MUSIKLIVETS PARTNERSKAB
FOR BÆREDYGTIG UDVIKLING

Final

Methodology for calculating GHG-emissions for the Danish Music Industry

December 2024

Agenda

1. **Project activities and purpose**
2. **Value chain and scope:** Actors in the ecosystem
3. **Data availability:** Data maturity assessment and gap analysis
4. **Segment deep-dives:** Data maturity and calculation framework
5. **Appendix**

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Project purpose | Create a shared understanding of emissions in Music, and subsequently calculate emissions to increase transparency and encourage action

Background and purpose of the report

Background

- Denmark targets a 70% CO_2e reduction by 2030, but the **music industry's climate impact remains unmeasured**, unlike other sectors
- **Current data is limited and fragmented**, focusing mainly on live music and lacking a comprehensive view or unified strategy
- **No international methods exist to assess the music industry's CO_2e footprint**; developing one could set global benchmarks
- The Partnership for Sustainable Develop in Music seeks to **create a shared knowledge base to drive green transition efforts in the music industry**

Purpose of the reports

*This document covers findings from **Phase 1***

1 Phase *Define scope and develop methodology*

- **A** **Create shared approach:** Develop a shared methodology and scope for understanding and calculating the GHG emissions of the music industry
- **B** **Assess data availability:** Understand the data availability and how mature the data is to highlight needed improvements before calculating emissions

2 Phase *Calculate GHG inventory of the Danish Music Industry*

- **C** **Increase transparency:** Use the report to highlight and disclose emissions coming from the music industry
- **D** **Identify emission hotspots:** Identify emission areas where the industry and its stakeholders should prioritise efforts
- **E** **Encourage collective action:** Raise awareness and provide guidance on the most effective ways to reduce CO2e emissions

Source: The Footprint Firm analysis

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Project activities | The Phase 1 project was conducted over a **6-week timeline** seeking to engage key actors alongside developing a methodology...

Project activities and timeline

Project was conducted over a ***6-week timeline***

1 Phase *Define scope and develop methodology*

2 Phase *Calculate GHG inventory of the Danish Music Industry*

	1	2	3
Project objectives	Engage with key industry stakeholders and partners	Establish scope and boundaries for calculating industry emissions	Assess data availability and establish viable methodology for calculating emissions
Project activities	Interview key industry stakeholders: **5** internal interviews; **8** external interviews	Outline ecosystem of actors and Music segments	Outline available data sources within the Danish music industry
		Review existing methodological frameworks and guidance set out in the GHG protocol	Assess current maturity across industry segments
	Align project activities and ambition with partners: Kulturens Analyseinstitut; Augustinus Fonden	Align on ambitions and recommend a viable scope for calculating GHG emissions of the music industry	Recommend a viable approach for calculating emissions and key gaps to close in data

Source: The Footprint Firm analysis

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Interviews | ...underpinned by 5 interviews with key Koda employees and 8 interviews with key industry actors focused on hotspot emission segments

Category	Segment	Actors	Conducted
Internal interviews	General	Koda: Thue Iversen and Christian Schlein (x 2)	Completed
	Production	Koda: Andreas Elley	Completed
	Live	Koda: Søren Fleron and Søren Sørensen	Completed
	Streaming	Koda: Kasper Iversen	Completed
External interviews	Production	Warner Music Group: Madeleine Smith	Completed
	Live	Grønnere Musik: Hanne Halbye	Completed
		Down the Drain: Martin Thim	Completed
		Dansk Live: Torben Lyngsø	Completed
		Roskilde: Sanne Stephansen and Carl Thrane	Completed
		Green Producers Club: Ege Heckmann	Completed
	Streaming	Spotify: Hanna Grahn and Nønne Sif Hoffmeyer	Completed
	General	Music Declares Emergency: Malene Tofte	Completed

5 internal interviews

8 external interviews

Source: The Footprint Firm analysis

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4. **Segment deep-dives:** Data maturity and calculation framework
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Scoping principles | We have applied **three scoring principles** to guide the scoping of activities to include when estimating emissions from the industry

Overview of scoping principles

Scoping principles

Boundary for activities in scope

1. Activities or emission categories that are **not material** from an emissions perspective

2. Activities or emission categories that are **not traceable** either from an economic or emissions perspective

Boundary for geographical scope

2. Activities and emissions related to **DK artists performing in DK** (incl. acts from foreign artists) and activities and emission related to **DK venues/festivals**

The analysis include **traceable economic activities with material emissions associated to**...

....and within the geographical boundaries of the Danish Music Industry, defined as **emissions resulting from Danish artists performing in Denmark and abroad**....

...and **emissions resulting from Danish venues / festivals**, thus including activities associated with acts from foreign artists

Source: The Footprint Firm analysis

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Value chain | The report outlines how to estimate GHG emissions from segments that have a **material and traceable impact** on industry emissions...

Value chain segments

In scope | *Out of scope*

1 Copyrights and collection

Education & training

Music creation

Music production

1 Marketing & distribution

Music consumption

2 Music instruments & equipment

Merchandise

1 Materiality threshold

Emissions from **Copyrights, collection collectives** and **actors in marketing & distribution** are not expected to **have a material impact** on industry emissions

2 Traceability threshold

Emissions from the production, distribution and retail sales of **instruments & equipment** used in the music industry are **difficult to trace** both from an economic and emissions perspective

Source: The Footprint Firm analysis; Rambøll; Dansk Musikomsætning 2021 (2022); Silverlining Research; Musikkens Værdi og betydning for Aarhus (2024)

Segments | ...covering emissions from material activities across the value chain from education and training to the consumption of music

Value chain activities and actors

NON-EXHAUSTIVE

Segment		Sub-segment	Actors	Actor examples	Sources of emissions		Hotspots
Education & training		1 Education	Educational institutions	Royal Danish Academy	Transport	Energy consumption	
Education & training		2 Training	Music schools, MGK	Various	Transport	Energy consumption	
Music creation		3 Creative process	Creative platforms	SoundCloud, Dropbox	Energy consumption		
Music creation		4 Camps	Composers, songwriters	Various camps	Transport	Energy consumption	
Music production		5 Recording and digital distribution	Studios and Record Labels	Universal Music Group	Energy consumption		
Music production		6 Physical products (CDs etc.)	Product manufacturers	Product manufacturers	Plastic	Transport	
Music consumption	Live	7 Festivals	Festivals, artists and audience	Roskilde Festival	Audience transport	Food & beverages	CO_2
Music consumption	Live	8 Concerts	Venues, artists and audience	VEGA	Audience transport	Food & beverages	CO_2
Music consumption	Broadcast	9 Radio broadcast	Radio providers	Danmarks Radio, Radio 4	Energy consumption from data processing and storage		
Music consumption	Broadcast	10 TV broadcast	TV providers	Danmarks Radio, TV2	Energy consumption from data processing and storage		
Music consumption	Streaming	11 Video music streaming	Video music platforms	YouTube	Energy consumption from data processing and storage		CO_2
Music consumption	Streaming	12 Music streaming	Streaming & download platforms	Spotify	Energy consumption from data processing and storage		CO_2
Music consumption	Streaming	13 Music in film and series	SVOD and Download platforms	Netflix, Blockbuster etc.	Energy consumption from data processing and storage		CO_2
Music consumption	Streaming	14 Music on social media	Social media platforms	Tiktok	Energy consumption from data processing and storage		CO_2
Music consumption	Other online	15 Other online	E.g. Social media, Podcast and App providers	Webpages, Podimo etc.	Energy consumption		
Merchandise		16 Artist merchandise	Product manufacturers	Textile producers	Textile production		

