at 1 275 g for this GPU, considered to also include packaging.
CPU	Intel	i7 5930K	64 GB	-	CPU was modelled to be included in the motherboard in line with Loubet et al. (2023).
SSD	Samsung	850 EVO	1 TB	55 g	The weight of the SSD was obtained from Samsung (2025) based on the specifications provided by the KSPR team.
2*HDD	Seagate	Barracuda	4 TB	-	Considered to be the same as in Loubet et al. (2023)
RAM	-	-	64 GB	-	Considered to be the same as in Loubet et al. (2023)
Chassis	Fractal Design	Define R5	-	11 kg	The weight of the KSPR chassis at 10.7 kg was obtained from Fractal Design (2025) based on the specifications provided by the KSPR team.
Screen	Philips	BMD3270	32“	6.9 kg	The weight of the screen was obtained from Inet (2025b) based on the specifications provided by the KSPR team. The screen was assumed to only consists of liquid crystal display (LCD) (Subramanian and Yung 2017)
Mouse	HP	-	-	1 piece	-
Keyboard	Dell	-	-	1 piece	-

Note that "-" implies that information was missing.

Table S2. Life cycle inventory calculation input values and life cycle inventory results for the foreground system for the computer hardware production process in the baseline scenario. Note that values are presented with two significant figures.

Parameter [unit]	**Value**	**References and comments**
Total computer weight, m_c [kg]	25	For more detailed data on the computer and its components, see **Table S3**.
Lifetime of the computer, T_c [year].	5.0	Loubet et al. (2023)
Weight of the computer per functional unit, $m_{c,fu}$ [kg/ functional unit]	0.00057	Calculated (Eq 1 in the article). This value is then applied to scale the unit process data in **Table S3** to the functional unit.

Table S3. Unit process data per one assembled KSPR computer, including packaging, weighing about 25 kg* and transported from Shanghai, China, to Gothenburg, Sweden, by ship and finally transported from Gothenburg to Stockholm by lorry. These values were later scaled based on the resulting weight of the computer that can be assigned to the functional unit (see **Table S2**). Note that the disk drive (CD/DVD) included in Loubet et al. (2023) was not included in this study. Note that values are rounded with two significant figures. PCB=Printed circuit board. PP=polypropylene. GPU=graphical processing unit. HDD=hard disk drive. SSD=solid-state drive. CPU=central processing unit.

Flow	Computer component or type of process	Parameter	Value	Unit	References and comments
Computer assembly, including computer components					
Input	Computer component	Motherboard	700	g	Motherboard and its inputs: Loubet et al. (2023). The CPU was modelled as a part of the motherboard.
Input	Motherboard component	Processor	6.8	g	
Input	Motherboard component	Wafer	64	mm^2	
Input	Motherboard component	Electrolytic capacitors	54	g	
Input	Motherboard component	SMD (mainly capacitors)	92	g	
Input	Motherboard component	Inductors	17	g	
Input	Motherboard component	Integrated circuits	50	g	
Input	Motherboard component	PCB	67 000	mm^2	
Input	Motherboard process	Mounting of PCB	67 000	mm^2	
Input	Motherboard component	PCIE and RAM slots	81	g	
Input	Motherboard component	Connectors	180	g	
Input	Computer component	GPU	940	g	GPU and its inputs: Modelled based on the Loubet et al. (2023) components; motherboard, GPU and RAM, and here scaled to be about 14% larger for KSPR since the weight of the KSPR GPU at about 940 g (see **Table S1**) is about 14% larger than the weight of these Loubet et al. (2023) components (at about 830 g**).
Input	GPU component	Processor	7.7	g	These inputs are modelled and scaled based on the motherboard component in Loubet et al. (2023).
Input	GPU component	Wafer	73	mm^2	
Input	GPU component	Electrolytic capacitors	62	g	
Input	GPU component	SMD (mainly capacitors)	100	g	
Input	GPU component	Inductors	19	g	
Input	GPU component	Integrated circuits	57	g	
Input	GPU component	PCB	77 000	mm^2	
Input	GPU process	Mounting of PCB	77 000	mm^2	
Input	GPU component	PCIE and RAM slots	93	g	
Input	GPU component	Connectors	210	g	
Input	GPU component	Electrolytic capacitors	5.9	g	These inputs are modelled and scaled based on the GPU

Input	GPU component	SMD (mainly capacitors)	25	g	component in Loubet et al. (2023).
Input	GPU component	Inductors	4.3	g	
Input	GPU component	Integrated circuit (logic type)	11	g	
Input	GPU component	Integrated circuit (memory type)	9.1	g	
Input	GPU component	Wafer	92	mm^2	
Input	GPU component	PCB	12 000	mm^2	
Input	GPU process	Mounting of PCB	12 000	mm^2	
Input	GPU component	Connectors	23	g	
Input	GPU component	Integrated circuit (memory type)	9.1	g	These inputs are modelled and scaled based on the RAM component in Loubet et al. (2023).
Input	GPU component	PCB	4 600	mm^2	
Input	GPU process	Mounting of PCB	4 600	mm^2	
Input	Computer component	RAM	1	piece	RAM and its inputs: Loubet et al. (2023)
Input	RAM component	Integrated circuit (memory type)	8	g	
Input	RAM component	PCB	4 000	mm^2	
Input	RAM process	Mounting of PCB	4 000	mm^2	
Input	Computer component	HDD	1	piece	Loubet et al. (2023).
Input	Computer component	SSD	55	g	See **Table S1**
Input	Computer component	Power supply unit	1	piece	Loubet et al. (2023).
Input	Computer component	Chassis	11	kg	Chassis and its inputs: Loubet et al. (2023). Note that all the these component chassis inputs (except the computer cable plug, network cable plug and the inputs for the fans) are here scaled to be about 73 weight-% larger than in Loubet et al. (2023)***.
Input	Chassis component	Steel, low-alloyed, hot rolled	8.6	kg	
Input	Chassis process	Sheet rolling, steel	8.6	kg	
Input	Chassis component	Powder coat, steel	0.92	m^2	
Input	Chassis component	Acrylonitrile-butadiene-styrene copolymer	0.26	kg	
Input	Chassis process	Stretch blow moulding	0.26	kg	
Input	Chassis component	Cable, ribbon cable, 20-pin, with plugs	0.086	kg	
Input	Chassis component	Connector cable	3.1	m	
Input	Chassis component	Computer cable plug	1	piece	Note that the computer cable plug was not scaled based on weight (one was considered to be needed).
Input	Chassis component	Network cable	5.2	m	
Input	Chassis component	Network cable plug	1	piece	Note that the network plug was not scaled based on weight (one was considered to be needed).
Input	Chassis component	Aluminium, wrought alloy	0.80	kg	Part of desktop 120 mm air-cooling system

