

THE GLOBAL MEDIA SUSTAINABILITY FRAMEWORK

TV Implementation Guide



Introduction

For more context on the development of this Television (TV) Implementation Guide, and on the concept of data guidance more generally, including Emissions Factors (EFs), please see the [GMSF Playbook](#). This Implementation Guide has been developed and refined based on lessons learned from our TV Data Guidance working group, which involved many TV stakeholders (see the following page), ensuring the workflow reflects current best practices.

Digital was the first channel to have data guidance within the GMSF, and as a result, is further ahead of other channels in its development. The practical implications of this are that GMSF users might notice differences in the appearance of Digital formulae, compared to other channels such as TV, OOH, and Print. It is the intention of the GMSF team in future versions to update all formulae to match the Digital format, and in doing so improve consistency and simplicity for users.

This document includes specific guidance for all distribution modes of TV including; Linear Broadcast (DTT/SAT), Multicast (IPTV), Unicast (OTT/CTV/VOD).



How did we construct this Implementation Guide?

With the support of EGTA and many of their 90+ members across 30+ countries, Ad Net Zero led industry discussion on TV data guidance. The work began by analysing the TV channel emissions workflow and formulae from v1.2 of the Global Media Sustainability Framework and identifying areas for improvement - sections where methodological adjustments and additional guidance and/or data were required to meet objectives for the standard. This group compiled the proposals within this guide over the course of several months.

Ad Net Zero engaged external technical experts and industry participants to validate the proposed data guidance. All industry data received was aggregated, anonymised, and processed independently by Ad Net Zero to ensure no company-specific operational data is disclosed. Individual participants did not have access to each other's data contributions, and no individual company information influenced the final factors. The feedback received was then used to further refine the proposals, before finally undergoing Steer Team and Climate Science Expert Group review. It is the intention of the GMSF team that this data guidance will continue to evolve in the years ahead as our understanding grows and more data and further contributions are received.

Contributors to the TV Implementation Guidance include:



Important notice for users

While the GMSF is a voluntary framework, organisations should implement it in compliance with applicable competition and antitrust laws in their jurisdictions. Specifically, organisations should be aware that:

- Implementation should remain independent. Competitors should not coordinate or align their approaches with each other.
- Sensitive commercial information (cost structures, staffing, volumes) should not be exchanged in the context of GMSF implementation.
- Any data-sharing mechanisms should be structured to prevent coordinated purchasing or supplier discrimination.
- Organisations should consult legal counsel if GMSF implementation raises competition law questions.
- Organisations are solely responsible for ensuring their use of this framework complies with all applicable laws.
- Adoption of the GMSF does not preclude or discourage the use of alternative emissions calculation methodologies.
- Corporate Overhead data sharing: When sharing Corporate Overhead Emissions data with counterparties (buyers, sellers, or third parties), organisations can individually disclose aggregated emissions data suitable for their specific reporting purposes.
- Programmatic defaults and technical parameters: Default values and technical benchmarks provided in this guide (such as server factors, call factors, apps-ads.txt line count assumptions) are for emissions measurement purposes only and must not be used as a basis for coordinating or aligning commercial or operational practices among market participants.

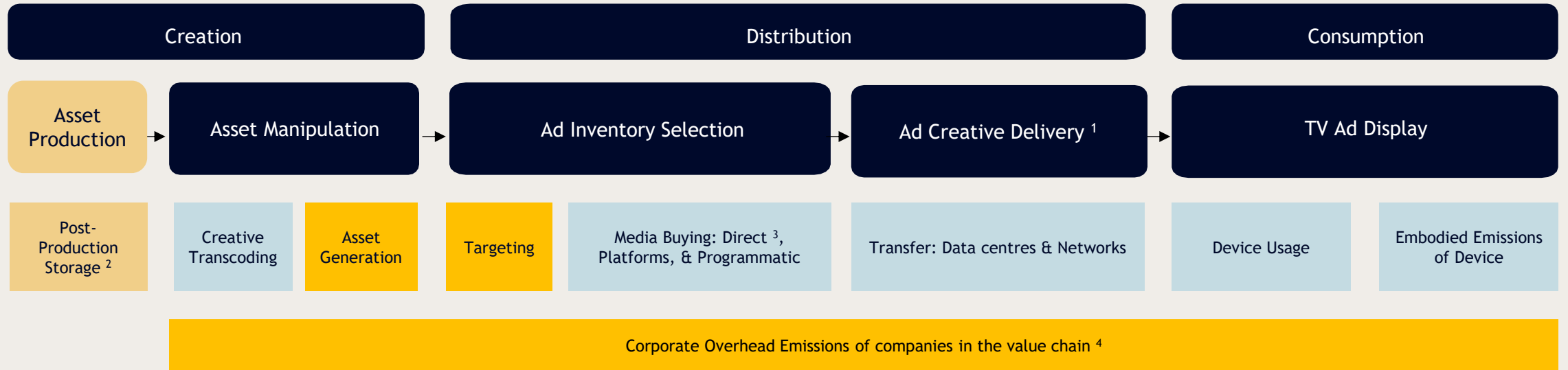
This Implementation Guide provides methodologies for calculating TV campaign emissions. It does NOT require organisations to:

- Contribute operational or financial data to a central GMSF repository.
- Share campaign-specific inputs (number of placements, surface area, material specs) with competitors or third parties.
- Mandate disclosure of internal calculations or allocation methodologies to external parties.



Television (TV): Channel Emissions Workflow

TV (including Video)



- Excluded from workflow boundaries
- Included in workflow boundaries with guidance provided
- Covered in Corporate Overhead Emissions for ease of implementation



TV Channel Emissions Workflow footnotes

¹ Different delivery types are identified and modelled in the formulae:

Linear Broadcast (DTT - Digital Terrestrial Television / SAT - Satellite Television)

Multicast (IPTV - Internet Protocol Television)

Unicast (OTT - Over The Top / CTV - Connected Television / VOD - Video On Demand)

² Previously included but now out of scope due to advertising production specific frameworks and calculator tools including these emissions. See the [GMSF Playbook](#) for further information.

³ In the case of traditional broadcast or direct-sold DAI, these should mostly be included in Corporate Overhead Emissions as part of the Ad Inventory Selection process. However, in the case of Direct sold DAI, the additional computing required by DAI will be accounted for in the Ad Creative Delivery step (see page 24 and 26 for more detail).

⁴ Corporate Overhead Emissions should cover emissions from the Asset Generation and Targeting steps, as well as overhead functions not allocated to specific campaigns. Other non-channel-specific corporate overhead activities include marketing/sales, client support teams, HR, legal, accounting, business travel, and product development, which is particularly important in the AI era.

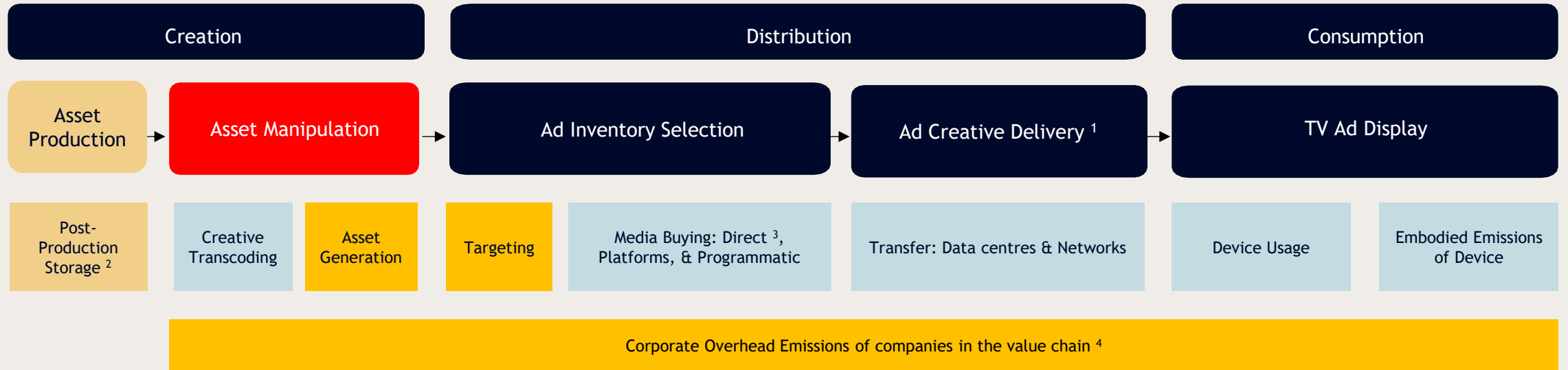


Television (TV)

Defined as television and long-form video content including that streamed on other devices

Television (TV): Channel Emissions Workflow

TV (including Video)



- Excluded from workflow boundaries
- Included in workflow boundaries with guidance provided
- Covered in Corporate Overhead Emissions for ease of implementation
- Denotes the focus of the following section of implementation guidance



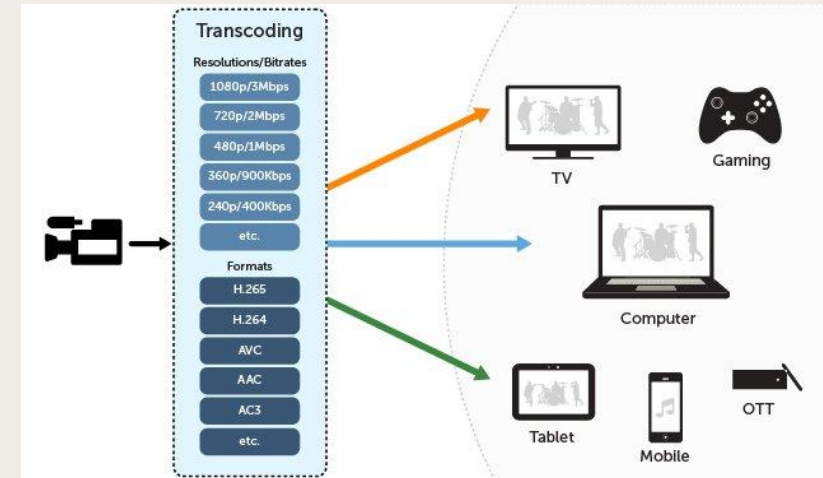
TV > Creation > Asset Manipulation > Creative Transcoding

Step context

Video transcoding is the process of converting a digital video or audio file from one format, codec, resolution, or bitrate into another. In the context of TV streaming, it is used to adapt video content to be compatible with a specific display device or to optimise it for available network bandwidth.