Source: The Footprint Firm analysis

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Segments | We address all underlying activities but **prioritise** building a framework for **emission intense segments with available data**

Prioritisation of segments based on relevance and data availability

Segment	Sub-segment	Activity relevance[1] (low/mid/high)	Data availability (low/mid/high)
Education & training	Education	Low	Low
	Training		
Music creation	Creative iterations		
	Camps		
Music production	1 Recording and digital distribution	Low	Low
	2 Production of music products		
Live	3 Festival activities	High	Medium
	4 Venue activities		
Broadcast	5 Radio broadcast	Medium	Medium
	6 TV broadcast		
Streaming	7 Video music streaming	High	Medium
	8 Music streaming		
	9 Music in film and series	Medium	Low
	Music on social media (e.g. Tiktok)	Medium	Low
Other online	E.g. Music on webpage, Apps etc.	Low	Low
Merchandise	Artist merchandise	Medium	Low

Activities not in focus: Estimation expected **spend-based** based on available financial data (e.g. Danmarks Statistik)

Activities in focus: Deep-dive recommendations are developed for best available methodological framework and approach to **estimate emissions based on available proxy data**

Activities not in focus: Estimation expected either **spend-based** or based on proxies from record labels published scope 3 emissions

Potential to capture some activity-based through GHG inventories of record labels

Source: The Footprint Firm analysis
Note: 1) Emission intensity and ability to influence

Activities and emissions | We establish clear boundaries for the **types of activities and emissions** to include in the analysis…

Activities and types of emissions in scope *(hypothesis)*

		Broadcast	Live	Streaming	Music production
Type of **Activities**	✓	**Broadcasted radio and TV:** *Emissions from broadcasted radio (DR, commercial and local) and TV (DR, TV2 and DK4)*	**Paid live arrangements:**. *Emissions from venues with publicly available ticket sale*	**Streamed music, film and series:** *Emissions from free or subscription-based services*	**Professional production** *Emissions from production in studios and record labels*
	✗	**Broadcasting outside listed channels**	**Unpaid / amateur / non-public concerts**	**Purchased online music**	**Home studio production[1]**
Types of **Emissions**	✓	**Emissions from broadcasting and use phase device**	**Emissions from concert and venue activities**	**Emissions from cloud storage and use phase device**	**Emissions from studio production such as energy consumption**
	✗	**Embedded emissions from broadcasting equipment and use phase device:** E.g. radio player	**Embedded emissions from Buildings and equipment:** E.g. VEGA venue	**Embedded emissions from cloud system, network infrastructure and use phase device:** E.g. mobile phone	**Emissions from artists,** i.e. not covering artists transport and Live emissions as this is accounted for elsewhere

Source: The Footprint Firm analysis
Notes: 1) DIY production where artists are using own gear and buildings to create and produce music

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Activities and emissions | ...and boundaries for **categories of emissions** to include from a traceability and materiality perspective

Industry value chain activities and key sources of emission *(hypothesis)*

Segment	Sub-segment	Emission categories *(scoping)*				Rationale for excluding
Music production	5 Recording and digital distribution	Recording activities	Digital storage & distribution	Artist transport		1 Materiality
	6 Production of music products	Manufacturing	Packaging	Distribution and retail	Device phase	2 Traceability
Live	7 Festivals	Venue activities	Audience transport	Artist transport	Music tourism[1]	2 Traceability
	8 Concerts	Venue activities	Audience transport	Artist transport		
Broadcast	9 Radio broadcast	Broadcasting	Online radio	Device use phase		
	10 TV broadcast	Broadcasting	Online TV	Device use phase		
Streaming	11 Video music streaming	Server use and storage	Internet network infrastructure	Device use phase		2 Traceability
	12 Music streaming	Server use and storage		Device use phase		
	13 Music in film and series	Server use and storage from Music		Device use phase		

Source: The Footprint Firm analysis

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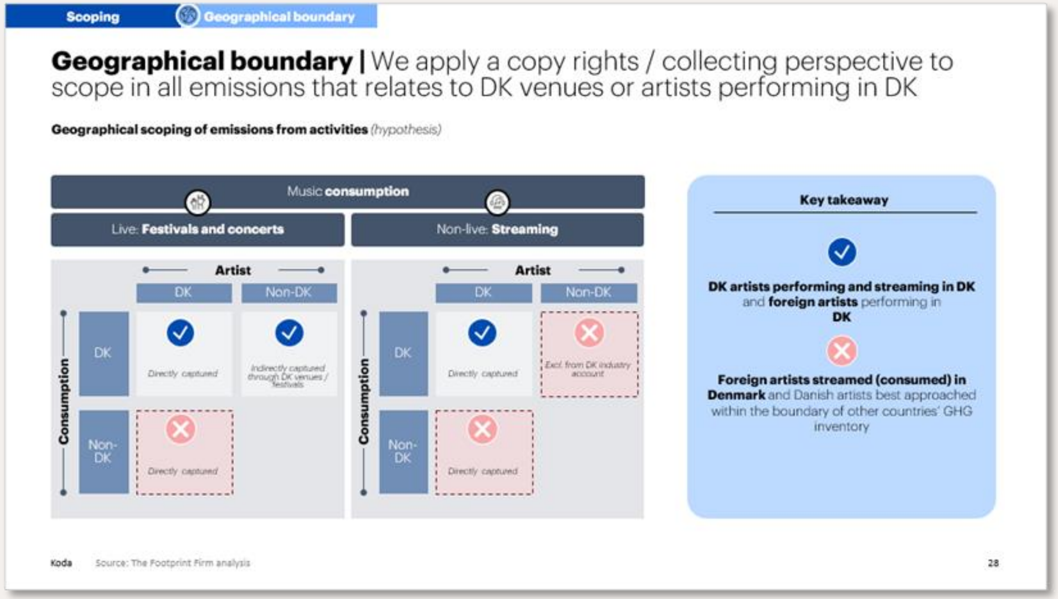
Geographical boundary | A broad geographical coverage is considered best-practice, but also comes with higher data complexity

Methodological considerations to geographical boundary setting

We will **not have to decide** now on the geographical boundary applied to form a recommendation to next phase yet **worth revisiting our initial discussion** as it relates to the purpose of the report and may have implications for the **Koda data needed to support it**



	Merits	Challenges
Broad *DK artists + DK venues incl. foreign streaming of DK artists and DK artists abroad*	**High coverage (credibility)** of emissions associated with the Danish music industry	**Higher data complexity** as Koda will have to collect data from other collection rights organisations + NMP data
Modest *Excl. DK artists abroad*		
Narrow *Excl. DK artist abroad + streaming of DK artists abroad*	**Less complexity** in calculation incl. effort needed from Koda	**Narrow coverage (credibility)** of emissions associated with the Danish music industry

Source: The Footprint Firm analysis

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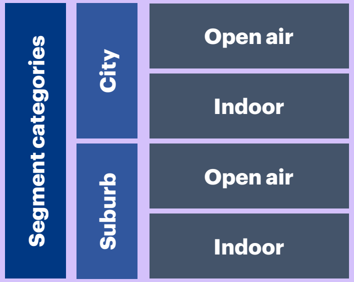
Approach | We apply a **four-step approach** to assess data maturity of each segment and to recommend a viable approach for estimating GHG emissions

Four-step approach to develop framework and recommendations for sub-segment

1 Segment categories are established

The most relevant segment categories are established to reflect differences in emission categories are established

E.g. the sub-segment concerts is divided into four segment categories reflecting the geographical placement and if the concert is an open-air or venue event.