Input	Chassis process	Section bar extrusion, aluminium	0.80	kg	Part of desktop 120 mm air-cooling system
Input	Chassis component	Copper	0.18	kg	Part of desktop 120 mm air-cooling system
Input	Chassis process	Wire drawing, copper	0.18	kg	Part of desktop 120 mm air-cooling system
Input	Chassis component	High density polyethylene, granulate	0.28	kg	Part of desktop 120 mm air-cooling system - Fan 120 mm. Note that the fan inputs were not scaled based on weight but the number of fans for the chassis was adjusted from one in Loubet et al. (2023) to two in this study.
Input	Chassis process	Injection moulding	0.28	kg	
Input	Computer component	Fan 120 mm	0.14	kg	Fan 120 mm and its inputs: Loubet et al. (2023).
Input	Fan component	High density polyethylene, granulate	0.14	kg	
Input	Fan process	Injection moulding	0.14	kg	
Input	Computer component	Packaging	2.4	kg	Packaging and its inputs: Loubet et al. (2023)
Input	Packaging component	Corrugated board box	2.2	kg	
Input	Packaging component	Polypropylene, granulate	0.16	kg	
Input	Packaging process	Polymer foaming	0.16	kg	
Input	Computer component	Screen	6.9	kg	See **Table S1**
Input	Computer component	Mouse	1	piece	See **Table S1**
Input	Computer component	Keyboard	1	piece	See **Table S1**
Input	Assembly process	Electricity, China	2.8	kWh	Loubet et al. (2023)
Input	Assembly process	Tap water	1.6	m^3	Loubet et al. (2023). Corresponding to about 1600 kg tap water (with a density of water at about 1000 kg /m^3)
Output	Assembly process	Treatment of wastewater	1.6	m^3	Loubet et al. (2023)
Transport					
Input	Process	Transport, ship	510	tkm	SEA-DISTANCES (2025), transport 20 300 km via the Suez Canal by ship from Shanghai to Gothenburg, here considering a computer weight at about 25 kg
Input	Process	Transport, lorry	12	tkm	Google maps (2025), 471 km transport by truck from Gothenburg to Stockholm, here considering a computer weight at about 25 kg

* The total weight of the computer was obtained by summarizing the weights of its individual components. Note that the weight of some components and their inputs (i.e., RAM, HDD, power supply unit, mouse and keyboard) was not available and/or not explicitly stated in Loubet et al. (2023) but were then instead obtained and/or calculated based on data (such as weight per piece or weight per meter or weight per m^2) from the Ecoinvent (2025) datasets applied, which are listed in **Section S2**.

** The component named GPU in Loubet et al. (2023) was identified, based on the computer specifications (Dell 2018), to simply include an integrated circuit, and hence, it only partly represents the GPU in KSPR (msi 2025). Due to the limited data availability for the KSPR GPU, it was modelled by combining the three Loubet et al. (2023) components; motherboard, GPU and RAM to make it more representative based on the KSPR GPU specifications (msi 2025). The weight of the Loubet et al. (2023) components (i.e., motherboard, GPU and RAM) at about 830 g was obtained by summing the weight of the inputs to these components. When weights for component inputs (i.e., wafer and PCB) were not explicitly stated in Loubet et al. (2023), the data were then instead obtained and/or calculated based on data (such as weight per m^2) from the Ecoinvent (2025) datasets applied, which are listed in **Section S2**.

*** The chassis in Loubet et al. (2023) and the KSPR chassis were both modelled to include one computer cable plug and one network plug. However, while the chassis in Loubet et al. (2023) was modelled to have one fan, the KSPR chassis was modelled to include two fans. All the Loubet et al. (2023) chassis inputs (except the computer cable plug, network cable plug and the inputs for the fan) were scaled to be about 73 weight-% larger than in Loubet et al. (2023). This was done since the weight of the KSPR chassis (when the weight of the computer cable plug, network cable plug and the inputs for the two fans have been subtracted) is about 73% larger than the weight of the Loubet et al. (2023) chassis components (when the weight of the computer cable plug, network cable plug and the inputs for one fan have been subtracted). The weight of individual chassis components was obtained from Loubet et al. (2023) based on data stated explicitly in their study, see Table 4 in their study; steel (5 kg), acrylonitrile-butadiene-styrene copolymer (0.15 kg), Cable, ribbon cable, 20-pin, with plugs (0.05 kg). The weight of the desktop 120 mm air-cooling system was provided in their Table S1.7 (0.463 kg plus 0.107 kg) and the weight of one 120 mm diameter fan was provided in their Table S1.6 (at 0.139 kg). However, the weight of the inputs of “Connector cable”, “Computer cable plug”, “Network cable” and “Network cable plug” were not explicitly stated in Loubet et al. (2023) but were instead obtained and/or calculated based on data (such as weight per piece or weight per meter) from the Ecoinvent (2025) datasets applied, see **Section S2**. In this way, the total weight of the chassis in Loubet et al. (2023) was estimated to about 6.2 kg. Note that the weight for “powder coat, steel” was not included since data on its weight was not available in the applied Ecoinvent (2025) dataset. On the other hand, it was expected to only constitute a smaller part of the total chassis weight.

S1.2. Training of AI models

Table S4. Life cycle inventory calculation input values and life cycle inventory results for the foreground system for the training of AI models: Total energy consumption from training AI models and number of inferences per functional unit, in the baseline scenario. Note that values are presented with two significant figures. LLM=large language model.