In the case of broadcast distribution (DTT, Satellite...), the original creative is not processed before distribution, it is passed on to the playout provider and transcoded directly at the point of distribution, therefore this step can be considered **included in the emissions associated with computing servers for the entire distribution process**, as those are usually top-down values including all operations related to the distribution (within step “DISTRIBUTION > Ad Creative Delivery > Transformation & Transfer : Data centres”).

In the case of other types of distribution, such as VOD/Non-linear, the original creative is pre-encoded in different formats and resolutions before the distribution. This step therefore generates additional server computing that scales according to the number of outputs required.



Credits: Wowza



TV > Creation > Asset Manipulation > Creative Transcoding

Operational formula

For a group of creatives with a given (or average) number of transcoded outputs:

$$\begin{aligned}
 &\text{Asset manipulation}_{\text{Creative Transcoding, Unicast/multicast}} = \\
 &\quad \text{number_outputs}^1 \\
 &\quad \times \text{transcode_time}^2 \text{ (s)} \\
 &\quad \times (\text{EF_datacentre_use_phase_intensity} \text{ (kWh/s)} \times \text{EF_electricity}_{\text{country}} \text{ (kgCO2e/kWh)} \\
 &\quad \quad + \text{EF_datacentre_embodied_intensity} \text{ (kgCO2e/s)})
 \end{aligned}$$

Legend:

- required inputs
- default values
- emissions factors

¹ Number of pre-transcoded outputs from the original creative for the campaign, in the case of unicast or multicast distribution (VOD / IPTV).

² Average computing time to transcode the original creative into the different outputs.



TV > Creation > Asset Manipulation > Creative Transcoding

Required inputs and data levels

Required inputs

Variable	Unit	Source
number_outputs	Integer	Media owners

Data levels - EF_datacentres_use_phase_intensity and EF_datacentres_embodied_intensity (per second)

Level	Method	Notes
0	Monetary data	If only spend data is available, then an average monetary emissions factor can be used.
1	Default value	Based on lifecycle assessment of VMs and assumptions.
2	Allocation from global data	Based on contributed data on the impact of server operations, allocated to the impression level from global, regional, or data centre level.
3	N/A	
4	Campaign specific data	Based on contributed data at a campaign level.



TV > Creation > Asset Manipulation > Creative Transcoding

Calculation example

Example inputs

Variable	Unit	Value
Number of outputs	Integer	100
Location	Country	UK

Conversion factors and example EFs

Variable	Unit	Value	Source
Transcode_time	Seconds	30	See GMSF TV Emissions Data Sources
EF_datacentre_use_phase_intensity	kWh per s	1.80E-03	
UK Electricity Emissions Factors	kgCO2e per kWh	0.1955	
EF_datacentre_embodied_intensity	kgCO2e per s	7.84E-05	

TV creative transcoding
 = number_outputs × transcode_time × (EF_datacentre_use × EF_electricity + EF_datacentre_embodied)
 = 100 * 30 * (1.80E-3 * 0.1955 + 7.84E-05)
 = 0.1 kgCO2e

Values are illustrative only. Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources.



TV > Creation > Asset Manipulation > Asset Generation

Within Corporate Overhead Emissions

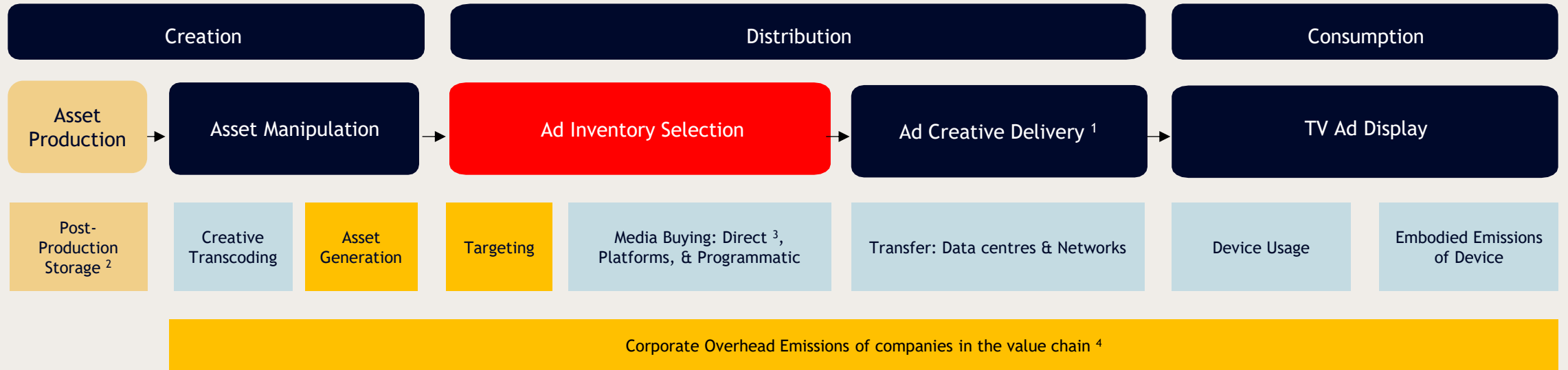
Asset Generation refers to the changes made to advertising copy once the master version has already been produced, including dynamic creative optimisation and AI-enabled personalisation. Organisations may allocate Asset Generation emissions either to individual campaigns or to corporate overhead, depending on their business model and data capabilities. For those choosing to allocate to corporate overhead for ease of implementation, the Corporate Overhead approach is provided. Organisations that invest in efficient, low-emission asset generation technology are encouraged to calculate and report these benefits at the campaign level where feasible, as this supports innovation in sustainable practices.

As industry practices and data maturity evolve, the Framework will continue to develop its treatment of Asset Generation related emissions accordingly.



Television (TV): Channel Emissions Workflow

TV (including Video)



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TV > Distribution > Ad Inventory Selection > Targeting

Within Corporate Overhead Emissions

This framework treats Targeting as a corporate overhead activity, recognising that it varies widely across organisations. However, organisations may choose to measure and report this activity separately if they deem it material to their operations or sustainability positioning. Where organisations elect to allocate these emissions to corporate overhead rather than campaign-level, the Corporate Overhead approach is provided for ease of implementation.

As industry practices and data maturity evolve, the Framework will continue to develop its treatment of Targeting-related emissions accordingly.



TV > Distribution > Ad Inventory Selection > Media Buying

Step context

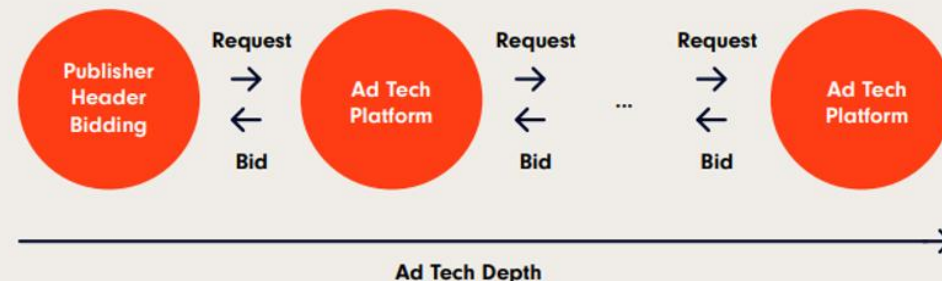
The selection stage accounts for the activity required to buy and sell TV ad inventory. Three main modes usually happen in a TV context:

- Direct insertion orders in traditional broadcast (linear ad insertion): Ad inventory sold based on data-driven TV program statistics and demographics, usually human guided. The content shown is the same for all users at a same time.
- Direct sold DAI (Dynamic Ad Insertion): a manual process where sales teams negotiate directly with advertisers to secure premium, guaranteed ad placements at a fixed price. The DAI technology allows automatic replacement of generic, static ads in unicast/multicast context such as linear OTT or VOD with customised content based on viewer data (location, device, habits).
- Programmatic TV: automates the buying, selling, and delivery of video ads, replacing traditional, manual, and reservation-based methods (upfronts). Server-side Ad Insertion is then often used to deliver the content.

In the case of traditional broadcast or direct-sold DAI, these should mostly be included in Corporate Overhead Emissions as part of the Ad Inventory Selection process. However, in the case of Direct sold DAI, the additional computing required by DAI will be accounted for in the Ad Creative Delivery step.

For programmatic TV, the proposed methodology is adapted from the Digital channel: the methodology accounts for server processing (compute) and transfer of RTB requests and responses (networking). There is nevertheless a certain consensus that the number of actors within the supply chain (and therefore the associated infrastructure) is lower for TV/video than for display advertising, therefore default values would be lower.