2 Data availability is established

For each sub-segment the data availability is estimated for 1) the full population 2) the activity and 3) related emissions.

E.g. the total number of concerts (divided into segment categories), the activity for each emission category (e.g. energy use) and related emission factors.

3 Segment relevance is established

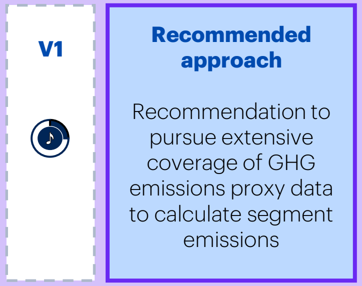
The relevance of each sub-segment is estimated based on 1) expected emission intensity and 2) the music industry's ability to impact the activities

E.g. the expected emission intensity of concerts as well as the industry's ability to impact is assessed.

4 Recommended path to estimation is summarised

A recommendation on how to estimate the emissions of each sub-segment is formulated summarising the data availability and activity relevance.

E.g. The recommendation of concerts suggest a method of calculation and if it requires the collection of additional data for that specific sub-segment



Source: The Footprint Firm analysis

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Data sources | Various data sources have been identified and leveraged to assess data availability and maturity across main segments

Available data sources and tools for calculating GHG emissions

Available data | In progress

	Emission data	Population and activity data	Tools to calculate GHG emissions
Music production	**Record labels:** Warner GHG inventory	**Music products:** NCB sales figures	**Green Producers Club:** Calculation tools for Music production developed with Warner **IMPALA:** Carbon-calculator for record labels not owned by majors
Live	**Festivals:** Roskilde Festival GHG inventory **Festivals:** NorthSide GHG inventory	**Festivals & Venues:** Danmark's Statistik venue data **Artist activities:** Music Declares Emergency artist tracker **Dansk Live:** Energy data from Live **Koda financial royalty data**	**Green Producers Club:** Granular Live segment emissions by venue type etc. **Music Declares Emergency:** Bottom-up data on selected artists touring **Green Deal Circular Festival** **MIT x Warner:** Framework for understanding record labels scope 3 emissions incl. break-down of live segment emissions by venue type etc. and some emissions from streaming and merchandise (In progress)
Streaming	**Music streaming:** Spotify GHG inventory	**Streaming:** NMP data **Music streaming:** YouSee streaming data (In progress) **Koda financial royalty data**	**DIMPACT:** Tool / method to assess emissions of digital products and services **MIT x Warner** (In progress)
Broadcast		**Koda financial royalty data**	

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Data maturity assessment | Some data available across segments yet gaps to close in recording, festivals, venues and streaming prior to estimation

Data maturity assessment across priority segments

Segment		Relevance	Current data maturity	Recommended target maturity	Data maturity gap
Music production	Recording and digital distribution	Low	Insufficient population and proxy data on emissions available	Robust population and proxy data on emissions	**Prioritise:** Establish population data and collect inventory to base proxy on
Music production	Production of music products	Low	Comprehensive population and emission data	Comprehensive population and emission data	**No gap:** Collect sales numbers from NCB
Live	Festivals	High	Insufficient population and proxy data on emissions available	Comprehensive population data and qualified proxy data on emissions	**Prioritise:** Categorise festivals (incl. audience numbers) and collect inventory from city festival
Live	Venues	High	Insufficient population data	Comprehensive population data and qualified proxy data on emissions	**Close gap:** Establish population data (incl. audience numbers) and collect inventory to base proxy on
Broadcast	Radio broadcast	Medium	Some population data and proxy data on emissions but low maturity	Robust population and proxy data on emissions	**Low:** Collect activity data (minutes broadcasted) and qualify proxy on emissions from radio broadcast
Broadcast	TV broadcast	Medium	Some population data and proxy data on emissions but low maturity	Robust population and proxy data on emissions	**Low:** Collect activity data (minutes broadcasted) and qualify proxy on emissions from TV broadcast
Streaming	Video music streaming	Medium	Some proxy on population data and proxy data on emissions but low maturity	Robust population and proxy data on emissions	**Low:** Collect activity data (streaming numbers from Youtube) from NMP and qualify if possible
Streaming	Music streaming	High	Comprehensive population data and proxy on emission data	Comprehensive population and qualified proxy data on emissions	**Prioritise:** Qualify activity data (minutes streamed) across platforms and emission proxy
Streaming	Music in film and series	Medium	Some population data and proxy data on emissions but low maturity	Robust population and proxy data on emissions	**Low:** Collect activity data (music percentages) across platforms and qualify emission proxy

Gaps to close **Prioritise improvements** **Available data** **Robust data foundation**

Source: The Footprint Firm analysis

Data gap closing | Mobilisation of industry actors and qualification of Koda data should be prioritised in next phase before entering calculation

Suggested focus of next phase

Segments		Close data gaps *(mobilised before viable to estimate)*	Prioritise improvements to data *(mobilised to increase robustness)*	Key actors to mobilise
Music production	Recording and digital distribution	Establish population data and collect inventories from selected actors	Improve understanding of emission data across production archetypes	Record labels and Green Producers Club
	Production of music products		Collect data on sales numbers and LCAs to check if data quality is as high as expected	NCB
Live	Festivals	Categorise all festivals and estimate audience numbers for each archetype	Collect data for smaller city festival and establish proxy	A small city festival and Green Producers Club
	Venues	Establish audience population data by venue type and proxy data on emissions	Expand proxy inventory data and qualify hotspot emission data on activity-level	Danish venues in collaboration with Dansk Live
Broadcast	Radio broadcast	*Potential to leverage work from the Music Industry Climate collective (Majors in collaboration with MIT) on emissions from live segments (published in February)*	Collect data on minutes broadcasted (to verify data quality) and establish proxy data on emissions	Danish Radio
	TV broadcast			Danish TV
Streaming	Video music streaming		Collect data on Youtube streaming numbers from NMP as well as proxy data on emissions	NMP and Youtube
	Music streaming	Qualify activity data on total streams and establish emission proxy for streaming	Qualify emission proxy and use phase emissions	NMP and Spotify or YouSee
	Music in film and series		Data on music share of consumption needs collected from NMP as well as emission data	NMP and Netflix

Source: The Footprint Firm analysis

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Data sources | Various data sources have been identified and leveraged to assess data availability and maturity across main segments

Available data sources and tools for calculating GHG emissions

Available data | In progress

	Emission data	Population and activity data	Tools to calculate GHG emissions
Music production	**Record labels:** Warner GHG inventory	**Music products:** NCB sales figures	**Green Producers Club:** Calculation tools for Music production developed with Warner **IMPALA:** Carbon-calculator for record labels not owned by majors
Live	**Festivals:** Roskilde Festival GHG inventory **Festivals:** NorthSide GHG inventory	**Festivals & Venues:** Danmark's Statistik venue data **Artist activities:** Music Declares Emergency artist tracker **Dansk Live:** Energy data from Live	**Green Producers Club:** Granular Live segment emissions by venue type etc. **Music Declares Emergency:** Bottom-up data on selected artists touring **Green Deal Circular Festival**
Streaming	**Music streaming:** Spotify GHG inventory	**Streaming:** NMP data **Music streaming:** YouSee streaming data **Koda financial royalty data**	**DIMPACT:** Tool / method to assess emissions of digital products and services **MIT x Warner:** Framework for understanding record labels scope 3 emissions incl. break-down of live segment emissions by venue type etc. and some emissions from streaming and merchandise
Broadcast			

