MAPPING GREENHOUSE GAS ESTIMATION SOLUTIONS IN DIGITAL ADVERTISING

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Executive Summary

There is a great deal of momentum in Europe around estimating and reducing greenhouse gas (GHG) emissions resulting from digital advertising. The major media groups and trade associations are heavily involved, and multiple companies have been set up to tackle this challenge. In this complex landscape, there is a need for a better understanding of the methodologies and data used to estimate the environmental impact of digital advertising. To this end, common methodological approaches are gradually being put in place at national and now global level. Our work with IAB Europe is helping to bring greater transparency and genuine cooperation between stakeholders to compare methodologies and data.

The options for estimating GHG emissions in the digital advertising industry have grown rapidly and are diverse. More are in the starting blocks. Nevertheless, there are significant differences in the details, which are shown in this gap analysis. Even when scratching the surface, it becomes clear that a holistic analysis of different solutions is necessary to understand why their estimates may differ. Moreover, additional engagement between supply chain stakeholders and further inclusion of market participants whose operations are targeted by third-party GHG estimates are crucial in order to achieve a more robust data basis.

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1. Introduction

Understanding the level of greenhouse gas (GHG) emissions associated with digital advertising is a necessary condition for environmental footprint reduction to be achieved. The development of tools that generate emissions estimates for digital campaigns and media products, driven primarily by firms aiming to quantify and reduce scope 3 emissions resulting from marketing activity, has opened a new dimension to media measurement. As the industry expands on its offering of sustainability-related solutions, marketers may find themselves in need of a reference tool to assist them in tailoring their strategy to their objectives. The following mapping is intended to support industry professionals in navigating the range of emissions models available and understanding how they may differ and why they may arrive at varying estimates. The information that was collected varies in terms of technical depth, ranging from basic descriptions of solutions to an overview of differences in methodology. Ultimately, the mapping includes data that industry professionals are likely to seek when exploring options for GHG estimation.

A second objective of the mapping is to uncover the main challenges in generating robust GHG estimates for digital advertising products and provide a basis for further work and industry collaboration. Four main areas of focus surfaced in exchanges with vendors regarding how their models can be improved. The European digital advertising ecosystem, represented by IAB Europe, is actively engaged in addressing these challenges and improving the reliability of GHG estimates relating to digital media products.

2. Format

2.1. Categories

The information collected from participating organisations spans 9 categories that represent different aspects of GHG estimation solutions.

Purpose
Use case for the solution as presented by the owner.

Supply Chain Scope
Evaluation of which stages in the digital advertising supply chain are covered.

Device Lifecycle
Evaluation of which lifecycle stages of devices are covered and what types of emissions are considered (e.g. use phase vs manufacturing).

Transparency
Evaluation of disclosure with respect to underlying assumptions, figures, and calculations.

Inclusion of Uncertainty
Evaluation of extent to which uncertainty of the GHG model is understood, accounted for, and represented in the solution.

Data Integration
Evaluation of extent to which model lends itself to use by firms at various levels of sustainability advancement.

Geographical Flexibility
Clarification on the markets that the solution is built for and whether it can be adapted to other locations.

Development
Clarification on whether and how the owner is developing and updating the solution, as well as their involvement in adoption by the market.

Compliance Orientation
Clarification on whether the solution enables compliance with non-financial disclosure regulation.

2.2. Additional Information

Participants were encouraged to share information that contextualises the description of their solutions relevant to each category. Readers are encouraged to review this additional information as it contains important insights that may not be fully captured in the visuals.