Parameter [unit]	Mistral 7B	TorTois e TTS	Suno AI	References and comments
Total energy consumption from training AI models				
Training time in GPU-hours for model i, $T_{GPU,i}$ [hours]	1 300 000	70 000	-	*Mistral 7B*: Github (2024), data for the LLM Llama 3, 8B, applied as an approximation since it is similar in size to Mistral 7B, both in terms of parameters and memory size (Bast et al. 2024). *TorToise TTS*: 24 hours times 365 days times eight, since trained on eight GPUs, Betker (2023)
Power of the GPU applied for model i, P_i [kW]	0.70	0.35	-	*Mistral 7B*: Github (2024), data for the LLM Llama 3, 8B, applied as an approximation since it is similar in size to Mistral 7B, both in terms of parameters and memory size (Bast et al. 2024). *TorToise TTS*: Trained on NVIDIA RTX-3090 GPU-type (Betker 2023) with a power at 0.35 kW (NVIDIA 2025).
Number of parameters for model i, p_i [billion]	-	-	5	Assuming that Suno AI (released in March 2024 (Misadov 2024)) holds the same number of parameters as another music model named Jukebox (released in 2020), which holds five billion parameters (Open AI 2020), and is similar in quality of output and tasks performed (Suno AI 2025a). This seems to be in line with two large music generative models released in 2023, such as MusicLM (Agostinelli et al. 2023), which probably has 2-3 billion parameters based on an estimate made by the authors based on Agostinelli et al. (2023), and Music Gen by Meta, which holds 3.3 billion parameters (Copet et al. 2023).
Energy consumed for training a music model per number of parameters, E_H [kWh/billion]	-	-	11 000	Based on data from Holzapfel et al. (2024), dividing 4375 kWh, i.e., the training energy of the largest AI model for automatic music generation in the study by Holzapfel et al. (2024), with its 0.412 billion parameters, based on Hawthorne et al. (2022) and their "base" diffusion model.
Total energy consumption from training of AI model i, $E_{tr,i}$ [kWh]	910 000	25 000	53 000	Calculated using Eq 3 in the article for Mistral 7B and Tortoise TTS and Eq 4 in the article for Suno AI.
Number of inferences per functional unit				
Number of inferences made by KSPR per functional unit for model i, $I_{fu,i}$ [-]	12	41	10	*Mistral 7B and Tortoise TTS*: Measured and collected for KSPR, specifically, see further **Supplementary Information 2**. *Suno AI*: Derived by dividing the number of music minutes per functional unit (30 minutes) by the average length of a song (three minutes). The data was obtained in personal communication with the KSPR team.

Table S5. Life cycle inventory calculation input values and life cycle inventory results for the foreground system for the training of AI models: Total number of inferences over the AI models' lifetimes, in the baseline scenario. Note that values are presented with two significant figures. LLM=large language model.

Parameter [unit]	Mistral 7B	TorToise TTS	Suno AI	References and comments
Total number of inferences over the AI models' lifetimes				
Lifetime of model i, T_i [days]	550	370	240	*Mistral 7B*: Based on release, September 27th 2023 (Mistral AI 2023), and retirement dates, March 30th 2025 (Mistral AI 2025), for Mistral 7B. *TorToise TTS*: In the official GitHub repository, the model was last updated on December 15th, 2023, and the last changes overall (e.g. to documentation) were made on November 19th, 2024 (Github 2025). Based on this, it was assumed that the model's lifetime is one year (365 days), considering the development of many other text-to-speech models in the following months (Matan and Velvizhy 2025). *Suno AI*: Based on the release dates for Suno AI v3, March 21st 2024 (Misadov 2024), and Suno AI v4, November 19th 2024 (Suno AI 2024), (i.e., 243 days, v3 was assumed to be retired at the release of v4).
Number of users per day for model i, $U_{day,i}$ [-]	5 600 000	20 000	6 000 000	Set to be half of the total number of downloads or users. *Mistral 7B*: Hugging Face (2025), (11 187 756 divided by 2) *TorToise TTS*: pepy.tech (2025), (39 000 divided by 2) *Suno AI*: Dredge (2024), (12 000 000 divided by 2)
Number of queries per user for model i, $Q_{u,i}$ [-]	18	70	5	*Mistral 7B*: Assumed to be the same as for ChatGPT at 17.5 (dividing 2 billion queries per day with 114.2 million users per day) (Singh 2025) *TorToise TTS*: Set to four times the value for Mistral 7B, i.e. 4 times 17.5, based on typical number of inferences in KSPR for Tortoise TTS compared to Mistral 7B, see **Supplementary Information 2**. *Suno AI*: Set to five based on the maximum number of songs that can be generated per day with a free service subscription Suno AI (2025b)
Number of queries per day for AI model i, $Q_{day,i}$ [-]	98 000 000	1 400 000	30 000 000	Calculated (Eq 6 in the article).
Total number of inferences over the lifetime of model i, $I_{lt,i}$ [-]	54 000 000 000	500 000 000	7 300 000 000	Calculated (Eq 5 in the article).
Energy use from training AI model i per functional unit, $E_{tr,fu,i}$ [kWh/functional unit]	2.0E-4	2.0E-3	7.3E-5	Calculated (Eq 2 in the article).

S1.3. KSPR deployment

The energy intensity of the internet, or the average energy required to transfer a certain amount of data over the internet, was calculated based on the following procedure and data as suggested by Coroamă (2021):

- Energy intensity values in the year of 2020:
    - Wide-area network (WAN) at 0.02 kWh/GB
    - Fixed access network (FAN) at 0.07 kWh/GB
    - Radio access network (RAN) at 0.2 kWh/GB

Coroamă (2021) suggested that the data for 2020 can be extrapolated for a couple of years into the future by applying annual intensity reduction factors to account for yearly efficiency gains:

- Annual energy intensity reduction factor:
    - WAN: 0.8
    - FAN: 0.85
    - RAN: 0.8

Thus, the average energy intensity of the internet in 2025 was calculated by applying the data for 2020 and extrapolating it to the year of 2025, by combining equations number five and fifteen in Coroamă (2021), according to:

$$EI_{y+n,Internet} = EI_{y,WAN} \cdot r_{WAN}^{n} + \left(1 - s_{RAN,y+n}\right) \cdot EI_{y,FAN} \cdot r_{FAN}^{n} + s_{RAN,y+n} \cdot EI_{y,RAN} \cdot r_{RAN}^{n} \qquad \text{Eq A1}$$

where $EI_{y+n,Internet}$ is the average energy intensity of the internet in year y+n [kWh/GB], $EI_{y,WAN}$ is the average energy intensity of WAN in year y [kWh/GB], r_{WAN}^{n} is the annual intensity reduction factor for WAN [-], $s_{RAN,y+n}$ is the suggested share of data accessed via RAN among all internet-delivered data in year y+n [-], $EI_{y,FAN}$ is the is the average energy intensity of FAN in year y [kWh/GB], r_{FAN}^{n} is the annual intensity reduction factor for FAN [-], $EI_{y,RAN}$ is the average energy intensity of RAN in year y [kWh/GB], r_{RAN}^{n} is the annual intensity reduction factor for RAN [-] and n was here set to five. The value applied for $s_{RAN,2025}$ was set to 0.1 based on Tarara (2025).

Table S6. Input values for life cycle inventory calculations and life cycle inventory results for the foreground system for the KSPR deployment process in the baseline scenario. Note that values are presented with two significant figures.