Source: The Footprint Firm analysis

Recording and distribution | Population data and more granular emission data needs to be collected before viable to estimate segment emissions

Data points and recommended approach to calculate GHG emissions from recording and distribution

Data for calculating GHG emissions

	Source	Data point
Population	**Desk research**	Total revenue of the three major labels (from DK activities)
		Total revenue of all other record labels
		Total revenue of all recording studios
Activity data	*No activity data necessary[1]*	
Emission data	**Warner Music Group**	GHG inventory from Warner Music Group
	Smal record label	GHG inventory from smaller record label
	Recording studio	GHG inventory from one or more recording studio(s)

Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability	**Population data**	No available population data on record labels and recording studios, although possible to collect through multiple available sources
	Emission data	The GHG inventory of Warner Music Group is on a group level and the numbers for Denmark need to be qualified. Further GHG inventories for smaller studios further need collected
Relevance	**Emission intensity**	The recording and distribution of music is not expected to be an emission hotspot of the industry but still has some relevance for industry emissions
	Ability to impact	The music industry can mainly reduce energy emissions from recording and distribution through incentivising better energy use and storage[2]

Current maturity and recommended approach

V4

Current maturity

Low data maturity as both population and emission data needs to be collected and qualified. However expected relatively doable to retrieve

V2

Recommended approach

Recommendation to mobilise key actors to reach a viable data quality for estimation. Data on major labels can be qualified in collaboration with Warner Music Group, which has indicated a willingness to participate. Data on a smaller record label and recording studios requires mobilisation of selected actors, expected to require some effort as they will be new to inventory data

Notes: 1) If emission data is unavailable, activity data can be collected as an alternative where feasible; 2) Does not cover Scope 3 emissions from labels and studios as this is covered directly in e.g. Live

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Recording and distribution | Calculation relies on GHG inventories from majors and selected inventories for smaller labels and studios

Framework for calculating GHG emissions associated with recording and distribution of music

Recommendation: The proposed approach estimates segment emissions by focusing on activities related to record labels and recording studios. It suggests categorising record labels into major labels and others, based on expected differences in their emission profiles. The method relies on GHG-inventories and revenue data to calculate intensity-based emission factors as a proxy for all actors in each category. One GHG inventory has been identified, and additional inventories are needed for a smaller record label and a recording studio.

Recording and distribution	Population		Emissions – Calculating intensity-based emission factor based on revenue			Approach to close data gap
Majors Warner, Universal & Sony	**Total revenue of the three majors** *Only including Danish activities*	✖	**GHG-inventory - scope 1, 2 and relevant scope 3 items** *Based on WMG GHG-inventory for DK activities*	✖	***Revenue of WMG*** *for DK activities*	• **Qualify revenue data:** Revenue data should only include DK activities • **Qualify GHG inventory:** Identify relevant scope 3 categories and only include emissions from DK activities
Other record labels	**Total revenue of the other record labels**	✖	**GHG-inventory - scope 1, 2 and relevant scope 3 items** *Based on smaller record label, e.g. Tambourhinoceros*	✖	**Revenue of same record label**	• **Collect revenue data:** Collect revenue data covering all record labels • **Collect GHG inventory:** Collect GHG-inventory from at least one smaller record label, and select relevant scope 3 categories
Recording studios	**Total revenue of recording studios**	✖	**GHG-inventory - scope 1, 2 and relevant scope 3 items** *Based on one or more recording studios*	✖	**Revenue of same recording studios**	• **Collect revenue data:** Collect revenue data covering all recording studios • **Collect GHG inventory:** Collect GHG-inventory from at least one recording studio, and select relevant scope 3 categories

Applicable data | Data to be qualified | Data to be collected

Source: The Footprint Firm analysis

Music products | Available data on sold CDs and LPs provide a solid foundation for estimating emissions associated with physical music products

Data points and recommended approach to calculate GHG emissions from music products

Data for calculating GHG emissions

	Source	Data point
Population	NCB sales figures	The number of CD's and LP's sold
Activity data	No activity data necessary	
Emission data	Desk research	LCA of CDs and LPs

Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability	Population data	Existing data allows to estimate the total number of CDs and LPs sold which provides a solid foundation for estimation
Data availability	Emission data	LCAs of the production of both CDs and LPs are readily available, providing a solid foundation for estimation
Relevance	Emission intensity	The production of CDs and LPs likely only contributes to a small share of industry emissions due to their declining use in favour of streaming
Relevance	Ability to impact	The industry's influence on physical products lies primarily in material choices and methods of distribution, hence some ability to impact

Current maturity and recommended approach

V4

Current maturity

High data maturity on both population and emission data providing a solid foundation for estimation

V4

Recommended approach

Low effort to reach viable path for estimation. It is recommended that the population data is collected from NCB, and that identified LCAs are qualified by further desk research

Source: The Footprint Firm analysis

Music products | Emissions associated with CDs and LPs will be estimated based on the total amount sold combined with product-specific LCAs

Framework for calculating GHG emissions associated with music products

Recommendation: The data on CDs and LPs provides a solid basis for estimation emissions from physical music products, using sales figures and product-specific LCAs for CDs and LPs.

Music		Population		Emission data	Approach to close data gap
Music products	CDs	**Total number of CDs produced/sold**	✖	**LCA for CDs** *Including emissions associated with production, distribution and use phase (if feasible)*	• **Collect NCB data:** Data on total number of CDs sold should be collected from NCB • **Identify LCA:** Identify best available LCA on CDs
Music products	LPs	**Total number of LPs produced/sold**	✖	**LCA for LPs** *Including emissions associated with production, distribution and use phase (if feasible)*	• **Collect NCB data:** Data on total number of LPs sold should be collected from NCB • **Identify LCA:** Identify best available LCA on LPs

Applicable data | Data to be qualified | Data to be collected

Source: The Footprint Firm analysis

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Festivals | Some data available to establish proxies – efforts is however needed to qualify population data and to understand GHG inventories of smaller festival

Data points and recommended approach to calculate GHG emissions from festivals

Data for calculating GHG emissions

	Source	Data point
Population	Koda royalty data	List of all festivals
	Danmarks Statistik	Total number of festival guests
	Desk research	Number of guests on each festival
		The categorisation of all festivals into the three defined categories of festivals
Activity data		*No activity data necessary*
Emission data[1]	Roskilde Festival GHG inventory	The 2023 GHG inventory of Roskilde Festival
	NorthSide GHG inventory	The 2022 GHG inventory of NorthSide
	Festival GHG inventory	The GHG inventory of a city festival without camping, e.g. Syd for Solen

Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability	Population data	Existing data enables a total estimate of festival attendees, but additional data is needed to classify festivals by type and estimate attendance for each
	Emission data	GHG inventories are available for two out of three established festival categories, thus assessed to hold some maturity
Relevance	Emission intensity	Festivals are expected to be one of the industry's emission hotspots.
	Ability to impact	Several initiatives can be implemented to reduce festival emissions, such as from audience transport, food and beverages, materials, and energy use.

Current maturity and recommended approach

V2

Current maturity

Modest maturity across data sources. Population data and emission data needs further qualification (with some new data points to be collected) but expectedly reasonable to approach within a relatively short timeframe

V4

Recommended approach

Recommendation to qualify data further given the importance of the segment. Identified GHG-inventories should be qualified in collaboration with the major festivals. Missing GHG-inventories for smaller festivals likely collected through Green Producers Club. Number of guests for each festival segment expected established w. Koda and Dansk Live

Notes: 1) Availability on emission data TBD - Green producers Club might have relevant data to include in analysis.