Programmatic TV is common in streaming/CTV and addressable inventory, while traditional DTT, satellite, and cable can support it only when the platform exposes the inventory through automated ad-tech workflows or set-top-box/addressable systems. **Industry experts currently consider programmatic modes for traditional broadcast channels (DTT, satellite, cable) to be immaterial, pending data indicating otherwise, therefore, this version of the framework focuses on providing defaults for programmatic addressable CTV only.** Programmatic CTV can be treated as conceptually similar to other programmatic digital, with a less complex ecosystem, however, which results in lower input values than those of the digital channel. CTV uses an extensive to ads.txt called apps-ads.txt, an IAB Tech Lab standard that extends ads.txt to mobile and CTV apps. Because it defines the legitimate programmatic supply path for a given CTV app, the presence (or absence) and contents of an apps-ads.txt file can be used as an input signal in carbon calculations similarly to ads.txt in the Digital Channel.



TV > Distribution > Ad Inventory Selection > Media Buying

Operational formulae (for data Level 1 and Programmatic TV)

For each group of impressions bought from a media owner with a given ads file in a given country, apply for each media owner:

Legend:

- *required inputs*
- *default values*
- *emissions factors*

$$\begin{aligned} &\text{Ad Inventory Selection}_{\text{programmatic TV, Data centres, Use Phase Emissions}} = \\ &\text{number_impressions} \times \text{apps-ads.txt_lines}^1 \times \text{server_factor}^1 \times \text{EF_datacentres_use_phase_intensity} \text{ (kWh / ad opportunity)} \\ &\times (\text{share_servers_local} \text{ (\%)} \times \text{EF_electricity_local}_{\text{country}} \text{ (kgCO2e / kWh)} + \text{share_servers_abroad} \text{ (\%)} \times \text{EF_electricity_abroad}_{\text{country}} \text{ (kgCO2e / kWh)}) \end{aligned}$$

$$\begin{aligned} &\text{Ad Inventory Selection}_{\text{programmatic TV, Data centres, Embodied Emissions}} = \\ &\text{number_impressions} \times \text{apps-ads.txt_lines}^1 \times \text{server_factor}^1 \times \text{EF_datacentres_embodied_intensity} \text{ (kgCO2e / ad opportunity)} \end{aligned}$$

$$\begin{aligned} &\text{Ad Inventory Selection}_{\text{programmatic TV, Networks, Use Phase Emissions}} = \\ &\text{number_impressions} \times \text{apps-ads.txt_lines}^1 \times \text{call_factor}^2 \times \text{RTB_payload_size_per_call} \text{ (MB)} \times \text{EF_network_use_phase_intensity}^3 \text{ (kWh / MB)} \\ &\times (\text{share_network_local} \text{ (\%)} \times \text{EF_electricity_local}_{\text{country}} \text{ (kgCO2e / kWh)} + \text{share_network_abroad} \text{ (\%)} \times \text{EF_electricity_abroad}_{\text{country}} \text{ (kgCO2e / kWh)}) \end{aligned}$$

$$\begin{aligned} &\text{Ad Inventory Selection}_{\text{programmatic TV, Networks, Embodied Emissions}} = \\ &\text{number_impressions} \times \text{apps-ads.txt_lines}^1 \times \text{call_factor}^2 \times \text{RTB_payload_size_per_call} \text{ (MB)} \times \text{EF_network_embodied_intensity}^3 \text{ (kgCO2e / MB)} \end{aligned}$$

¹ Those two factors allow calculation of the number of servers involved per impression (incl. estimation of ad tech depth).

² Those two factors allow calculation of the number of requests involved per impression (incl. bid rates).

³ Assuming the use of the simplified network model.



TV > Distribution > Ad Inventory Selection > Media Buying

Required inputs and data levels (for Programmatic TV)

Data levels - Programmatic activity (incl. apps-ads.txt lines input)

Required inputs

Variable	Unit	Source
number_impressions	Integer	Media buy data
Location	Country	
Apps-ads.txt lines	Integer	Media buy data, default available

Level	Method	Notes
0	Default value	Can be used for cases where no app-ads.txt is available, or if only monetary information is available.
1	Apps-ads.txt	Based on app-ads.txt length as a proxy and standard data on supply chain depth.
2	Global contributed data from stakeholders	Based on a sample of publishers, SSPs and DSPs sharing aggregate data on volumes of bidding activity for each partner they work with.
3	N/A	
4	Campaign specific data	Based on contributed data at a campaign level.

Data levels - EF_datacentres_use_phase_intensity and EF_datacentres_embodied_intensity (per ad opportunity)

Level	Method	Notes
0	Monetary data	If only spend data is available, then an average monetary emissions factor can be used.
1	Default value	Based on lifecycle assessment of VMs and assumptions.
2	Allocation from global data	Based on contributed data on the impact of server operations, allocated to the impression level from global, regional, or data centre level.
3	N/A	
4	Campaign specific data	Based on contributed data at a campaign level.



TV > Distribution > Ad Inventory Selection > Media Buying

Active paths - Example conversion factors and values (for Programmatic TV only)

For the Level 0 and 1 methodologies on active paths in the Digital channel, the IAB Europe Framework & Methodology working group developed a simple and practical approach that improves upon previous models of the programmatic supply chain by using more representative assumptions. For example, the size of the average RTB call was reduced by an order of magnitude (where previously a figure representing the average HTTP request was used) and a bid rate was introduced (where previously all bid requests were assumed to return a bid).

Combining aggregated supply chain data on depth (hops) with aggregated ad tech data (throttling, bid rate) yielded the **server factor** and **call factor**, which can be multiplied with the number of ads.txt lines to estimate the **number of activated servers** and **number of RTB calls** (requests/responses) respectively.

This method was adapted for the Level 0 method for programmatic CTV, to be used only in instances where no apps-ads.txt file is present. Discussion with subject matter experts suggested a conservative value of 500 apps-ads.txt lines as a default. This value is being suggested based on Q3 values for line count from a data set of apps-ads.txt files from 531,420 domains. It was noted that in certain regions where apps-ads.txt adoption is less common the Level 0 and 1 methods may be difficult to apply. It is further acknowledged that the number of apps-ads.txt lines is an imperfect proxy of programmatic CTV supply chain.

The technical parameters provided here are derived from independently aggregated and anonymised industry data and are provided solely for the purpose of emissions calculation accuracy.

All data levels are valid for GMSF implementation. Organisations may select the Level 0 methodology when appropriate to their circumstances.

Conversion factors and default values

Variable	Unit	Source
EF_datacentres_use_phase_intensity EF_datacentres_embodied_intensity	kg CO2e per supply chain node	Estimated using the Data Centre Processing methodology on page 20. Refer to the Data Centres Calculation in the GMSF TV Emissions Data Sources .
EF_networks_use_phase_intensity	kWh per KB	Fixed network assumption for RTB calls. Refer to the Network Calculation in the GMSF TV Emissions Data Sources .
EF_networks_embodied_intensity	kg CO2e per KB	
RTB Call factor	Dimensionless	Refer to the Active Paths Level 0 and 1 methodologies. Different figures for display and video ad slots.
Server factor	Dimensionless	
EF_electricity_local	kg CO2e per kWh	Refer to the Grid Emissions Factors in the GMSF TV Emissions Data Sources .
EF_electricity_abroad	kg CO2e per kWh	Refer to the Continental Server Emission Factors in the GMSF TV Emissions Data Sources .
RTB Payload size per call	KB	Chartboost, provided through Ad Net Zero feedback.

Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources.

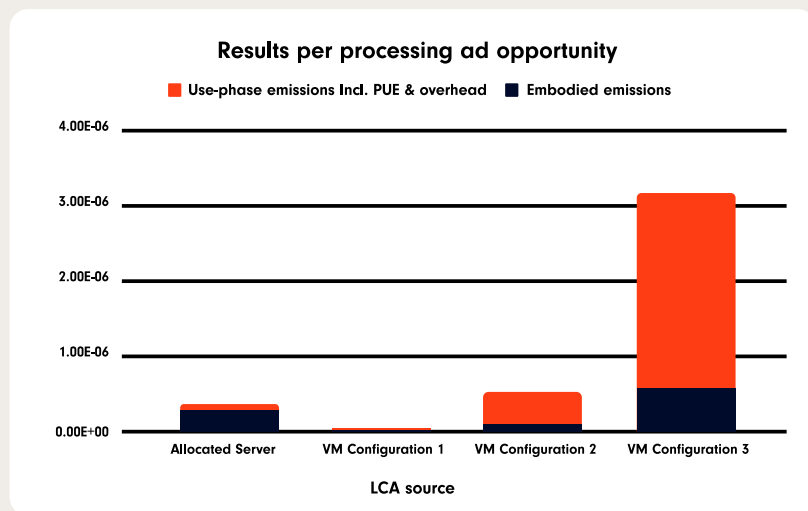


TV > Distribution > Ad Inventory Selection > Media Buying

Data centre processing

Required inputs, default values and conversion factors

For the Level 0 default on server processing intensity, the IAB Europe Methodology & Framework working group evaluated an approach based on time allocation from LCA data and assumptions around virtualisation, drawing from the Digital Carbon Footprint Framework. They proposed using figures from a lifecycle assessment of virtual machines for homogeneity (avoiding an additional assumption on VMs per physical machine) and suggested the VM configuration most representative, given the set of assumptions and based on feedback from subject matter experts. Organisations may use the Level 0 default as appropriate to their individual circumstances. All data levels are valid for emissions estimation.