Parameter [unit]	Mistral 7B	TorToise TTS	Suno AI	References and comments
Total network energy required for AI model downloading				
Energy intensity of the internet, $EI_{Internet}$ [kWh/GB]	0.041	0.041	0.041	Calculated based on Coroamă (2021) and Tarara (2025) as explained in **Section S1.3**.
Size of the data being transferred for the AI model or music library i, M_i [GB]	4.1	15	74	*Mistral 7B*: Bast et al. (2024) *TorToise TTS*: Voice Models (2025) *Suno AI*: Personal communication with the KSPR team (73.73 GB)
Total network energy required for downloading AI model or music library i, $E_{d,i}$ [kWh]	0.17	0.62	3.0	Calculated (Eq 7 in the article).
Energy from AI model downloading per functional unit				
Expected lifetime of KSPR, T_{lt} [days]	1 100	1 100	-	Counting from its launch on March 22nd, 2024 and two years forward from the time of writing (April 22nd, 2025): 1126 days
Number of music minutes per functional unit, $T_{m,fu}$ [min]	-	-	30	Personal communication with the KSPR team
Total number of minutes in the library, T_m [min]	-	-	54 000	Personal communication with the KSPR team (53 690 minutes)
Energy use from downloading AI model or music library i per functional unit, $E_{d,i,fu}$ [kWh/functional unit]	6.2E-6	2.3E-5	1.7E-3	*Mistral 7B and Tortoise TTS*: Calculated (Eq 8 in the article). *Suno AI*: Calculated (Eq 9 in the article).

S1.4. Use phase

The generation of the radio session, represented by the processes; text generation in Mistral 7B, text-to-speech conversion in TorToise TTS, music mixing (song choice, assembly and export) and session assembly, is a stepwise process where sessions are pre-generated in batches following a fixed schedule. The generating steps occurs one at a time, while the broadcasting of the session is a continuous process that happens in parallel with the pre-generation of radio sessions. The broadcasting of KSPR refers to the energy required to get the radio session continuously broadcasted on YouTube, which depends on KSPR's workstation and the Wi-Fi it is connected to. The broadcasting data was difficult to separate from the generation processes without losing precision. Thus, since it is a continuous process in parallel to the generation, it was included in the data for the generation processes (see **Table S7**).

Table S7. Life cycle inventory calculation input values and life cycle inventory results for the foreground system for the use phase processes in the baseline scenario. Note that values are presented with two significant figures.

Parameter [unit]	Text generation in Mistral 7B	Text-to-speech conversion in TorToise TTS	Music mixing (song choice, assembly and export)	Session assembly	Streaming	References and comments
Total measured energy consumption during the 96-hour measurement interval, E_p [kWh]	3.2*	11*	0.12*	0.56*	-	Measured and collected for KSPR, specifically, see **Supplementary Information 2**.
Energy consumption for one-hour streaming per listener, E_s [kWh/listener]	-	-	-	-	0.08	Kamiya (2020), typical value for one hour of video streaming, while the actual value depends on the device, network connection and resolution.
Number of listeners, n_l [-]	1					Information collected on KSPR's YouTube channel by the fourth author of this article
Total use phase energy for KSPR per functional unit, $E_{use,fu}$, [kWh/ functional unit]	0.24					Calculated (Eq 10 in the article).

* Note that the data for the processes of Text generation in Mistral 7B, text-to-speech conversion in TorToise TTS, music mixing (song choice, assembly and export) and session assembly also include the energy needed for broadcasting.

S1.5. Baseline scenario life cycle inventory results for the foreground system

Table S8. Summary of the life cycle inventory results for the foreground system in the baseline scenario. Note that values are presented with two significant figures. fu=functional unit.

Parameter	Value	Unit
Computer hardware production		
Weight of the computer	5.7E-04	kg/fu
AI model training		
Energy use from training AI model Mistral 7B	2.0E-04	kWh/fu
Energy use from training AI model Tortoise TTS	2.0E-03	kWh/fu
Energy use from training AI model Suno AI	7.3E-05	kWh/fu
KSPR deployment		
Energy use from downloading AI model Mistral 7B	6.2E-06	kWh/fu
Energy use from downloading AI model Tortoise TTS	2.3E-05	kWh/fu
Energy use from downloading music from Suno AI	1.7E-03	kWh/fu
Use phase KSPR		
Use phase energy for Text-generation Mistral 7B	3.3E-02	kWh/fu
Use phase energy for Text-to-speech converstion Tortoise TTS	1.2E-01	kWh/fu
Use phase energy for Music mixing	1.2E-03	kWh/fu
Use phase energy for Session assembly	5.8E-03	kWh/fu
Use phase energy for Streaming	8.0E-02	kWh/fu
End-of-life for computer hardware		
Computer hardware to recycling	5.2E-04	kg/fu
Computer hardware to municipal solid waste	5.7E-05	kg/fu

S2. Background system data

Table S9. Datasets applied from Ecoinvent (2025) for the background system processes. PCB=printed circuit board.

Background system data	**Ecoinvent 3.11 dataset**
Computer hardware production	
Motherboard	
Inputs	
Processor	Integrated circuit, logic type (GLO)| market for integrated circuit, logic type | Cut-off, U
Integrated circuits	
Wafer	Wafer, fabricated, for integrated circuit (GLO)| market for wafer, fabricated, for integrated circuit | Cut-off, U
Electrolytic capacitors	Capacitor, electrolyte type, < 2cm height (GLO)| market for capacitor, electrolyte type, < 2cm height | Cut-off, U
SMD (mainly capacitors)	Capacitor, for surface-mounting (GLO)| market for capacitor, for surface-mounting | Cut-off, U
Inductors	Inductor, low value multilayer chip (GLO)| market for inductor, low value multilayer chip | Cut-off, U
PCB	Printed wiring board, for surface mounting, Pb free surface (GLO)| market for printed wiring board, for surface mounting, Pb free surface | Cut-off, U
Mounting of PCB	Mounting, surface mount technology, Pb-free solder (GLO)| market for mounting, surface mount technology, Pb-free solder | Cut-off, U
PCIE and RAM slots	Electric connector, peripheral component interconnect buss (GLO)| market for electric connector, peripheral component interconnect buss | Cut-off, U
Connectors	Electric connector, peripheral type buss (GLO)| market for electric connector, peripheral type buss | Cut-off, U
GPU	
Inputs	
Electrolytic capacitors	Capacitor, electrolyte type, < 2cm height (GLO)| market for capacitor, electrolyte type, < 2cm height | Cut-off, U
SMD (mainly capacitors)	Capacitor, for surface-mounting (GLO)| market for capacitor, for surface-mounting | Cut-off, U
Inductors	Inductor, low value multilayer chip (GLO)| market for inductor, low value multilayer chip | Cut-off, U
Integrated circuit (logic type)	Integrated circuit, logic type (GLO)| market for integrated circuit, logic type | Cut-off, U
Integrated circuit (memory type)	Integrated circuit, memory type (GLO)| market for integrated circuit, memory type | Cut-off, U
Wafer	Wafer, fabricated, for integrated circuit (GLO)| market for wafer, fabricated, for integrated circuit | Cut-off, U
PCB	Printed wiring board, for surface mounting, Pb free surface (GLO)| market for printed wiring board, for surface mounting, Pb free surface | Cut-off, U
Mounting of PCB	Mounting, surface mount technology, Pb-free solder (GLO)| market for mounting, surface mount technology, Pb-free solder | Cut-off, U
Connectors	Electric connector, peripheral type buss (GLO)| market for electric connector, peripheral type buss | Cut-off, U
RAM	
Inputs	
Integrated circuit (memory type)	Integrated circuit, memory type (GLO)| market for integrated circuit, memory type | Cut-off, U
PCB	Printed wiring board, for surface mounting, Pb free surface (GLO)| market for printed wiring board, for surface mounting, Pb free surface | Cut-off, U
Mounting of PCB	Mounting, surface mount technology, Pb-free solder (GLO)| market for mounting, surface mount technology, Pb-free solder | Cut-off, U