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Festivals | Calculation framework relies on available GHG inventories from selected festivals that share characteristics

Framework for calculating GHG emissions associated with festivals

Recommendation: The proposed approach divides all festivals into three categories based on expected differences in their emission profiles.[1] The suggested approach requires categorising all festivals (incl. number of guests) into one of the three categories and a GHG inventory from one festival to represent each category. Two GHG inventories have been identified and need to be qualified, while a GHG inventory for city festivals must be collected.

Festivals		Population				Emissions	Approach to close data gap	
Green field	Camping	Total number of festival guests	✖	Share of guests going to greenfield camping festivals	✖	**GHG emissions per guest** based on Roskilde Festival[2]	**Improve data quality:** Review and improve the GHG inventory of Roskilde Festival. Requires dialog with Roskilde Festival.	**Categorisation of festivals:** Further research on the categorisation of all festivals (incl. audience numbers) is required.
Green field	No camping	Total number of festival guests	✖	Share of guests going to greenfield festivals without camping	✖	**GHG emissions per guest** based on NorthSide	**Improve data quality:** Review and improve the GHG inventory of NorthSide. Requires dialog with NorthSide.	
City	No camping	Total number of festival guests	✖	Share of guests going to greenfield camping festivals	✖	**GHG emissions per guest** based on a city festival with no camping, e.g. Syd for Solen	**Collect GHG inventory:** No inventories for city festivals without camping have been identified. It is recommended to estimate one before calculating emissions from festivals, e.g. for Syd for Solen.	

Applicable data | Data to be qualified | Data to be collected

Notes: 1) Certain emission categories will depend on the size of the festival. The approach should take this into account when calculating specific scopes, e.g. audience and artist transport and stage production. 2) Emissions from camping-equipment brought along by guests is included in the waste of Roskilde Festivals GHG-inventory.

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Venues | Data maturity on venues shows that efforts need to go into the collection of both population data and GHG inventories of different venues

Data points and recommended approach to calculate GHG emissions from venues

Data for calculating GHG emissions

	Source	Data point
Population	Koda royalty data	List of all concert venues
	Danmarks Statistik	Number of concert guests by type of concert organiser
	Desk research	The categorisation of venues and concert organisers into the four categories of concerts
Activity data		*No activity data necessary*
Emission data[1]	Venue GHG inventory	The GHG inventory of venues. Preferably four inventories, one for each category of venues.

Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability	Population data	Existing data makes it possible to make a complete list of venues and estimate the total number of guests. The categorisation of venues (incl. number of guests) requires qualification
	Emission data	No GHG inventories of venues have been identified, hence low data maturity
Relevance	Emission intensity	Venues are expected to be one of the industry's emission hotspots.
	Ability to impact	Multiple initiatives can be promoted to reduce the emissions associated with venues, e.g. from audience transport, food and beverages and energy use.

Current maturity and recommended approach

V1

Current maturity

Low overall data maturity as population data needs further qualification while emission data remains outstanding. Mobilising key venue actors however expected doable within a relatively short timeframe

V4

Recommended approach

Recommendation to improve data quality given the importance of the segment. Population data should be qualified knowledge in both Koda, Danmarks Statistik and Dansk Live. Further is recommended to collect GHG inventories of 3-4 venues, each representing different venue categories; expected viable to established through collab. with Green Producers Club.

Notes: 1) Availability on emission data TBD - Green producers Club might have relevant data to include in analysis.

Venues | The estimation of emissions associated with concerts will require the collection of activity data from several venues

Framework for calculating GHG emissions associated with venues

Recommendation: The proposed approach divides all concert venues into four categories based on expected differences in their emission profiles.[1] The suggested approach requires categorising all venues (incl. number of guests) into one of the four categories and a GHG inventory from one venue to represent each category. No complete GHG inventory for venues have been identified, so they must be collected before estimation is possible. Additionally, further investigation is needed to categorise all venues, including the number of guests.

Venues		Population			Emissions	Approach to close data gap	
Big city	Open-air	**Total number of concert guests**	✖	**Share of guests to open-air concerts in a big city**	✖ **GHG emissions per guest** *based on venue GHG inventory, e.g. Grøn Koncert*	**Collect GHG inventory:** No complete GHG inventory for venues have been identified. It is recommended to collect a GHG inventory for an open-air venue in a big city before calculating emissions from venues, e.g. Grøn Koncert	**Categorisation of venues:** Further collection of data on the categorisation of all venues (incl. audience numbers) is required.
Big city	Indoor	**Total number of concert guests**	✖	**Share of guests to indoor concerts in a big city**	✖ **GHG emissions per guest** *based on venue GHG inventory, e.g. Vega or Train*	**Collect GHG inventory:** No complete GHG inventory for venues have been identified. It is recommended to collect a GHG inventory for an indoor venue in a big city before calculating emissions from venues, e.g. Vega or Train	
Smaller cities	Open-air	**Total number of concert guests**	✖	**Share of guests going to open-air concerts in smaller cities**	✖ **GHG emissions per guest** *based on venue GHG inventory, e.g. Grøn Koncert*	**Collect GHG inventory:** No complete GHG inventory for venues have been identified. It is recommended to collect a GHG inventory for an open-air venue in a smaller city before calculating emissions from venues, e.g. Grøn Koncert	
Smaller cities	Indoor	**Total number of concert guests**	✖	**Share of guests going to indoor concerts in smaller cities**	✖ **GHG emissions per guest** *based on venue GHG inventory, e.g. Fermaten*	**Collect GHG inventory:** No complete GHG inventory for venues have been identified. It is recommended to collect a GHG inventory for an indoor venue in a smaller city before calculating emissions from venues.	

Applicable data | Data to be qualified | Data to be collected

Notes: 1) Certain emission categories will depend on the size of the venues. The approach should take this into account when calculating specific scopes, e.g. audience and artist transport and stage production.

Radio broadcast | The minutes of music broadcasted on radio needs to be categorised and energy consumption from broadcasting needs to be collected

Data points and recommended approach to calculate GHG emissions from radio broadcast

Data for calculating GHG emissions

	Source	Data point
Population	Koda royalty data	Minutes played by radio channel (~30 biggest radio stations)
Population	Koda royalty data	Total number of radio listeners
Population	Desk research	The categorisation of radio channels into DAB and FM
Population	Desk research	Share of devices used to listen to radio
Activity data	Radio station / desk research	Energy consumption from broadcasting radio on DAB and FM
Activity data	Desk research	Energy consumption from listening to radio on different devices, e.g. radio and mobile phone
Emission data	Desk research	Emission factor for electricity

Legend: Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability	Population data	Existing population data allows to calculate minutes broadcasted. The split between different use devices needs to be qualified
Data availability	Activity / emission data	Data on energy consumption from broadcasting FM/DAB radio needs to be collected. Energy use associated with different use devices needs validation
Relevance	Emission intensity	Radio broadcasting is expected to be a moderate source of emissions, and the shift towards DAB technology is likely to reduce energy consumption and emissions
Relevance	Ability to impact	The industry's ability to influence emissions from radio broadcasting is estimated to be minimal

Current maturity and recommended approach

V4

Current maturity

Some maturity in population data through Koda yet lacking a granular understanding of activity and emissions data. Particularly data on energy consumption from radio broadcasting needs collected and validated

V4

Recommended approach

Only some effort recommended to reach viable estimation given the only modest importance of the segment. Recommended that population data is qualified and that activity data on energy consumption from broadcasting and use devices is collected and validated in collaboration with key actors (e.g. Danmarks Radio)

Source: The Footprint Firm analysis

Radio broadcast | Emissions associated with radio broadcasting is calculated based on a broadcasting and a listening phase

Framework for calculating GHG emissions associated with radio broadcast

Recommendation: The proposed approach separates radio broadcasting into FM and DAB, reflecting differences in energy use and emission profiles. Therefore, all radio channels must be categorised into FM or DAB to calculate total minutes broadcasted for each type. Additionally, data on the energy consumption of FM and DAB broadcasting needs to be collected. To estimate emissions from user devices, the share of listening across device types and the energy consumption of each device must be collected.