Assumptions

Variable	Unit	Value	Notes	Source
Electricity consumption of VM	kWh per year	55.2	VM Configuration 1:1 vCPU, 4 GB dedicated RAM, 5 years lifespan	ADEME, Base Empreinte [French LCA Database] (NegaOctet v1.5).
Embodied emissions of VM	kg CO2e per year	23.79		
Processing time	Ms	100	Used to allocate server emissions to processing of an ad opportunity	Clearcode, provided through ANZ feedback.
Overhead factor	(dimensionless)	1.25	Buffer to account for other processing tasks, increase conservativeness	RTB House, provided through Ad Net Zero feedback.
Share of servers in local geo	(dimensionless)	0.5	Share of servers assumed to be in the same country as the user	Digital Carbon Footprint Framework by SRI x Alliance Digitale.
Share of servers abroad	(dimensionless)	0.5	Share of servers assumed to be abroad	
Average PUE	(dimensionless)	1.56	Applied as factor to use-phase	Uptime Institute.
Local grid intensity	kg CO2e per kWh		Refer to the Grid Emissions Factors in the GMSF TV Emissions Data Sources .	
Foreign grid intensity	kg CO2e per kWh		Refer to the 'Continental server emissions factors in the GMSF TV Emissions Data Sources .	
Results				
Use-phase server energy incl. PUE & overhead	kWh per ad opportunity	3.41E-07	Based on the assumptions above, to be combined with grid intensities.	
Server embodied emissions	Kg CO2e per ad opportunity	1.50E-08	Based on the assumptions above.	



*Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources.

TV > Distribution > Ad Inventory Selection > Media Buying

Calculation example (for Programmatic TV)

Example inputs

Variable	Unit	Value
Number of impressions	Integer	1,000,000
Location	Country	UK
Apps-ads.txt lines	Integer	300

Conversion factors and example EFs

Variable	Unit	Value	Source
Server factor (Video)	Dimensionless	1.316	GMSF TV Emissions Data Sources.
EF_datacentres_use_phase_intensity	kWh per ad opportunity	3.41E-07	
EF_datacentres_embodied_intensity	kg CO2e per ad opportunity	1.5E-08	
Call factor (Video)	Dimensionless	1.334	
RTB size per call	MB	0.003	
EF_networks_use_phase_intensity (fixed networks, simplified model)	kWh per MB	1.65E-05	
EF_networks_use_phase_intensity (fixed networks, simplified model)	kg CO2e per MB	2.14E-06	
UK Electricity emissions factor (location-based)	kg CO2e per kWh	0.1955	
EU average Electricity emissions factor (location-based)	kg CO2e per kWh	0.242	

CTV programmatic datacentres = number_impressions * apps-ads.txt lines * server_factor * (EF_datacentres_use_phase_intensity * (share_servers_local * EF_electricity_local + share_servers_abroad * EF_electricity_abroad) + EF_datacentres_embodied_intensity)
 = 1,000,000 impressions * 300 * 1.316 * (3.41E-07 * (50% * 0.1955 + 50% * 0.242) + 1.5E-08)
 = **35.4 kg CO2e**

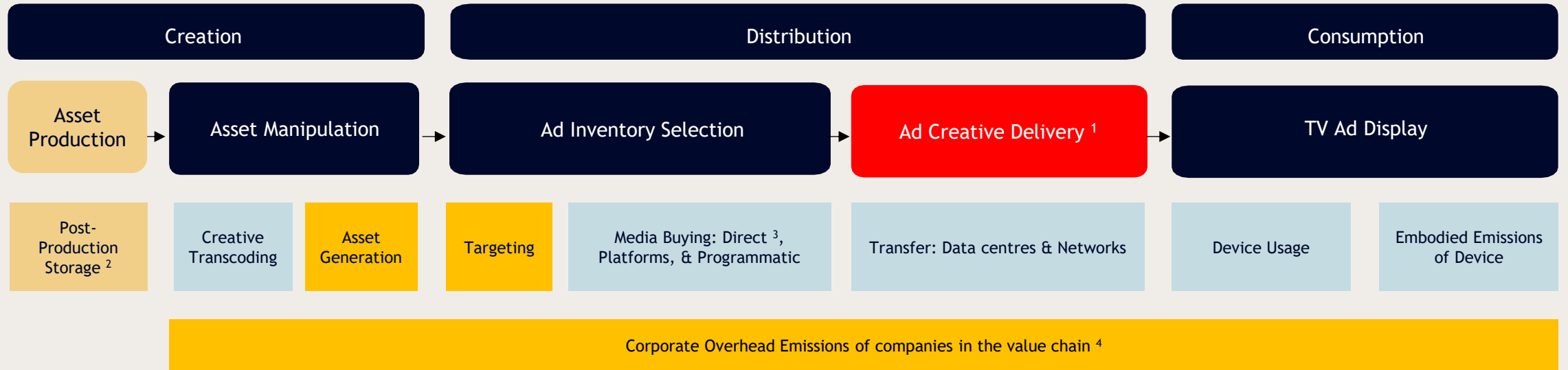
CTV programmatic networks = number_impressions * apps-ads.txt lines * call_factor * RTB_size_per_call * (EF_networks_use_phase_intensity * (share_networks_local * EF_electricity_local + share_networks_abroad * EF_electricity_abroad) + EF_networks_embodied_intensity)
 = 1,000,000 impressions * 300 * 1.334 * 0.003 * (1.65E-05 * (50% * 0.1955 + 50% * 0.242) + 2.14E-06)
 = **6.9 kg CO2e**

Values are illustrative only. Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources.



Television (TV): Channel Emissions Workflow

TV (including Video)



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TV > Distribution > Ad Creative Delivery

Step context

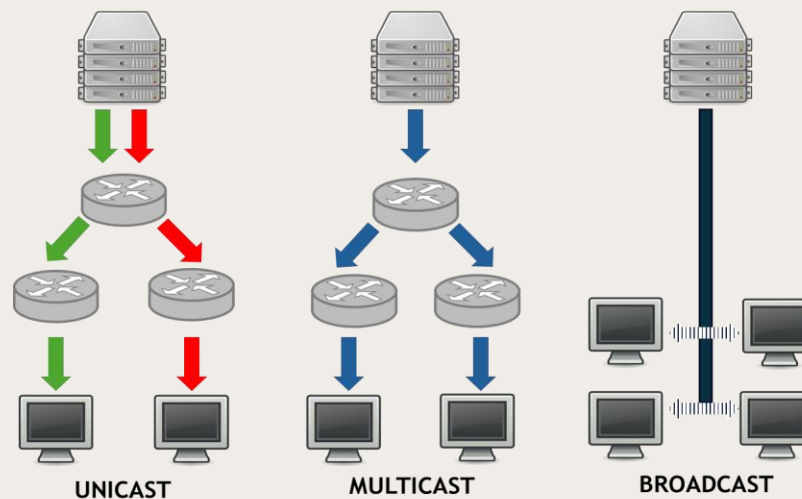
Different transmission modes may be involved in delivering ads (and more generally content) on the TV channel.

At this stage, 3 modes had been distinguished in the formulae:

- Traditional linear modes of TV (Terrestrial / Satellite) use a broadcast mode: the signal is sent once to all users. The overall impact of broadcast network infrastructures is the same regardless of the number of users, so they are particularly effective when used by a sufficient number of users.
- In contrast, OTT audiovisual content (mostly non-linear streaming) is delivered using a unicast signal, which means that each connected terminal places a specific demand on the network.
- In between, managed IPTV networks uses the same infrastructure as the fixed Internet network, only the data transmission is not carried out in the same way. The parts of the backbone network and the transport network used for managed IPTV transmission are multicast, until the connecting network where transmission is unicast.

These considerations have an impact on modelling the impact of data centres and networks.

This step of the workflow is represented first for Unicast, and then again for Broadcast.



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Unicast)

Step context

Infrastructure in Unicast & Multicast delivery

The delivery section accounts for the emissions resulting from transferring ads to user devices over fixed or mobile connections. Given how emissions factors are usually built, the main input is usually the **payload size** of this transfer.

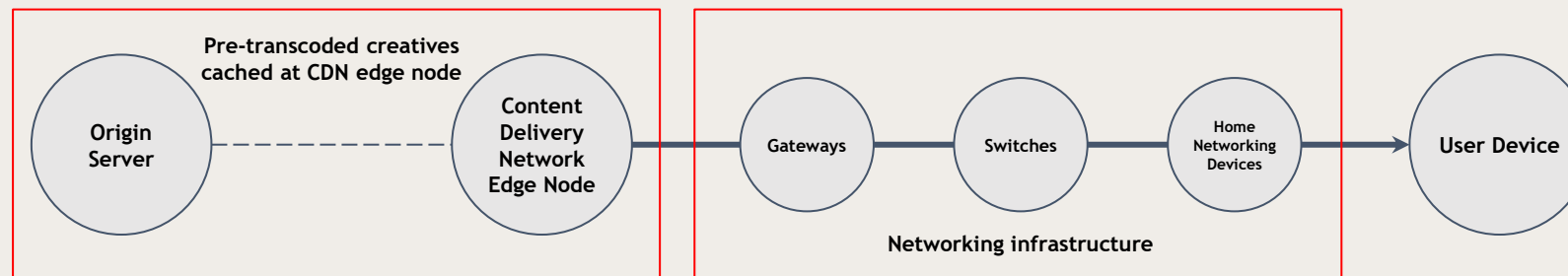
The digital channel methodology (like unicast TV) accounts for CDN¹ infrastructure and includes an overhead for the origin server. An overhead is applied in certain data levels to account for additional payloads (wrappers, players etc.).