Chassis	
Inputs	
Steel, low-alloyed, hot rolled	Steel, low-alloyed, hot rolled (GLO)| market for steel, low-alloyed, hot rolled | Cut-off, U
Sheet rolling, steel	Sheet rolling, steel (GLO)| market for sheet rolling, steel | Cut-off, U
Powder coat, steel	Powder coat, steel (GLO)| market for powder coat, steel | Cut-off, U
Acrylonitrile-butadiene-styrene copolymer	Acrylonitrile-butadiene-styrene copolymer (GLO)| market for acrylonitrile-butadiene-styrene copolymer | Cut-off, U
Stretch blow moulding	Stretch blow moulding (GLO)| market for stretch blow moulding | Cut-off, U
Cable, ribbon cable, 20-pin, with plugs	Cable, ribbon cable, 20-pin, with plugs (GLO)| market for cable, ribbon cable, 20-pin, with plugs | Cut-off, U
Connector cable	Cable, connector for computer, without plugs (GLO)| market for cable, connector for computer, without plugs | Cut-off, U
Computer cable plug	Plug, inlet and outlet, for computer cable (GLO)| market for plug, inlet and outlet, for computer cable | Cut-off, U
Network cable	Cable, network cable, category 5, without plugs (GLO)| market for cable, network cable, category 5, without plugs | Cut-off, U
Network cable plug	Plug, inlet and outlet, for network cable (GLO)| market for plug, inlet and outlet, for network cable | Cut-off, U
Aluminium, wrought alloy	Aluminium, wrought alloy (GLO)| market for aluminium, wrought alloy | Cut-off, U
Section bar extrusion, aluminium	Section bar extrusion, aluminium (GLO)| market for section bar extrusion, aluminium | Cut-off, U
Copper	Copper-rich materials (GLO)| market for copper-rich materials | Cut-off, U
Wire drawing, copper	Wire drawing, copper (GLO)| market for wire drawing, copper | Cut-off, U
Fan 120 mm	
Inputs	
High density polyethylene, granulate	Polyethylene, high density, granulate (GLO)| market for polyethylene, high density, granulate | Cut-off, U
Injection moulding	Injection moulding (GLO)| market for injection moulding | Cut-off, U
Assembly of computer	
Inputs	
Electricity, China	Electricity, medium voltage (CN)| market group for electricity, medium voltage | Cut-off, U
Tap water	Tap water (RoW)| market for tap water | Cut-off, U
Outputs	
Treatment of wastewater	Wastewater, unpolluted (RoW)| market for wastewater, unpolluted | Cut-off, U
Packaging	
Inputs	
Corrugated board box	Corrugated board box (RoW)| market for corrugated board box | Cut-off, U
Polypropylene, granulate	Polypropylene, granulate (GLO)| market for polypropylene, granulate | Cut-off, U
Polymer foaming	Polymer foaming (GLO)| market for polymer foaming | Cut-off, U
Other computer components	
Inputs	
Hard disk drive	Hard disk drive, for desktop computer (GLO)| market for hard disk drive, for desktop computer | Cut-off, U
Solid-state drive	Integrated circuit, logic type (GLO)| market for integrated circuit, logic type | Cut-off, U
Power supply unit	Power supply unit, for desktop computer (GLO)| market for power supply unit, for desktop computer | Cut-off, U
Screen	Liquid crystal display, unmounted (GLO)| market for liquid crystal display, unmounted | Cut-off, U
Mouse	Pointing device, optical mouse, with cable (GLO)| market for pointing device, optical mouse, with cable | Cut-off, U
Keyboard	Keyboard (GLO)| market for keyboard | Cut-off, U

Transport	
Inputs	
Transport, ship	Transport, freight, sea, container ship, heavy fuel oil (GLO)| market for transport, freight, sea, container ship, heavy fuel oil | Cut-off, U
Transport, lorry	Transport, freight, lorry, 16-32 metric ton, diesel, EURO 5 (RER)| market for transport, freight, lorry, 16-32 metric ton, diesel, EURO 5 | Cut-off, U
Training of AI models	
Inputs	
Electricity, France	Electricity, medium voltage (FR)| market for electricity, medium voltage | Cut-off, U
Electricity, USA	Electricity, medium voltage (US)| market group for electricity, medium voltage | Cut-off, U
China (applied in uncertainty analysis)	Electricity, medium voltage (CN)| market group for electricity, medium voltage | Cut-off, U
Sweden (applied in uncertainty analysis)	Electricity, medium voltage (SE)| market for electricity, medium voltage | Cut-off, U
KSPR deployment	
Inputs	
Electricity, Sweden	Electricity, medium voltage (SE)| market for electricity, medium voltage | Cut-off, U
Use phase	
Inputs	
Electricity, Sweden	Electricity, medium voltage (SE)| market for electricity, medium voltage | Cut-off, U
USA (applied in uncertainty analysis)	Electricity, medium voltage (US)| market group for electricity, medium voltage | Cut-off, U
Global (applied in uncertainty analysis)	Electricity, medium voltage (GLO)| market group for electricity, medium voltage | Cut-off, U
End-of-life for computer hardware	
Municipal solid waste treatment, Sweden	Municipal solid waste (SE)| treatment of municipal solid waste, municipal incineration | Cut-off, U
Used desktop recycling, global market	Used desktop computer (GLO)| market for used desktop computer | Cut-off, U

S3. Input data and life cycle inventory results for sensitivity and scenario analysis

Table S10. Sensitivity and scenario analyses parameter changes. Note that values are presented with two significant figures.