Radio: Radio broadcast

Emissions from radio broadcast (Population × Activity × Emissions)

- **FM**: **Total minutes of music broadcasted on FM radio** × **Energy use from broadcasting FM radio** *per minute broadcasted* × **Emission factor for electricity** *Location based Danish emission factor*
- **DAB**: **Total minutes of music broadcasted on DAB radio** × **Energy use from broadcasting DAB radio** *per minute broadcasted* × **Emission factor for electricity** *Location based Danish emission factor*

+

Emissions from listening to radio[1] (Population × Activity × Emissions)

- **Total minutes music broadcasted in radio** × **Total number of radio listeners** × **Share of listeners using device A** × **Energy use per minute radio played on device A** × **Emission factor for electricity**
- **Total minutes music broadcasted in radio** × **Total number of radio listeners** × **Share of listeners using device B** × **Energy use per minute radio played on device B** × **Emission factor for electricity**
- **Total minutes music broadcasted in radio** × **Total number of radio listeners** × **Share of listeners using device C** × **Energy use per minute radio played on device C** × **Emission factor for electricity**

Approach to close data gap

- **Collect data on energy use from broadcasting FM and DAB radio :** Collect data on energy use for FM and DAB, e.g. with key actors like Danmarks Radio.
- **Qualify data on minutes played:** Categorise Koda royalty data to split minutes of music broadcasted between FM and DAB.
- **Qualify data on listeners:** Leverage Koda royalty data to qualify estimates of listeners numbers.
- **Split between user devices and energy consumption:** Qualify estimates on energy use and split between different use devices.

Legend: Applicable data | Data to be qualified | Data to be collected

Source: The Footprint Firm analysis

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TV broadcast | Possible to estimate total minutes of music on broadcasted TV – data on energy use from broadcasting music on TV needs to be collected

Data points and recommended approach to calculate GHG emissions from TV broadcast

Data for calculating GHG emissions

	Source	Data point
Population	Koda royalty data	Minutes played on broadcasted TV
	Desk research	Share of devices used to watch TV
	Koda royalty data / desk research	Total number of viewers
Activity data	TV station / desk research	Energy consumption from broadcasting music on TV
	Desk research	Energy consumption from watching TV on different devices, e.g. TV and computer
Emission data	Desk research	Emission factor for electricity

Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability	Population data	Existing population data allows to calculate minutes broadcasted. The number of viewers and the split between different use devices needs to be qualified.
	Activity / emission data	Data on energy consumption from TV broadcasting of music needs to be collected. Energy use associated with different use devices needs validation.
Relevance	Emission intensity	TV is expected to be a moderate source of emissions, and the shift towards streaming is likely to reduce the use of broadcasted TV and hence the emissions from the segment.
	Ability to impact	The industry's ability to influence emissions from TV broadcasting is estimated to be minimal

Current maturity and recommended approach

V4

Current maturity

Low-mid overall maturity mainly given lacking activity and emission data which needs collected and validated for TV broadcasting with music involved; expectedly available once mobilised key broadcasting actors. Population data is somewhat available leveraging Koda data

V4

Recommended approach

It is recommended that the population data is qualified in collaboration with Koda and that the activity data on energy consumption from broadcasting and use devices is collected and validated activating key actors, like Danmarks Radio.

Source: The Footprint Firm analysis

MUSIKLIVETS PARTNERSKAB FOR BÆREDYGTIG UDVIKLING

TV broadcast | Emissions from music on TV is calculated based on a broadcasting and a listening phase

Framework for calculating GHG emissions associated with TV broadcast

Recommendation: The proposed approach assumes similar energy use and emission profiles across channels. Energy use from broadcasting music on TV is estimated using the total minutes of music broadcasted and the energy use stemming from broadcasting TV with music. The share of energy use originating from the music will be estimated using the share of megabits associated with the music. To estimate emissions from user devices, the split between different devices and the energy consumption of each device must be collected.

TV – **TV broadcast**

Emissions from broadcasting TV with music

Population | Activity | Emissions

Total minutes of music broadcasted on TV × **Energy use from broadcasting music on TV** *per minute broadcasted* × **Emission factor for electricity** *Location based Danish emission factor*

Energy use from broadcasting music on TV = **Energy use from broadcasting TV** *per minute broadcasted* × **Share of megabits associated with music when TV with music is broadcasted**

+

Emissions from watching TV with music[1]

Population | Activity | Emissions

Total minutes music broadcasted in TV × **Total number of TV viewers** × **Share of viewers watching TV on device A** × **Energy use per minute viewed on device A** × **Emission factor for electricity**

Total minutes music broadcasted in TV × **Total number of TV viewers** × **Share of viewers watching TV on device B** × **Energy use per minute viewed on device B** × **Emission factor for electricity**

Total minutes music broadcasted in TV × **Total number of TV viewers** × **Share of viewers watching TV on device C** × **Energy use per minute viewed on device C** × **Emission factor for electricity**

Approach to close data gap

Collect data on energy use from broadcasting TV and share of magebits from music: Collect data on energy use iin collaboration with key actors like Danmarks Radio.

Qualify data on viewers: Leverage Koda royalty data to qualify estimates of viewers numbers.

Split between user devices and energy consumption: Qualify estimates on energy use and split between different use devices.

Legend: Applicable data | Data to be qualified | Data to be collected

Notes: 1) Emissions from listening to radio (use phase) are calculated for each type of device, e.g. radio, mobile phone, computer etc.

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Video music streaming | Minutes of music with video streamed is possible to estimate, energy use and emissions need to be collected and qualified

Data points and recommended approach to calculate GHG emissions from video music streaming

Data for calculating GHG emissions

	Source	Data point
Population	**NMP report**	Koda music recognised in Youtube videos (minutes viewed)
	Desk research	Share of devices used to watch Youtube
Activity data	**Google / desk research**	Energy use from Youtube streaming
	Desk research	Energy consumption from watching Youtube videos on different devices, e.g. TV and computer
Emission data	**Google / desk research**	Cloud emission factor (data centre + content delivery network)
	Desk research	Emission factor for electricity

Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability

Population data	NMP data collects alle Koda music on Youtube, to be qualified to estimate number of minutes streamed. Split between different devices should be qualified by desk research.
Activity/ emission data	Almost all activity and emission data on both streaming and listening needs to be collected or qualified.

Relevance

Emission intensity	Video music streaming is expected to fall into a moderate-to-high emissions category due to YouTube's popularity.
Ability to impact	The industry's ability to impact emissions from video music streaming is expected to be minimal.