3. Included Solutions

3.1. Solution Classification

Prior to the analysis, the following classification of GHG estimation solutions was adopted by the Committee to assist in describing different types of outputs.
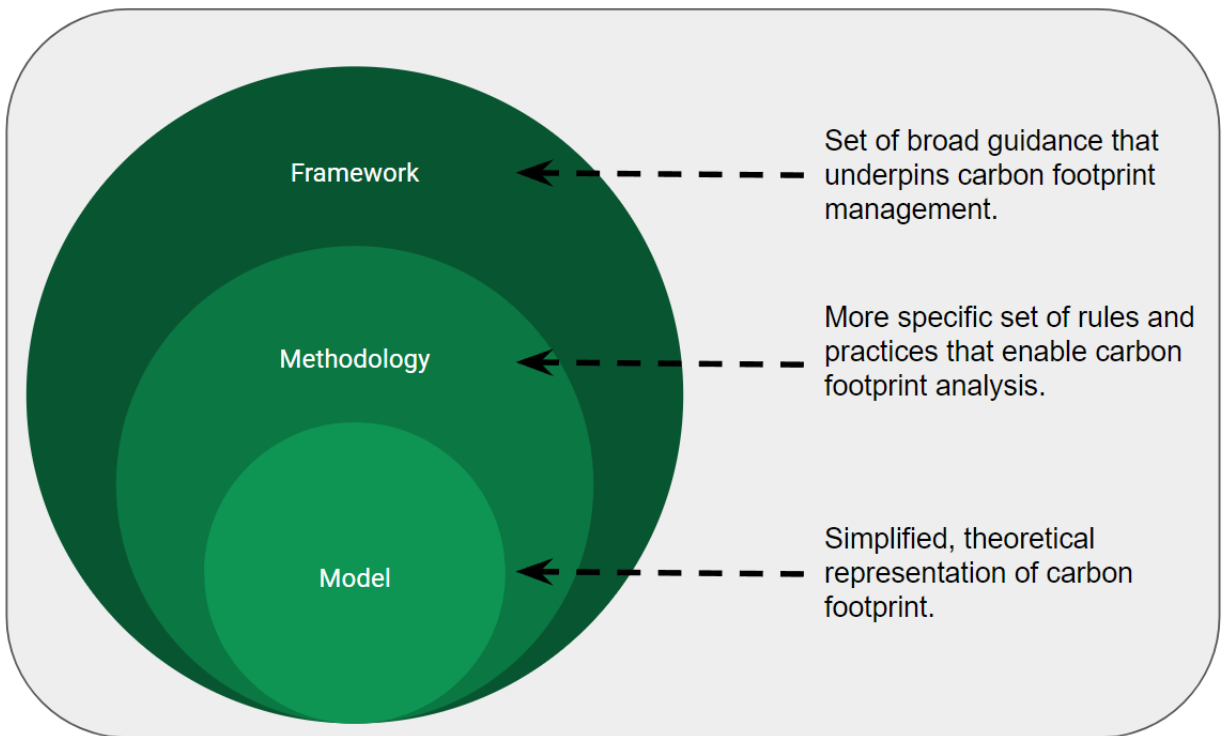
Frameworks are broad, formalised sets of guidance that describe how an entity should act to deal with - that is measure, report, and mitigate - its greenhouse gas emissions. They may be public and underlie many different GHG estimation solutions or be developed as proprietary technological guidance. **Methodology** refers to the set of practices, rules, and guidelines on which an entity bases its organisational, operational, and analytic actions when measuring its GHG emissions. It describes the data that is collected to describe specific value chain activities and how estimates for GHG impact are calculated. A **model or estimator** is a tool that accepts inputs that describe activity in the value chain (e.g. number of impressions, creative file size) and returns an estimate for the associated GHG footprint. Models are usually built by applying a framework and methodology.

3.2. Participating Organisations

Prior to the analysis, the following classification of GHG estimation solutions was adopted by the Committee to assist in describing different types of outputs.

| Owner	Framework	Methodology	Model
SRI / Alliance Digitale	✓	✓	
Climate Partner*	✓	✓	✓
DIMPACT	✓	✓	✓
GroupM *	✓	✓	✓
Omnicom Media Group *		✓	✓
Dentsu *	✓	✓	✓
AdGreen		✓	✓
Scope3 *		✓	✓
Good-Loop *		✓	✓
IMPACT+ *		✓	✓
DK *		✓	✓
SeenThis *		✓	
Cedara *		✓	✓