The multicast delivery is considered equal in terms of modelling to the unicast delivery channel, given that most emissions relies in the delivery from a CDN/Edge node which happens in both modes, according to expert opinions.

As described in the previous ad inventory selection step, in the case of TV channel, Dynamic Ad Insertion (DAI) technology can also be used to deliver content:

- With Server-Side Ad Insertion (SSAI), double delivery of content (original and inserted) to the user is usually avoided in the case of VOD, thanks to a replacement process that results in a single, stitched stream.
- However, in the case Client-Side Ad Insertion (CSAI) for linear content (such as segmented or addressable TV), the original content is still sent to the user through the original network (ad switched locally), hence accounting for an additional delivery in this case.

Diagram extracted from the digital channel guidance:



Covered by data centres formulae

Covered by networks formulae

¹Content Delivery Networks



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Unicast)

Operational formulae (for data Level 1)

For a group of creatives with a given (or average) payload, delivered to users in a given country over mobile and fixed network connections (unicast):

$$\begin{aligned} &\text{Ad Creative Delivery}_{\text{Data centres, Use Phase Emissions, Unicast TV}} = \\ &\text{number_impressions} \times (\text{payload_size (MB)} + \text{payload_overhead (MB)}) \\ &\times (\text{EF_edge_nodes_use_phase_intensity (kWh / MB)} \times \text{EF_electricity_local}_{\text{country}}(\text{kgCO}_2\text{e / kWh})) \end{aligned}$$

$$\begin{aligned} &\text{Ad Creative Delivery}_{\text{Data centres, Embodied Emissions, Unicast TV}} = \\ &\text{number_impressions} \times (\text{payload_size (MB)} + \text{payload_overhead (MB)}) \times \text{EF_edge_nodes_embodied_intensity (kgCO}_2\text{e / MB)} \end{aligned}$$

$$\begin{aligned} &\text{Ad Creative Delivery}_{\text{Networks, Use Phase Emissions, Unicast TV}} = \\ &\text{number_impressions} \times (\text{payload_size (MB)} + \text{payload_overhead (MB)}) \\ &\times (\text{EF_networks_use_phase_intensity}^1 (\text{kWh / MB}) \times \text{EF_electricity_local}_{\text{country}}(\text{kgCO}_2\text{e / kWh})) \end{aligned}$$

$$\begin{aligned} &\text{Ad Creative Delivery}_{\text{Networks, Embodied Emissions, Unicast TV}} = \\ &\text{number_impressions} \times (\text{payload_size (MB)} + \text{payload_overhead (MB)}) \times \text{EF_networks_embodied_intensity}^1 (\text{kgCO}_2\text{e / MB)} \end{aligned}$$

Legend:

- *required inputs*
- *default values*
- *emissions factors*

¹Assuming the use of the simplified network model.



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Unicast)

Required inputs and data levels (1/2)

Note that network emissions factors (EF_networks...) data are, in principle, national values and therefore not relevant for data levels.

Required inputs

Variable	Unit	Source
number_impressions	Integer	Media buy data.
Location	Country	
Payload_size	MB	Media buy data, default available.

Data levels - payload_size and payload_overhead (per impression)

Level	Method	Video Default	Notes
0	Default creative weight.	4 MB, 6 MB instream	Overestimation by design. Instream figure can be used in other environments where heavy ad intervention does not apply (e.g. Safari).
1	100% of creative data assumed to be transferred.	N / A	Full creative data assumed to be transferred, overestimation due to lack of data.
2	Completion rate used as proxy for data transferred ¹ .		E.g. 50% video completion rate - 50% of video transferred. Option when actuals on completion rate are available.
3	Actual measurement of data transfer.		Eliminates need for overhead payload term below. Option when data transfer measurement is available.
Overhead			
Add-on to levels 0-2	Payload beyond creative assets (e.g. players).	0.35 MB	Overestimation due to caching - actual would require information on network reach, campaign reach, cache lifetimes etc.
	Payload associated to Dynamic Ad Insertion (only in case of Client-Side Ad Insertion).	payload_size (doubling the payload)	The impact of Client-side AI considers 1. Delivery of the classic spot in traditional linear IPTV (emissions from servers and networks) 2. Additional delivery of replacement ads (playlist) taking into account: delivery from an origin server (ad server, etc.) followed by delivery by the CDN operator of the replacement playlist. Thus, it can be estimated that the linear DAI process is doubled on the server and network side. Additional requests outside of content delivery are not considered but remain negligible compared to the creative file.

¹ Particularly relevant in VOD and replay environments where ads can be skipped, therefore completion rates do vary



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Unicast)

Required inputs and data levels (2/2)

Note that network emissions factors (EF_networks...) data are, in principle, national values and therefore not relevant for data levels.

Required inputs

Variable	Unit	Source
number_impressions	Integer	Media buy data
Location	Country	
Payload_size	MB	Media buy data, default available

Data levels - EF_edge_nodes_use_phase_intensity and EF_edge_nodes_embodied_intensity (per MB)

Level	Method	Notes
0	Monetary data	If only spend data is available, then an average monetary emissions factor can be used.
1	Default value	Based on lifecycle assessment of VMs and assumptions.
2	Allocation from global data	Based on contributed data on the impact of server operations, allocated to the impression level from global, regional, or data centre level.
3	N/A	
4	Campaign specific data	Based on contributed data at a campaign level.



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Unicast)

Calculation example

Example inputs

Variable	Unit	Value
Number of impressions	Integer	1,000,000
Location	Country	UK
Payload size	MB	4

Conversion factors and example EFs

Variable	Unit	Value	Source
Payload overhead	MB	0.35	GMSF TV Emissions Data Sources.
EF_datacentres_use_phase_intensity	kWh per MB	4.30E-07	
EF_datacentres_embodied_intensity	kgCO2e per MB	5.88E-07	
EF_networks_use_phase_intensity	kWh per MB	1.65E-05	
EF_networks_embodied_intensity	kgCO2e per MB	2.14E-06	
UK Electricity emissions factors	kgCO2e/kWh	0.1955	

Ad Creative Delivery (datacentres, unicast)

$$\begin{aligned}
 &= \text{number_impressions} * (\text{payload_size} + \text{payload_overhead}) * (\text{EF_datacentres_use_phase_intensity} * \text{EF electricity UK} + \text{EF_datacentres_embodied_intensity}) \\
 &= 1,000,000 * (4 + 0.35) \text{ MB} * (4.30\text{E-}07 * 0.1955 + 5.88\text{E-}07) \\
 &= 2.9 \text{ kgCO2e}
 \end{aligned}$$

Ad Creative Delivery (networks, unicast)

$$\begin{aligned}
 &= \text{number_impressions} * (\text{payload_size} + \text{payload_overhead}) * (\text{EF_networks_use_phase_intensity} * \text{EF electricity UK} + \text{EF_networks_embodied_intensity}) \\
 &= 1,000,000 * (4 + 0.35) \text{ MB} * (1.65\text{E-}05 * 0.1955 + 2.14\text{E-}06) \\
 &= 23.3 \text{ kgCO2e}
 \end{aligned}$$

Values are illustrative only. Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources.



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Broadcast)

Step context

Data centre infrastructure in Linear Broadcast delivery

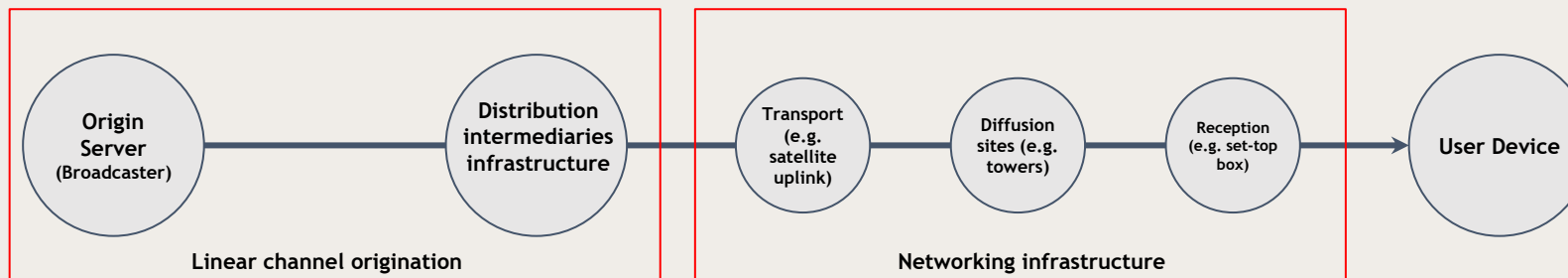
The delivery section accounts for the emissions resulting from transferring ads to user devices over broadcast networks such as DTT or satellite. As the signal is sent 24/7 regardless of the number of users, the main input is the **time** the infrastructure is used.

Linear TV broadcast is a one-to-many model where content is curated, scheduled in advance, and delivered to millions of households simultaneously, so the transmission infrastructure and its energy cost are largely shared across the audience rather than replicated per viewer. Unlike on-demand streaming, which scales more like a one-to-one delivery model and adds network load as audience size grows, broadcast energy use does not increase proportionally with each additional viewer, so figures normalised per user or per hour should be interpreted differently.

The modern broadcast chain is split into two main, interconnected infrastructures: the datacentres (linear channel origination) and the network (distribution):

- Channel Origination is the "head-end" or "master control" where the channel is created, scheduled, and prepared for broadcast including: ingesting raw content, transcoding into broadcast-standard format, playout automation, multiplexing...
- Once the multiplexed signal is created, it is transmitted to the end-user through satellite ground stations (uplink), terrestrial transmission towers, cable/fibre networks, reception (collective or individual).