Current maturity and recommended approach

V4

Current maturity

Low-medium overall maturity. Population data available through NMP/Koda yet activity and emission data needs collected and qualified expectedly through Google (Youtube)

V4

Recommended approach

Recommendation to improve data quality slightly, reflecting only modest importance of the segment. Activity data from NCB needs collected and qualified to estimate minutes played. To estimate energy use and emissions, key actors like Google or D-impact should be engaged, to which a contact a has been established

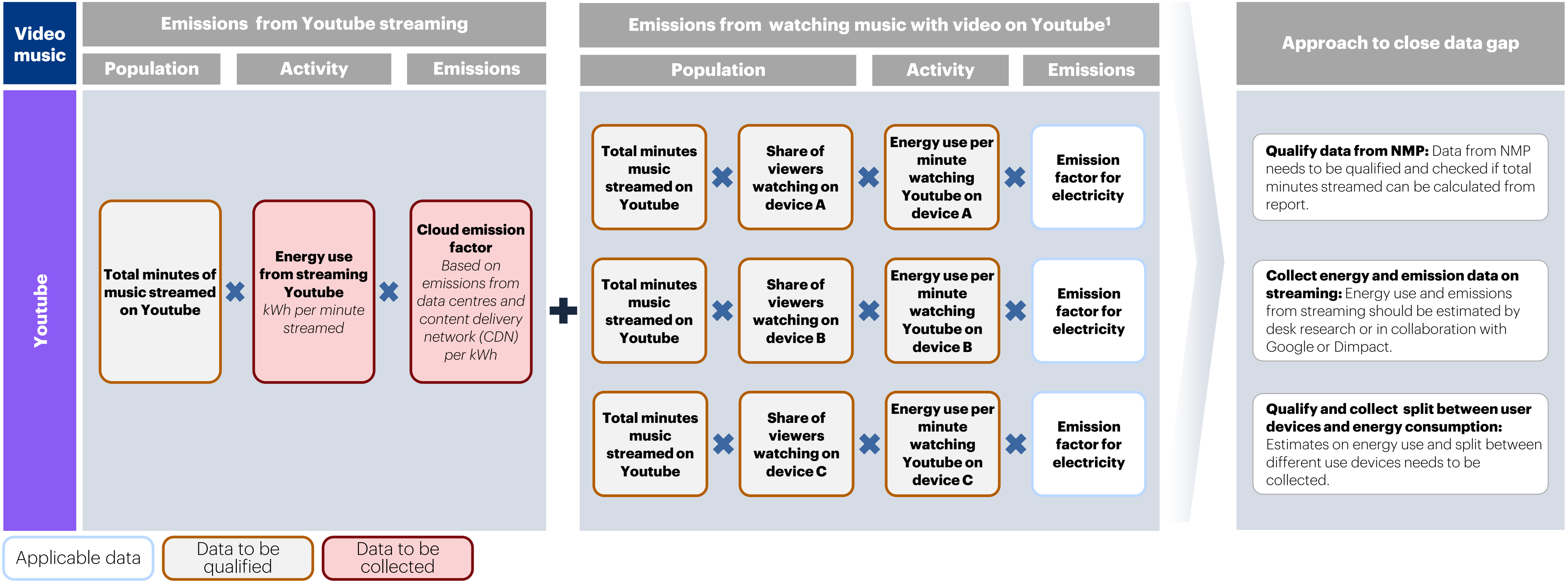
Source: The Footprint Firm analysis

MUSIKLIVETS PARTNERSKAB FOR BÆREDYGTIG UDVIKLING

Video music streaming | Calculation framework relies on Youtube activity data and energy use and emissions data from Google

Framework for calculating GHG emissions associated with video music streaming

Recommendation: NMP data is leveraged to estimate minutes of music streamed on Youtube which is the only platform included in the analysis of streaming of music with video. Emissions from streaming is based on the energy use and the corresponding emissions from data centres and content delivery networks. This data needs to be collected in collaboration with key actors, e.g. Google. To estimate emissions from user devices, the split between different devices and the energy consumption of each device must be collected.



Notes: 1) Emissions in use phase are calculated for each type of device, e.g. mobile phone, computer etc.

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Music streaming | Some data available for estimating emissions, yet some efforts required to reach granular understanding given high importance

Data points and recommended approach to calculate GHG emissions from physical products

Data for calculating GHG emissions

	Source	Data point
Population	Koda royalty data	Total number of streams/download by streaming service
Population	Desk research	Share of devices used to stream music
Activity data	Desk research	Energy consumption from streaming music on different devices, e.g. TV and computer
Emission data	Spotify	GHG-inventory of Spotify, specifically emissions associated with cloud
Emission data	Tidal	GHG-inventory of Tidal, specifically emissions associated with cloud
Emission data	Apple Music	GHG-inventory of Apple Music, specifically emissions associated with cloud

Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability	Population data	Existing data allows to estimate the total number of tracks streamed across music streaming channels – downloaded tracks still somewhat a shadow number
Data availability	Activity / emission data	Emission data mainly related to cloud hosting and distribution can be obtained from Spotify, yet lacking from other key actors
Relevance	Emission intensity	Music streaming is considered a high-impact segment (hotspot) which calls for a granular understanding of energy emissions esp. related to Cloud hosting
Relevance	Ability to impact	Some ability to reduce energy emissions from large streaming providers through more sustainable data practices and hosting (location and energy efficiency)

Current maturity and recommended approach

V4

Current maturity

Relatively high data maturity leveraging population data from Koda and expected qualification through collab. with Yousee. Emission data can be established using Spotify's inventory yet ideally improved to also include Cloud emissions from other channels (e.g. Tidal and Apple)

V4

Recommended approach

Recommendation to improve data quality; a viable foundation for estimation is available, yet high segment importance indicate need for more granular understanding. Activity data from NMP/Koda needs qualified. Spotify inventory data needs qualified, and additional data points from other channels needs collected

Source: The Footprint Firm analysis

MUSIKLIVETS PARTNERSKAB FOR BÆREDYGTIG UDVIKLING

Music streaming | Music streaming is estimated based on three biggest streaming services and differentiated on streaming vs. download

Framework for calculating GHG emissions associated with music streaming

Recommendation: Koda royalty data is used to estimate minutes of music played on streaming services. It is suggested to differentiate between the three biggest platforms and collect platform specific emission factors, as well as differentiate whether the music is streamed or downloaded. Emissions from music played on remaining streaming services will be estimated based on an average. To estimate emissions from user devices, the split between different devices and the energy consumption of each device must be collected.

Music streaming – Emissions from cloud-hosting and infrastructure

Music streaming	Emissions by streaming			Emissions by download		
Spotify	Total number of streams on Spotify	✖	Emission factor cloud *based on Spotify GHG-inventory* ✚	Total number of downloads on Spotify	✖	Emission factor download *based on Spotify GHG-inventory*
Apple Music	Total number of streams on Apple Music	✖	Emission factor cloud *based on Apple GHG-inventory* ✚	Total number of downloads on Apple Music	✖	Emission factor download *based on Apple GHG-inventory*
Tidal	Total number of streams on Tidal	✖	Emission factor cloud *based on Tidal GHG-inventory* ✚	Total number of downloads on Tidal	✖	Emission factor download *based on Tidal GHG-inventory*
Other streaming services	Total number of streams on other streaming services	✖	Emission factor cloud *based on average emission factor* ✚	Total number of downloads on other streaming services	✖	Emission factor download *based on average emission factor*

✚

Emissions from listening to streamed/downloaded music[1]

Population			Activity		Emissions
Total minutes music streamed across services	✖	Share of viewers listening on device A	✖ Energy use per minute streamed on device A	✖	Emission factor for electricity
Total minutes music streamed across services	✖	Share of viewers listening on device B	✖ Energy use per minute streamed on device B	✖	Emission factor for electricity
Total minutes music streamed across services	✖	Share of viewers listening on device C	✖ Energy use per minute streamed on device C	✖	Emission factor for electricity

Approach to close data gap

- **Qualify number of downloads:** In Koda data on minutes streamed needs to be qualified to separate minutes streamed vs. downloaded
- **Collect and qualify emission factors:** Emission factors for download and streaming should be estimated for each streaming service. This requires the involvement of each streaming service
- **Qualify and collect split between user devices and energy consumption:** Estimates on energy use and split between different use devices needs to be collected.