Parameter	BS	LIS	HIS1 and/or HIS2	Sensitivity analysis	References and comments
Listeners [-]	1	0	29 000 (HIS1) 1 (HIS2)	29 000 (S1)	The number of listeners for the HIS1 and S1 was set to be the same as for the Swedish radio channel P3 in week 8 in 2024 (Kantar Sifo 2025), at 704 000 listeners per day, which was divided by 24 hours; resulting in 29 000 listeners.
Computer lifetime [year]	5	10	3	10 (S2)	A lifetime was considered to be doubled in the LIS and S2. A shorter lifetime at 3 years, which was identified as the lowest computer lifetime in (Yao et al. 2010), was assumed in HIS1 and HIS2.
Training time TorToise TTS [hours]	70 000	2 100	70 000	2 100 (S3)	In HIS1 and HIS2 it was assumed that TorToise TTS was trained 24/7 as in the BS. In LIS and S3, the parameter was changed to the working hours (40 hours/week) over that year (52 weeks) instead.
Training country (electricity mix) for Mistral 7B	France	Sweden	China	-	China was chosen for HIS1 and HIS2 as it is a carbon intensive electricity mix and Sweden for the LIS since the Swedish mix has a high share of renewables. China was chosen in S4 as the country is increasingly developing AI models.
Training country (electricity mix) for TorToise TTS	USA	Sweden	China	China (S4)	
Training country (electricity mix) for Suno AI	USA	Sweden	China	-	
Number of daily users for Mistral 7B [-]	5 600 000	11 000 000	1 100 000	1 100 000 (S5)	For the LIS, the number of daily users was estimated to be the same as the total number of downloads (instead of half the total number of downloads as in the BS): *Mistral 7B*: Hugging Face (2025), (11 187 756) *TorToise TTS*: pepy.tech (2025), (39 000) *Suno AI*: Dredge (2024), (12 000 000) For HIS1, HIS2 as well as for S5-S7, one tenth, i.e. 10%, of the total number of downloads was set to be the number of daily users.
Number of daily users for TorToise TTS [-]	20 000	39 000	3 900	3 900 (S6)	
Number of daily users for Suno AI [-]	6 000 000	12 000 000	1 200 000	1 200 000 (S7)	
Screen size [kg]	6.9	2.2	6.9	2.2 (S8)	A smaller screen of 22” (Inet 2025a) was considered in the LIS and in S8.
Streaming country	Sweden	Sweden	Global	-	In HIS1 and HIS2, international listeners are considered.
Use phase country (electricity mix) for Mistral 7B and TorToise TTS	Sweden	Sweden	USA	-	For the HIS1 and HIS2, KSPR is assumed to operate in USA.

Table S11. Life cycle inventory results for the foreground system in the sensitivity analysis. Values are presented with two significant figures. fu=functional unit. The values that have changed relative the baseline scenario are indicated with a blue-coloured cell.

Parameter	Unit	Increased number of listeners (S1)	Longer computer lifetime (S2)	Shorter training time for TorToise TTS (S3)	TorToise TTS trained in China (S4)	Lower daily users for Mistral 7B (S5)	Lower daily users for TorToise TTS (S6)	Lower daily users for Suno AI (S7)	Smaller screen (S8)
Computer hardware production									
Weight of the computer	kg/fu	5.7E-04	2.9E-04	5.7E-04	5.7E-04	5.7E-04	5.7E-04	5.7E-04	4.7E-04**
AI model training									
Energy use from training AI model Mistral 7B	kWh/fu	2.0E-04	2.0E-04	2.0E-04	2.0E-04	1.0E-03	2.0E-04	2.0E-04	2.0E-04
Energy use from training AI model Tortoise TTS	kWh/fu	2.0E-03	2.0E-03	6.0E-05	2.0E-03*	2.0E-03	1.0E-02	2.0E-03	2.0E-03
Energy use from training AI model Suno AI	kWh/fu	7.3E-05	7.3E-05	7.3E-05	7.3E-05	7.3E-05	7.3E-05	3.6E-04	7.3E-05
KSPR deployment									
Energy use from downloading AI model Mistral 7B	kWh/fu	6.2E-06	6.2E-06	6.2E-06	6.2E-06	6.2E-06	6.2E-06	6.2E-06	6.2E-06
Energy use from downloading AI model Tortoise TTS	kWh/fu	2.3E-05	2.3E-05	2.3E-05	2.3E-05	2.3E-05	2.3E-05	2.3E-05	2.3E-05
Energy use from downloading music from Suno AI	kWh/fu	1.7E-03	1.7E-03	1.7E-03	1.7E-03	1.7E-03	1.7E-03	1.7E-03	1.7E-03
Use phase KSPR									
Use phase energy for Text-generation Mistral 7B	kWh/fu	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02
Use phase energy for Text-to-speech converstion Tortoise TTS	kWh/fu	1.2E-01	1.2E-01	1.2E-01	1.2E-01	1.2E-01	1.2E-01	1.2E-01	1.2E-01
Use phase energy for Music mixing	kWh/fu	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03
Use phase energy for Session assembly	kWh/fu	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03
Use phase energy for Streaming	kWh/fu	2.3E+03	8.0E-02	8.0E-02	8.0E-02	8.0E-02	8.0E-02	8.0E-02	8.0E-02
End-of-life for computer hardware									
Computer hardware to recycling	kg/fu	5.2E-04	2.6E-04	5.2E-04	5.2E-04	5.2E-04	5.2E-04	5.2E-04	4.2E-04
Computer hardware to municipal solid waste	kg/fu	5.7E-05	2.9E-05	5.7E-05	5.7E-05	5.7E-05	5.7E-05	5.7E-05	4.7E-05

* The value was not changed but the type of electricity mix applied for the energy use for training AI model Tortoise TTS was changed according to **Table S10**.

** The weight of the screen was reduced (from 6.9 kg to 2.2 kg) and thus the total weight of the computer was also reduced (to about 20 kg instead of about 25 kg).

Table S12. Life cycle inventory results for the foreground system in the scenario analysis. Values are presented with two significant figures. fu=functional unit. The values that have changed relative the baseline scenario are indicated with a blue-coloured cell.

Parameter	Unit	Low impact scenario (LIS)	High impact scenario one (HIS1)	High impact scenario two (HIS2)
Computer hardware production				
Weight of the computer	kg/fu	2.3E-04*	9.6E-04	9.6E-04
AI model training				
Energy use from training AI model Mistral 7B	kWh/fu	1.0E-04	1.0E-03**	1.0E-03**
Energy use from training AI model Tortoise TTS	kWh/fu	3.0E-05	1.0E-02**	1.0E-02**
Energy use from training AI model Suno AI	kWh/fu	3.6E-05	3.6E-04**	3.6E-04**
KSPR deployment				
Energy use from downloading AI model Mistral 7B	kWh/fu	6.2E-06	6.2E-06	6.2E-06
Energy use from downloading AI model Tortoise TTS	kWh/fu	2.3E-05	2.3E-05	2.3E-05
Energy use from downloading music from Suno AI	kWh/fu	1.7E-03	1.7E-03	1.7E-03
Use phase KSPR				
Use phase energy for Text-generation Mistral 7B	kWh/fu	3.3E-02	3.3E-02**	3.3E-02**
Use phase energy for Text-to-speech converstion Tortoise TTS	kWh/fu	1.2E-01	1.2E-01**	1.2E-01**
Use phase energy for Music mixing	kWh/fu	1.2E-03	1.2E-03	1.2E-03
Use phase energy for Session assembly	kWh/fu	5.8E-03	5.8E-03	5.8E-03
Use phase energy for Streaming	kWh/fu	0.0E+00	2.3E+03**	8.0E-02**
End-of-life for computer hardware				
Computer hardware to recycling	kg/fu	2.1E-04	8.6E-04	8.6E-04
Computer hardware to municipal solid waste	kg/fu	2.3E-05	9.6E-05	9.6E-05

* The weight of the screen was reduced (from 6.9 kg to 2.2 kg) and thus the total weight of the computer was also reduced (to about 20 kg instead of about 25 kg). This value also reflects that the computer lifetime was set to 10 instead of 5 years.