In the case of addressable broadcast, some Client-Side Ad Insertion (CSAI) can happen for linear content, the original content is still sent to the user through the original network (ad switched locally), hence accounting for an additional delivery in this case.



Covered by data centres formulae

Covered by networks formulae



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Broadcast)

Operational formulae (for data Level 1 Linear Broadcast)

For a group of creatives, delivered to users in a given country over broadcast network connections, apply in a given country:

$$\text{Ad Creative Delivery}_{\text{Data centres, Use Phase Emissions, Broadcast TV}} = \text{total_duration_instream}^1 \text{ (s)} \times \text{EF_datacentre_use_phase_intensity}^2 \text{ (kWh/s)} \times \text{EF_electricity}_{\text{country}} \text{ (kgCO2e/kWh)}$$

$$\text{Ad Creative Delivery}_{\text{Data centres, Embodied Emissions, Broadcast TV}} = \text{total_duration_instream}^1 \text{ (s)} \times \text{EF_datacentre_embodied_intensity}^2 \text{ (kgCO2e/s)}$$

$$\text{Ad Creative Delivery}_{\text{Networks, Use Phase Emissions, Broadcast TV}} = \text{total_duration_instream}^1 \text{ (s)} \times \text{EF_networks_use_phase_intensity}^3 \text{ (kWh/s)} \times \text{EF_electricity}_{\text{country}} \text{ (kgCO2e/kWh)}$$

$$\text{Ad Creative Delivery}_{\text{Networks, Embodied Emissions, Broadcast TV}} = \text{total_duration_instream}^1 \text{ (s)} \times \text{EF_networks_embodied_intensity}^3 \text{ (kgCO2e/s)}$$

Additional overhead for CSAI in addressable broadcast⁴: import formulae from unicast/multicast

Legend:

- *required inputs*
- *default values*
- *emissions factors*

These formulae are defined per broadcast mode (e.g., DTT, Satellite...), meaning that the total duration instream applies only to the specific delivery mode considered; if the campaign runs across several broadcast modes, the calculation should be duplicated for each mode and then aggregated.

¹ The total duration calculated as the sum of all on-air occurrences of the campaign creative(s) associated with the ad campaign(s) across the relevant TV channels.

² Total emissions associated with server operations involved in signal transmission prior to sending to the broadcast network, including transcoding operations (see details in CREATION > Asset Manipulation > Creative transcoding step), allocated per duration of signal broadcast per TV channel (including multiplexing allocation).

³ Usually average national values covering the emissions (use phase and embodied) associated with the national network inventory for the broadcast networks, allocated per hour of broadcast per channel.

⁴ Client-Side Ad Insertion for addressable broadcast considers an additional unicast delivery on top of the original broadcast delivery of content, directly using the formulae from unicast/multicast (servers & networks).



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Broadcast)

Required inputs and data levels (for data Level 1 Linear Broadcast)

Note that network emissions factors (EF_networks...) are, in principle, national values and therefore not relevant for data levels.

Required inputs

Variable	Unit	Source
total_duration_instream	Hours	Media buy data
Location	Country	

Data levels - EF_datacentres_use_phase_intensity and EF_datacentres_embodied_intensity (per second)

Level	Method	Notes
0	Monetary data	If only spend data is available, then an average monetary emissions factor can be used.
1	Default value	Based on lifecycle assessment of VMs and assumptions.
2	Allocation from global data	Based on contributed data on the impact of server operations, allocated to the impression level from global, regional, or data centre level.
3	N/A	
4	Campaign specific data	Based on contributed data at a campaign level.



TV > Distribution > Ad Creative Delivery > Transfer: Data Centres & Networks (Broadcast)

Calculation example

Example inputs

Variable	Unit	Value
Total duration instream	Hours	3.5
Location	Country	UK
Broadcast mode	—	DTT

Conversion factors and example emissions factors

Variable	Unit	Value	Source
EF_datacentre_use_phase_intensity	kWh per s	1.80E-03	See GMSF TV Emission Data Sources .
EF_datacentre_embodied_intensity	kgCO2e per s	7.84E-05	
EF_networks_use_phase_intensity	kWh per s	1.30E-01	
EF_networks_use_phase_intensity	kgCO2e per s	3.06E-02	
UK Electricity Emissions Factors	kgCO2e per kWh	0.1955	

Ad Creative Delivery (datacentres, broadcast)

$$\begin{aligned}
 &= \text{total_duration_instream} * (\text{EF_datacentres_use_phase_intensity} * \text{EF electricity UK} + \text{EF_datacentres_embodied_intensity}) \\
 &= 3.5 \text{ hours} * 3600 \text{ conversion to seconds} * (1.80\text{E-}03 * 0.1955 + 7.84\text{E-}05) \\
 &= \mathbf{5.4 \text{ kgCO}_2\text{e}}
 \end{aligned}$$

Ad Creative Delivery (networks, broadcast)

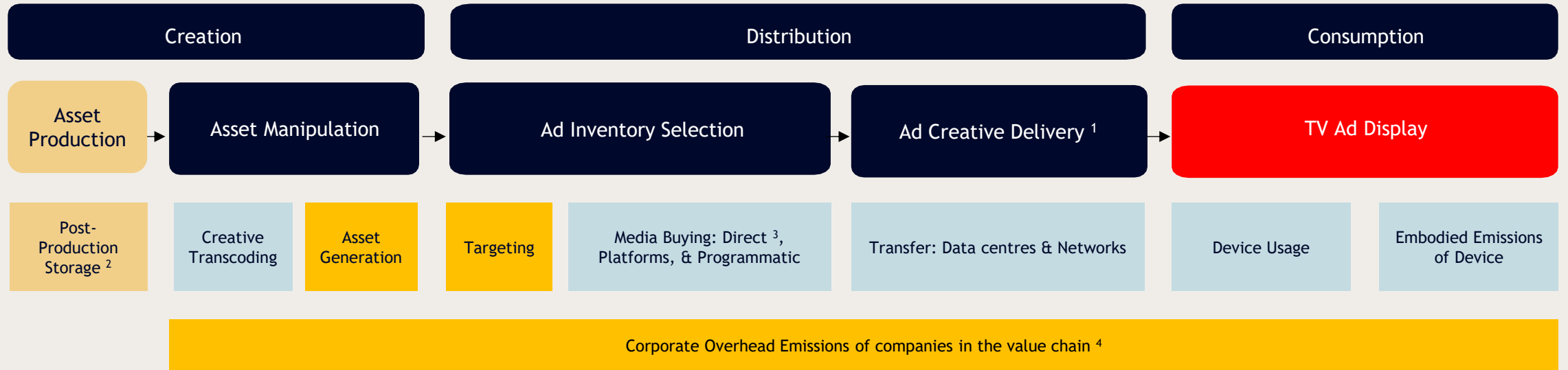
$$\begin{aligned}
 &= \text{total_duration_instream} * (\text{EF_datacentres_use_phase_intensity} * \text{EF electricity UK} + \text{EF_datacentres_embodied_intensity}) \\
 &= 3.5 \text{ hours} * 3600 \text{ conversion to seconds} * (1.30\text{E-}05 * 0.1955 + 3.06\text{E-}02) \\
 &= \mathbf{707.4 \text{ kgCO}_2\text{e}}
 \end{aligned}$$

Values are illustrative only. Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources.



Television (TV): Channel Emissions Workflow

TV (including Video)



- Excluded from workflow boundaries
- Included in workflow boundaries with guidance provided
- Covered in Corporate Overhead Emissions for ease of implementation
- Denotes the focus of the following section of implementation guidance



TV > Consumption > TV Ad Display > Device Usage & Embodied Emissions of Device

Step context

The consumption stage accounts for emissions arising from resource usage on user devices, including both use-phase and embodied emissions across 4 device groups: mobile, tablet, PC, and TV.

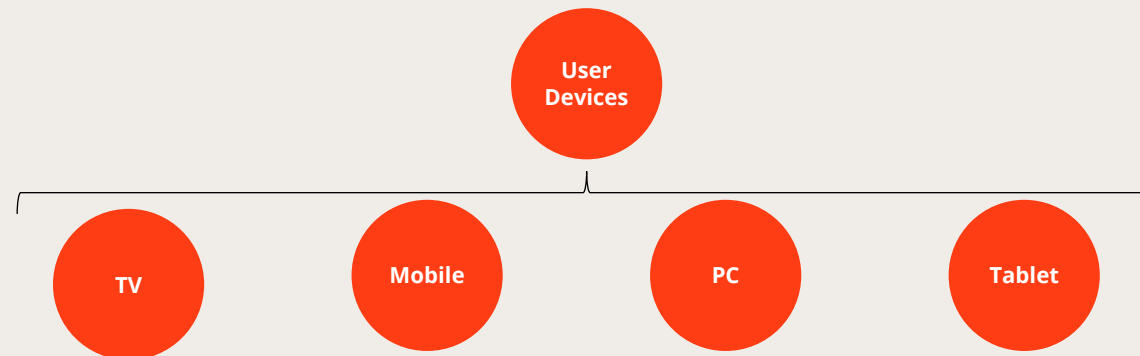
Obviously, the TV Ad Displays are generally more represented in the distribution of users of this channel.

It should be noted that most TVs have a built-in digital terrestrial television (DTT) box, so it is not usually necessary to consider additional equipment for this mode. For other networks, the set-top box (satellite, ISP box...) is generally integrated into the local network loop and included in the emission factors, therefore should not be counted twice in the values.