Applicable data | Data to be qualified | Data to be collected

Notes: 1) Emissions in use phase are calculated for each type of device, e.g. mobile phone, computer etc.

MUSIKLIVETS PARTNERSKAB FOR BÆREDYGTIG UDVIKLING

Music in film and series | Some data available yet recommended to obtain better understanding understanding of Music's share of emissions

Data points and recommended approach to calculate GHG emissions from music in film and series

Data for calculating GHG emissions

	Source	Data point
Population	Koda royalty data	Total minutes streamed (based on percentages of music)
	Desk research	Share of devices used to stream film and series
Activity data	Netflix / desk research	Energy use from streaming Netflix
	Desk research	Energy use from watching Netflix on different devices, e.g. TV and computer
Emission data	Netflix / desk research	Cloud emission factor (data centre + content delivery network)
	Desk research	Emission factor for electricity

Applicable data | Data to be qualified | Data to be collected

Data availability and relevance

Data availability	Population data	Available population data from Koda allows for a reasonable understanding yet needs qualified once pulled
	Activity / emission data	Emission and activity somewhat available through emission proxies yet needs further clarification through collaboration with key actors
Relevance	Emission intensity	Emission intensity of music in film and series considered to be modest; overall segment emissions are high, yet music takes up only a share of emissions e.g. from a film
	Ability to impact	Lower ability to impact key actors; mainly done through better data storage, yet music is only a sub-component of the final product

Current maturity and recommended approach

V4

Current maturity

Data maturity considered modest as Koda data can be leveraged to understand the bitrates attributed to music in films, and the minutes streamed. Emission data less robust despite available emission proxies – music's contribution to emissions of e.g. a film needs to be understood better

V4

Recommended approach

Recommendation to improve data slightly mainly related to quantifying music's contribution to segment emissions. Importance of the segment is only modest, yet selected low-effort initiatives may improve estimation substantially

Source: The Footprint Firm analysis

MUSIKLIVETS PARTNERSKAB FOR BÆREDYGTIG UDVIKLING

Music in film and series | Emissions from music in streamed film and series is based on one streaming service and data needs to be collected

Framework for calculating GHG emissions associated with music in film and series

Recommendation: Koda royalty data is leveraged to estimate minutes of music streamed in films and series on various streaming services. Energy use and emissions from streaming of music in film and series is estimated based on one streaming service, e.g. Netflix. To estimate emissions from user devices, the split between different devices and the energy consumption of each device must be collected.

Streaming

Music in film and series

Emissions from streaming film and series (music)

Population | Activity | Emissions

Total minutes of music streamed in film and series × **Energy use from streaming music in film and series** *kWh per minute streamed* × **Hosting and distribution emission factor** *based on Netflix GHG-inventory, per kWh*

Energy use from streaming music in film and series = **Energy use from streaming film and series** *per minute streamed* × **Share of megabits associated with music when film and series with music is streamed**

➕

Emissions watching film and series[1]

Population | Activity | Emissions

Total minutes music streamed in film and series × **Share of viewers watching on device A** × **Energy use per minute music streamed on device A** × **Emission factor for electricity**

Total minutes music streamed in film and series × **Share of viewers watching on device B** × **Energy use per minute streamed on device B** × **Emission factor for electricity**

Total minutes music streamed in film and series × **Share of viewers watching on device C** × **Energy use per minute streamed on device C** × **Emission factor for electricity**

Approach to close data gap

Collect energy and emission data on streaming: Energy use and emissions from streaming should be collected by desk research or in collaboration with Netflix or Dimpact.

Qualify and collect split between user devices and energy consumption: Estimates on energy use and split between different use devices needs to be collected by desk research or in collaboration with key actors, as Dimpact.

Applicable data | Data to be qualified | Data to be collected

Notes: 1) Emissions in use phase are calculated for each type of device, e.g. TV, computer etc.

Agenda

1. **Project activities and purpose**
2. **Value chain and scope:** Actors in the ecosystem
3. **Data availability:** Data maturity assessment and gap analysis
4. **Segment deep-dives:** Data maturity and calculation framework
5. **Appendix**

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Calculating emissions | GHG emissions are calculated based on activity data and an emission factor

Approach calculate emissions (festival example)

EXAMPLE

GHG inventory from one Festival

Emission category	Activity data		Emission factors		Emissions
Energy consumption	kWh	x	CO_2e / kWh	=	CO_2e
Artist transport	L fuel OR X km	x	CO_2e / L fuel OR km	=	CO_2e
Audience transport	L fuel OR X km	x	CO_2e / L fuel OR km	=	CO_2e
Food & beverages	kg food	x	CO_2e / kg	=	CO_2e
Waste	kg waste	x	CO_2e / kg	=	CO_2e
					Total CO2e

Source: The Footprint Firm analysis

Calculating segment emissions | There are several ways to approach calculating emissions from broader segments depending on the data available

Approach calculate segment emissions (festival example)

EXAMPLE

GHG inventory from one Festival

Emission category	Data points				Emissions
Energy consumption	kWh	x	emissions / kWh	=	CO2e
Artist transport	km	x	emission / km	=	CO2e
Audience transport	km	x	emission / km	=	CO2e
Food & beverages	kg food	x	emissions / kg	=	CO2e
Waste	kg waste	x	emissions / kg	=	CO2e
					Total CO2e

GHG inventory for all festivals

Complete coverage of GHG inventories	Proxy based on available inventories	Proxy based on available activity data	Estimate based on benchmarks
Roskilde GHG inventory	Roskilde GHG inventory	Activity	*E.g. based on data from comparable activities*
Northside GHG inventory	Northside proxy	Activity	
SMUK GHG inventory	SMUK proxy	Activity	
...	...	...	
...	...	...	
...	...	...	

Source: The Footprint Firm analysis

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Calculating industry emissions | Industry emissions are calculated as an aggregate of the emissions coming from segment

Approach to aggregate Industry emissions

ILLUSTRATIVE

GHG emissions from the **Danish Music Industry**

		Production		Live		Streaming		Other
Segment		**Production**		**Live**		**Streaming**		**Other**
Sub-segment		**Studios and record labels**	**Physical products**	**Festivals**	**Venues**	**Video**	**Music**	
Type *(example)*		Production / post-production studios	CD / LP etc.	City / Greenfield	Music only / Multi-functional	Download / Cloud streaming	Download / Cloud stream	
Scopes	**Energy consumption**	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	*Awaiting confirmation on scope*
	Artist transport	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	
	Audience transport	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	
	Food & beverages	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	
	Waste	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	
	....	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions	
Total segment emissions		**X** tCO2e emissions	**X** tCO2e emissions	**X** tCO2e emissions		**X** tCO2e emissions		

Source: The Footprint Firm analysis

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