** Note that the type of electricity mix applied in the modelling of these energy uses was changed according to **Table S10**.

S4. Absolute and relative values for the climate change impact results

Table S13. Absolute climate change impact results per functional unit (fu) for the baseline scenario and the sensitivity analysis S1 to S8. The functional unit is one hour of generating, broadcasting and streaming radio content. Values are presented with two significant figures.

Process contribution	Climate change impact [kg CO_2eq/fu]								
	Baseline scenario (BS)	Increased number of listeners (S1)	Longer computer lifetime (S2)	Shorter training time for TorToise TTS (S3)	TorToise TTS trained in China (S4)	Lower daily users for Mistral 7B (S5)	Lower daily users for TorToise TTS (S6)	Lower daily users for Suno AI (S7)	Smaller screen (S8)
Computer hardware production, of which:	2.3E-02	2.3E-02	1.1E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	1.6E-02
Computer assembly	2.3E-02	2.3E-02	1.1E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	1.6E-02
Transport, ship	1.2E-04	1.2E-04	6.1E-05	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	9.9E-05
Transport, lorry	5.3E-05	5.3E-05	2.6E-05	5.3E-05	5.3E-05	5.3E-05	5.3E-05	5.3E-05	4.3E-05
AI model training, of which:	1.0E-03	1.0E-03	1.0E-03	8.1E-05	1.8E-03	1.1E-03	5.0E-03	1.2E-03	1.0E-03
Training Mistral 7B	1.6E-05	1.6E-05	1.6E-05	1.6E-05	1.6E-05	8.0E-05	1.6E-05	1.6E-05	1.6E-05
Training Tortoise TTS	9.9E-04	9.9E-04	9.9E-04	2.9E-05	1.7E-03	9.9E-04	5.0E-03	9.9E-04	9.9E-04
Training Suno AI	3.6E-05	3.6E-05	3.6E-05	3.6E-05	3.6E-05	3.6E-05	3.6E-05	1.8E-04	3.6E-05
KSPR deployment, of which:	6.0E-05	6.0E-05	6.0E-05	6.0E-05	6.0E-05	6.0E-05	6.0E-05	6.0E-05	6.0E-05
Downloading Mistral 7B	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07
Downloading Tortoise TTS	8.0E-07	8.0E-07	8.0E-07	8.0E-07	8.0E-07	8.0E-07	8.0E-07	8.0E-07	8.0E-07
Downloading music from Suno AI	5.9E-05	5.9E-05	5.9E-05	5.9E-05	5.9E-05	5.9E-05	5.9E-05	5.9E-05	5.9E-05
Use phase, of which:	8.3E-03	8.1E+01	8.3E-03	8.3E-03	8.3E-03	8.3E-03	8.3E-03	8.3E-03	8.3E-03
Text generation Mistral 7B	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03
Text-to-speech conversion Tortoise TTS	4.1E-03	4.1E-03	4.1E-03	4.1E-03	4.1E-03	4.1E-03	4.1E-03	4.1E-03	4.1E-03
Music mixing	4.2E-05	4.2E-05	4.2E-05	4.2E-05	4.2E-05	4.2E-05	4.2E-05	4.2E-05	4.2E-05
Session assembly	2.0E-04	2.0E-04	2.0E-04	2.0E-04	2.0E-04	2.0E-04	2.0E-04	2.0E-04	2.0E-04
Streaming	2.8E-03	8.1E+01	2.8E-03	2.8E-03	2.8E-03	2.8E-03	2.8E-03	2.8E-03	2.8E-03

End-of-life computer hardware	2.6E-04	2.6E-04	1.3E-04	2.6E-04	2.6E-04	2.6E-04	2.6E-04	2.6E-04	2.1E-04
Total for the life cycle:	3.3E-02	8.1E+01	2.1E-02	3.2E-02	3.3E-02	3.3E-02	3.7E-02	3.3E-02	2.6E-02
Difference in total result relative the BS:	-	2 500	0.64	0.97	1.0	1.0	1.1	1.0	0.78

Table S14. Relative climate change impact results per functional unit (fu) for the baseline scenario (BS) and the sensitivity analysis S1 to S8. The functional unit is one hour of generating, broadcasting and streaming radio content. Values are presented with two significant figures.