Consistently with the Digital channel, in the absence of more specific data relating digital ads to hardware usage, two assumptions are included in the proposed methodology. First, the entire device's lifecycle emissions are allocated to each digital ad. Second, view time is used as a proxy to facilitate the time-based allocation. For devices, the input metric may differ fundamentally between traditional broadcast modes and multicast/unicast delivery, but in both cases the goal is to estimate the number of devices exposed to the ad:

- For broadcast modes (DTT, satellite, cable), there is no direct visibility into individual devices; the number of devices is therefore estimated using a primary audience-based input, to be combined conversion factors (e.g. households per TV) and average device split;
- For multicast/unicast (addressable TV, IPTV, CTV, OTT), the key input is impressions per device, because each stream or session is tied to a specific screen or household, allowing measurement at the device or user level; therefore, deriving the input directly from the campaign-level impression data.

Device splits mentioned above reflect household diversity, capturing variations in device usage across different household profiles and connection types. Defaults are provided where needed. This step of the workflow is represented first for Unicast, and then again for Broadcast.



Only user render step can be modelled with available data to this date. User device load is therefore neglected.



TV > Consumption > TV Ad Display > Device Usage & Embodied Emissions of Device (Unicast)

Operational formulae

For a group of creatives with given (or average) view time served to a given group of user devices in a given country, apply for each device in a given country:

$$\begin{aligned} & \text{TV Ad Display}_{\text{Device Use Phase Emissions, Unicast/multicast}} = \\ & \text{number_impressions}^1 \times \text{view_time}^2 \text{ (s)} \times \text{device_split} \text{ (\%)} \\ & \times \text{EF_device_use_intensity} \text{ (kWh / s)} \times \text{EF_electricity}_{\text{country}} \text{ (kgCO2e / kWh)} \end{aligned}$$

$$\begin{aligned} & \text{TV Ad Display}_{\text{Device Embodied Emissions, Unicast/multicast}} = \\ & \text{number_impressions}^1 \times \text{view_time}^2 \text{ (s)} \times \text{device_split} \text{ (\%)} \\ & \times \text{EF_device_embodied_intensity} \text{ (kgCO2e / s)} \end{aligned}$$

Legend:

- required inputs
- default values
- emissions factors

¹ Impression data is ideally sourced directly from media owners, broken down by device type (e.g. connected TV, mobile, tablet, browser, games console...). In practice, platform-reported device classifications may lack granularity or require assumptions – for example, inferring the screen type connected to a games console. Where device-type breakdowns are unavailable or unreliable, audience measurement survey data (e.g. BARB in the UK, or equivalent bodies in other markets) should be used to estimate device distribution, consistent with the approach used in the broadcast formula.

² Beyond time allocation, the addition of another variable to the equation to further allocate emissions based on screen share will be explored in the next release.



TV > Consumption > TV Ad Display > Device Usage & Embodied Emissions of Device (Unicast)

Required inputs and data levels

Note that network emissions factors (EF_networks...) data are, in principle, national values and therefore not relevant for data levels.

Required inputs

Variable	Unit	Source
number_impressions (unicast/multicast)	Integer	Media buy data.
Location	Country	
Device type split	%	Media buy data, default available.
view_time	Seconds	Refer to 'View Time calculation'.

Data levels - view_time

Level	Method	Video default	Notes
0	Default view time	30s	Overestimation by design. For cases where no view time data is available.
1	Average campaign-level view time	N / A	Average view time for campaign used across device types.
2	Average view time per device type		Device type-specific view time used in calculations.
Overhead			
Add-on to levels 1-2	Minimum view time	2s	Based on MRC standard for viewability - used to account for device usage in cases where view time is not reported for ads that fail to meet viewability specifications.

Data levels - device type split

Level	Method	Notes
0	Default split	Overestimation by design. For cases where no view time data is available.
1	Global generic split	Based on contributed data on device split, from global, regional, or campaign level.
2	Regional split	
3	N/A	
4	Campaign-level split	



TV > Consumption > TV Ad Display > Device Usage & Embodied Emissions of Device (Unicast)

Calculation example

Example inputs

Variable	Unit	Value
Number of impressions	Integer	500,000
Location	Country	UK
Device type split	%	80% TV, 15% Mobile, 5% PC
View time	Seconds	30

Conversion factors and example EFs

Variable	Unit	Value	Source
EF_device_use_per_second (TV)	kWh/s	3.8E-05	See GMSF TV Emissions Data Sources .
EF_device_embodied_per_second (TV)	kgCO2e/s	8.65E-05	
UK Electricity Emissions Factors	kgCO2e/kWh	0.1955	

Per device (Unicast)

= impressions × device_split × view_time × (EF_device_use_per_s × EF_local + EF_device_embodied_per_s)

For TV = 500,000 × 80% × 30s × (3.8E-05 × 0.1955 + 8.65E-05) = **192.2 kgCO2e**

Repeat for mobile, PC. Total = use phase + embodied across all devices (unicast)

Values are illustrative only. Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources



TV > Consumption > TV Ad Display > Device Usage & Embodied Emissions of Device (Broadcast)

Operational formulae

For a group of creatives with given (or average) view time served to a given group of user devices in a given country, apply for each device in a given country:

$$\text{TV Ad Display Device Use Phase Emissions, Broadcast} = \text{total_audience}^1 \times \text{audience_devices_conversion_factor}^2 \times \text{view_time}^3 \text{ (s)} \times \text{device_split} \text{ (\%)} \times \text{EF_device_use_intensity} \text{ (kWh / s)} \times \text{EF_electricity}_{\text{country}} \text{ (kgCO2e / kWh)}$$

$$\text{TV Ad Display Device Embodied Emissions, Broadcast} = \text{total_audience}^1 \times \text{audience_devices_conversion_factor}^2 \times \text{view_time}^3 \text{ (s)} \times \text{device_split} \text{ (\%)} \times \text{EF_device_embodied_intensity} \text{ (kgCO2e / s)}$$

Legend:

- required inputs
- default values
- emissions factors

¹ The total broadcast audience (e.g. total audience aged 4+) used as the starting point for the calculation, expressed in viewers or households as defined by the media buy data. In the absence of direct device-level visibility for broadcast modes, audience-to-device conversion factors are derived from establishment or panel surveys conducted by audience measurement bodies (e.g. BARB in the UK), which capture the range of devices present in homes. Where available, market-specific survey data should be used; if not available, regional or global proxies may be applied.

² Factor used to convert total audience into an estimated number of devices, based on the average number of devices or terminals per audience unit. This can be calculated at the channel level or using a national average, depending on the granularity of the available data.

³ Beyond time allocation, the addition of another variable to the equation to further allocate emissions based on screen share will be explored in the next release.



TV > Consumption > TV Ad Display > Device Usage & Embodied Emissions of Device (Broadcast)

Data levels - *view_time*

Required inputs and data levels

Required inputs

Variable	Unit	Source
<i>total_audience (broadcast)</i>	Integer	Media buy data
Location	Country	
<i>audience_devices_conversion_factor¹</i>	Integer	Media owners
Device type split	%	Media buy data, default available
<i>view_time</i>	Seconds	Refer to 'View Time calculation'

Note that network emissions factors (EF_networks...) data are, in principle, national values and therefore not relevant for data levels.

¹ Typically below 1 to account for co-viewing.

Level	Method	Video default	Notes
0	Default view time	30s	Overestimation by design. For cases where no view time data is available.
1	Average campaign-level view time.	N / A	Average view time for campaign used across device types.
2	Average view time per device type.		Device type-specific view time used in calculations.
Overhead			
Add-on to levels 1-2	Minimum view time	2s	Based on MRC standard for viewability - used to account for device usage in cases where view time is not reported for ads that fail to meet viewability specifications.

Data levels - Device type split

Level	Method	Notes
0	Default split	Overestimation by design. For cases where no view time data is available.
1	Global generic split	Based on contributed data on the device split, from global, regional, or campaign level.
2	Regional split	
3	Campaign-level split	



TV > Consumption > TV Ad Display > Device Usage & Embodied Emissions of Device (Broadcast)

Calculation example

Example inputs

Variable	Unit	Value
Total audience	Integer	2,000,000
Location	Country	UK
Audience-to-devices conversion factor	—	0.7
Device type split	%	95% TV, 5% other
View time	Seconds	30

Conversion factors and example EFs

Variable	Unit	Value	Source
EF_device_use_per_second (TV)	kWh/s	3.8E-05	GMSF TV Emissions Data Sources.
EF_device_embodied_per_second (TV)	kgCO2e/s	8.65E-05	
UK Electricity Emissions Factors	kgCO2e/kWh	0.1955	

Per device (broadcast)

= total_audience x audience_devices_conversion_factor x device_split x view_time x (EF_device_use_per_s x EF_local+ EF_device_embodied_per_s)

For TV = 2,000,000 x 0.7 x 95% x 30s x (3.8E-05x 0.1955 + 8.65E-05) = **641.5 kgCO2e**