Process contribution	**Climate change impact [kg CO_2eq/fu]**								
	Baseline scenario (BS)	**Increased number of listeners (S1)**	**Longer computer lifetime (S2)**	**Shorter training time for TorToise TTS (S3)**	**TorToise TTS trained in China (S4)**	**Lower daily users for Mistral 7B (S5)**	**Lower daily users for TorToise TTS (S6)**	**Lower daily users for Suno AI (S7)**	**Smaller screen (S8)**
Computer hardware production, of which:	70%	0.028%	55%	72%	69%	70%	63%	70%	62%
Computer assembly	70%	0.028%	54%	72%	68%	70%	62%	69%	62%
Transport, ship	0.37%	0.00015%	0.29%	0.38%	0.36%	0.37%	0.33%	0.37%	0.39%
Transport, lorry	0.16%	0.000065%	0.12%	0.17%	0.16%	0.16%	0.14%	0.16%	0.17%
AI model training, of which:	3.2%	0.0013%	5.0%	0.26%	5.4%	3.4%	14%	3.6%	4.1%
Training Mistral 7B	0.049%	0.000020%	0.076%	0.051%	0.048%	0.24%	0.044%	0.049%	0.063%
Training Tortoise TTS	3.0%	0.0012%	4.7%	0.093%	5.2%	3.0%	14%	3.0%	3.9%
Training Suno AI	0.11%	0.000044%	0.17%	0.11%	0.11%	0.11%	0.10%	0.55%	0.14%
KSPR deployment, of which:	0.18%	0.000074%	0.29%	0.19%	0.18%	0.18%	0.16%	0.18%	0.23%
Downloading Mistral 7B	0.00067%	0.00000027%	0.0010%	0.00069%	0.00065%	0.00066%	0.00059%	0.00066%	0.00085%
Downloading Tortoise TTS	0.0024%	0.00000098%	0.0038%	0.0025%	0.0024%	0.0024%	0.0022%	0.0024%	0.0031%
Downloading music from Suno AI	0.18%	0.000073%	0.28%	0.19%	0.18%	0.18%	0.16%	0.18%	0.23%
Use phase, of which:	26%	100%	40%	26%	25%	25%	23%	25%	33%
Text generation Mistral 7B	3.6%	0.0014%	5.5%	3.7%	3.5%	3.6%	3.2%	3.6%	4.6%
Text-to-speech conversion Tortoise TTS	13%	0.0051%	20%	13%	12%	13%	11%	13%	16%
Music mixing	0.13%	0.000052%	0.20%	0.13%	0.13%	0.13%	0.11%	0.13%	0.16%
Session assembly	0.62%	0.00025%	0.96%	0.64%	0.61%	0.62%	0.55%	0.62%	0.79%
Streaming	8.6%	100%	13%	8.8%	8.4%	8.5%	7.6%	8.5%	11%
End-of-life computer hardware	0.79%	0.00032%	0.61%	0.81%	0.77%	0.79%	0.70%	0.78%	0.82%
Total for the life cycle:	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table S15. Absolute climate change impact results per functional unit (fu) for the baseline scenario (BS) and in the scenario analysis. The functional unit is one hour of generating, broadcasting and streaming radio content. Values are presented with two significant figures.

Process contribution	**Climate change impact [kg CO_2eq/fu]**			
	Baseline scenario (BS)	**Low impact scenario (LIS)**	**High impact scenario one (HIS1)**	**High impact scenario two (HIS2)**
Computer hardware production, of which:	2.3E-02	8.0E-03	3.8E-02	3.8E-02
Computer assembly	2.3E-02	7.9E-03	3.8E-02	3.8E-02
Transport, ship	1.2E-04	4.9E-05	2.0E-04	2.0E-04
Transport, lorry	5.3E-05	2.1E-05	8.8E-05	8.8E-05
AI model training, of which:	1.0E-03	5.9E-06	9.9E-03	9.9E-03
Training Mistral 7B	1.6E-05	3.5E-06	8.7E-04	8.7E-04
Training Tortoise TTS	9.9E-04	1.0E-06	8.7E-03	8.7E-03
Training Suno AI	3.6E-05	1.3E-06	3.1E-04	3.1E-04
KSPR deployment, of which:	6.0E-05	6.0E-05	6.0E-05	6.0E-05
Downloading Mistral 7B	2.2E-07	2.2E-07	2.2E-07	2.2E-07
Downloading Tortoise TTS	8.0E-07	8.0E-07	8.0E-07	8.0E-07
Downloading music from Suno AI	5.9E-05	5.9E-05	5.9E-05	5.9E-05
Use phase, of which:	8.3E-03	5.7E-03	1.6E+03	1.3E-01
Text generation Mistral 7B	1.2E-03	1.2E-03	1.6E-02	1.6E-02
Text-to-speech conversion Tortoise TTS	4.1E-03	4.1E-03	5.8E-02	5.8E-02
Music mixing	4.2E-05	4.2E-05	4.2E-05	4.2E-05
Session assembly	2.0E-04	2.0E-04	2.0E-04	2.0E-04
Streaming	2.8E-03	1.0E-04	1.6E+03	5.5E-02
End-of-life computer hardware	2.6E-04	2.6E-04	4.3E-04	4.3E-04
Total for the life cycle:	3.3E-02	1.4E-02	1.6E+03	1.8E-01
Difference in total result relative the BS:	-	0.43	49 000	5.5

Table S16. Relative climate change impact results per functional unit (fu) for the baseline scenario (BS) and in the scenario analysis. The functional unit is one hour of generating, broadcasting and streaming radio content. Values are presented with two significant figures.

Process contribution	**Climate change impact [kg CO_2eq/fu]**			
	Baseline scenario (BS)	**Low impact scenario (LIS)**	**High impact scenario one (HIS1)**	**High impact scenario two (HIS2)**
Computer hardware production, of which:	70%	57%	0.0024%	21%
Computer assembly	70%	57%	0.0024%	21%
Transport, ship	0.37%	0.35%	0.000013%	0.11%
Transport, lorry	0.16%	0.15%	0.0000055%	0.049%
AI model training, of which:	3.2%	0.042%	0.00062%	5.5%
Training Mistral 7B	0.049%	0.025%	0.000055%	0.49%
Training Tortoise TTS	3.0%	0.0075%	0.00054%	4.9%
Training Suno AI	0.11%	0.0091%	0.000020%	0.18%
KSPR deployment, of which:	0.18%	0.43%	0.0000037%	0.034%
Downloading Mistral 7B	0.00067%	0.0016%	0.000000014%	0.00012%
Downloading Tortoise TTS	0.0024%	0.0057%	0.000000050%	0.00045%
Downloading music from Suno AI	0.18%	0.42%	0.0000037%	0.033%
Use phase, of which:	26%	41%	100%	73%
Text generation Mistral 7B	3.6%	8.4%	0.0010%	9.2%
Text-to-speech conversion Tortoise TTS	13%	30%	0.0036%	33%
Music mixing	0.13%	0.30%	0.0000026%	0.024%
Session assembly	0.62%	1.5%	0.000013%	0.11%
Streaming	8.6%	0.75%	100.0%	31%
End-of-life computer hardware	0.79%	1.8%	0.000027%	0.24%
Total for the life cycle:	100%	100%	100%	100%

Table S17. Absolute and relative climate change impact results per functional unit (fu) for the computer assembly in the baseline scenario. The functional unit is one hour of generating, broadcasting and streaming radio content. Values are presented with two significant figures.

Process contribution	**Climate change impact [kg CO_2eq/fu]**	
	Computer assembly in the baseline scenario (BS) Absolute results	**Computer assembly in the baseline scenario (BS) Relative results**
Motherboard	2.8E-03	12%
GPU	4.2E-03	19%
RAM	2.1E-04	0.93%
HDD	3.5E-04	1.5%
SDD	2.0E-03	8.6%
Power supply unit	8.1E-04	3.5%
Chassis	1.1E-03	4.8%
Fan	1.3E-05	0.058%
Packaging	8.3E-05	0.36%
Screen	1.0E-02	45%
Mouse	1.4E-04	0.62%
Keyboard	7.0E-04	3.1%
Assembly	1.0E-04	0.46%
Total for the computer assembly:	2.3E-02	100%

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