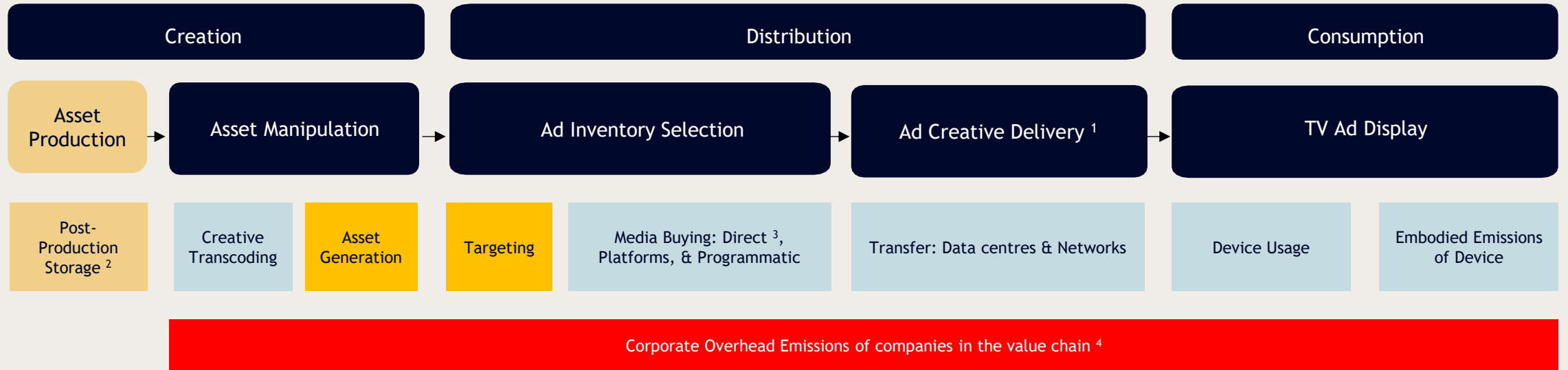
Repeat for mobile, PC. Total = use phase + embodied across all devices (broadcast)

Values are illustrative only. Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources.



Television (TV): Channel Emissions Workflow

TV (including Video)



- Excluded from workflow boundaries
- Included in workflow boundaries with guidance provided
- Covered in Corporate Overhead Emissions for ease of implementation
- Denotes the focus of the following section of implementation guidance



TV > Corporate Overhead Emissions

Step context

Corporate overhead emissions are:

- Emissions caused by processes that are not already captured in the unit process formulae.
- Generally organised into ‘fixed’ and ‘dedicated’ (that can vary by client and ad campaign).

Methodology:

Subtract all emissions that would be reported under the GMSF formulae from the overall corporate emissions to estimate the total annual corporate overhead emissions (TCOE). The expectation is that all scope 1 and 2 emissions (e.g., associated with office buildings) and all the relevant scope 3 emissions (e.g., business travel, purchased goods and services for marketing/administration) will be included and accurate.

Allocate the TCOE using one of the following approaches, depending on what data is available and appropriate to the organisation's circumstances:

- a. By labour (e.g., person-hours worked; FTE) so there is a kgCO₂e/person-hour figure; or
- b. By revenue, so there is a kgCO₂e/\$ figure
- c. By output (e.g., kgCO₂e/1000 impressions)

Estimate either corporate overhead per ad campaign by labour or revenue or output including both the fixed and the dedicated types of resources.

Estimate the corporate overhead emissions by multiplying the figures from steps 2 and 3.

For further information and background on the challenges of Corporate Overhead methodologies, please see the [GMSF Playbook](#). Organisations are not required to disclose enterprise-level revenue, turnover, or cost data to external parties in order to implement the Corporate Overhead Emissions methodology. These calculations should be performed internally by each organisation using their own financial and emissions data. The result may be shared with clients or buyers, but the underlying financial metrics and allocation factors need not be disclosed.



TV > Corporate Overhead Emissions

Operational formula

For each entity of the ad value chain in a given GHG reporting year:

Enterprise GHG inventory (kg CO₂e) - GMSF emissions reported via formulae (kgCO₂e) = Total Corporate Overhead Emissions (TCOE) (kg CO₂e)

Allocate by revenue, FTE or impressions to create emission factor (EF) - in the most common case by revenue:

TCOE-EF = TCOE/revenue for GHG reporting year (kg CO₂e/\$)

Multiply TCOE-EF by the invoiced value for the ad campaign being estimated (Campaign Corporate Overhead Emissions, CCOE):

CCOE (kg CO₂e) = TCOE-EF (kg CO₂e/\$) * campaign invoice (\$)

Legend:

- required inputs
- emissions factors



TV > Corporate Overhead Emissions

Required inputs and data levels

Required inputs

For a specific entity of an ad campaign value chain, do you have:	
A	Enterprise emissions inventory, including AI emissions (third-party verified).
B	Total of all emissions reported elsewhere in the GMSF (credible & documented).
C	The TCOE unitised by enterprise revenue, enterprise FTE, or output unit (credible & documented).
D	The corresponding figure of revenue, FTE, or output unit for the specific activity for the ad campaign emissions being estimated (credible & documented).

Data levels

Level	Method
0	If only D is available (or is estimated) a revenue, FTE and output unit EF will be provided by the GMSF.
1	If there are GMSF default values for C by the type of enterprise and activity as well as geography, use those emission factors.
2	If only A and D are available, use standard overhead % provided by the GMSF to estimate TCOE which is unitised by revenue (or FTE, output) to estimate C.
3	If A, B, and C are available but D is only approximately estimated.
4	If YES to all.

Note: to facilitate the estimation of the emissions captured elsewhere in the GMSF (input B), please see the [corporate overhead emissions by scope guidance](#) which is ordered by emission scope 1, 2 and 3 to indicate which emissions categories are most likely to be included in the overhead estimate and which are likely already captured elsewhere by the GMSF.

A greyed-out box denotes an area of the GMSF under current development.



TV > Corporate Overhead Emissions

Calculation example

For a given organisation in a GHG reporting year:

Total enterprise GHG inventory = 10,000 kg CO₂e

GMSF-reported emissions = 8,000 kg CO₂e

Total Corporate Overhead Emissions (TCOE) = 2,000 kg CO₂e

If allocating by output (e.g., 1,000,000 impressions delivered in the year):

TCOE EF = 2,000 kg CO₂e / 1,000,000 impressions = 0.002 kg CO₂e per 1,000 impressions

For the campaign being estimated (50,000 impressions):

CCOE = 0.002 kg CO₂e/1,000 impressions × 50 = 0.1 kg CO₂e"

Values are illustrative only, and this example represents Level 4 Data. Please refer to the [GMSF TV Emissions Data Sources](#) for latest reference on values and sources.



Data Uncertainty

As noted in the playbook, the assessment and communication of Data Uncertainty is an important last step in the GMSF process.

Assessing uncertainty is a key principle in carbon accounting and is important in the GMSF context for several reasons:

- It encourages practitioners to use the most accurate data available.
- It provides a roadmap for better data development.
- It provides context for users of GMSF based estimates.

The uncertainty assessment in GMSF v1.3 is designed to be as simple as possible to implement by relying only on the percentage of Level 0 and Level 1 approaches used in the calculation. The overall level of uncertainty is simply based on that percentage as noted below.

For more information on Data Uncertainty, including context and challenges, please see the [GMSF Playbook](#).

$$\text{Uncertainty Level (UL)} = (\text{Count of all Level 0, 1}) / (\text{Total Count})$$

UL = % of all data estimates using Level 0 or Level 1
for a specific channel

Lower level of accuracy	< 30% use of Level 0 + Level 1 approaches
Increased level of accuracy	between 30% and 60% use of Level 0 + Level 1 approaches
Higher level of accuracy	> 60% use of Level 0 + Level 1 approaches



Data Uncertainty

Calculation example

For a TV campaign for the launch of Product X, the following data levels were used, depending on the available data:

Level	Number of times utilised within Channel Workflow
0	9
1	3
2	2
3	0
4	1

Uncertainty Level = $12/15 = 80\%$ **High uncertainty** (as $> 60\%$)

Values are illustrative only.



Further resources

Associated GMSF resources



[GMSF TV
Emissions Data
Sources](#)



[GMSF TV Emissions
Data Request Form](#)



Other industry resources



[egta sustainability in TV advertising case studies including the practical use of the GMSF](#)





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Ad Net Zero Compliance Statement

Ad Net Zero is an advertising industry climate action plan to decarbonise emissions in ad development, production, and media placement, and accurately promote more sustainable products, services and behaviours

It represents the interests of the advertising industry. It acts as a forum for legitimate contacts between supporters of the advertising industry. It is the policy of Ad Net Zero that it will not be used by any company, industry grouping or individuals to further any anti-competitive or collusive conduct, or to engage in other activities that could violate any antitrust or competition law, regulation, rules or directives of any country, or otherwise impair full and fair competition.

Supporters acknowledge that being a supporter of Ad Net Zero is subject to the competition law rules and they agree to comply fully with those laws. Supporters agree that they will not use Ad Net Zero, directly or indirectly, (a) to reach or attempt to reach agreements or understandings with one or more of their competitors; (b) to obtain or attempt to obtain, or exchange or attempt to exchange, confidential or proprietary information regarding any other company other than in the context of a bona fide business; (c) to further any anti-competitive or collusive conduct; or (d) to engage in other activities that could violate any antitrust or competition law, regulation, rule or directives of any country or otherwise impair full and fair competition.

Organisations are not precluded from using competing, alternative, or supplementary sustainability calculation frameworks or methodologies in addition to or instead of the GMSF. Use of the GMSF does not require exclusive adoption. Use of simplified default approaches should be a fallback, where primary data is unavailable or prohibitively difficult to obtain, not a preferred methodology.

The GMSF is designed to be scalable and accessible to organisations of varying sizes and capabilities. Organisations with limited resources may adopt simplified approaches using Level 0 data or select elements of the Framework. No organisation should be disadvantaged in the market for choosing to implement the GMSF in a simplified manner.

Organisations participating in GMSF development or data contribution processes do so under confidentiality protections.