* for-profit entity

3.3. Solution Interplay

Prior to the analysis, the following classification of GHG estimation solutions was adopted by the Committee to assist in describing different types of outputs.
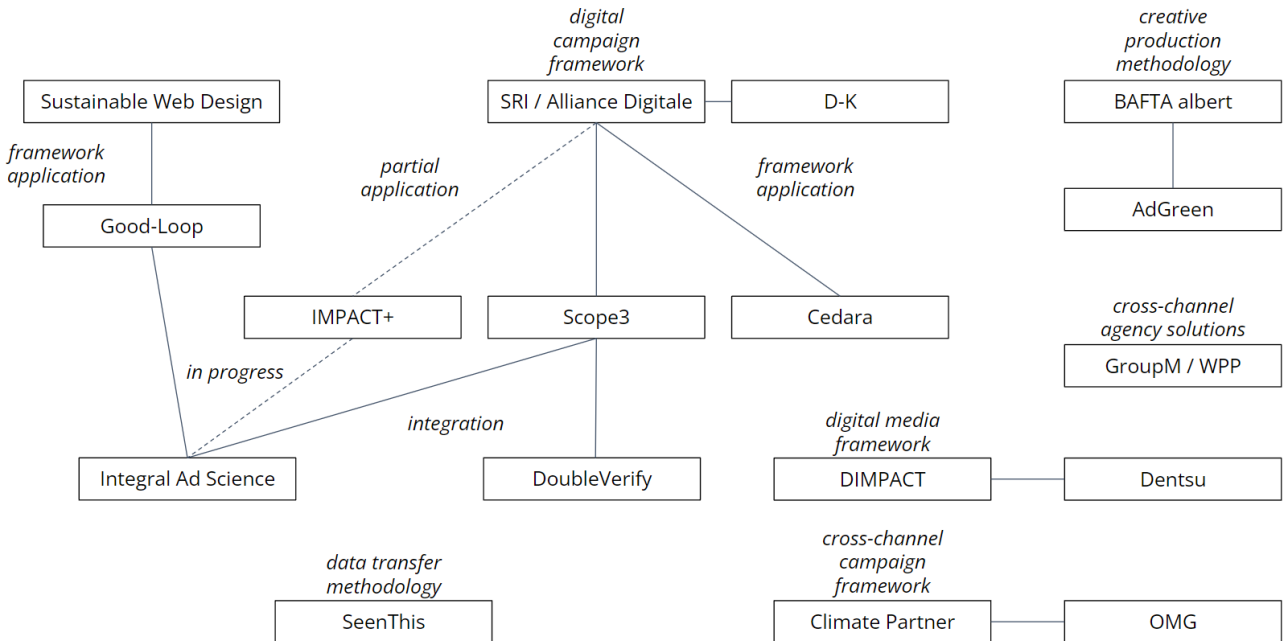
4. Results

4.1. Purpose

The information collected from participating organisations spans 9 categories that represent different aspects of GHG estimation solutions.

SRI / Alliance Digitale

Build methodology & database to enable stakeholders to develop carbon footprint assessment tools to evaluate emissions resulting from digital campaigns.

Climate Partner

They aim to provide media agencies, publishers, and other stakeholders with a comprehensive outline of CO_2 emissions throughout the value chain. This facilitates the incorporation of emissions considerations into campaign planning, enabling the derivation of effective reduction measures. Moreover, for clients seeking to offset emissions, they deliver robust emission data as a basis.

DIMPACT

DIMPACT is an initiative that supports companies to estimate and address the emissions from serving digital media and entertainment products. Whilst DIMPACT offers a tool and public methodology, they are a collaborative group of media and entertainment companies who come together to better understand and address the emissions from serving media and entertainment products.

GroupM

As the first in the industry to account for media emissions in their science-based reduction and net-zero targets, GroupM and WPP are working to support the industry and their clients to reduce emissions in this highly complex space. While GroupM is a for-profit entity, it should be noted that they provide access to their framework free of charge and have openly shared it with industry working groups engaging in the development of standards.

Omnicom Media Group

Their carbon tool uses the method developed and certified by ClimatePartner to calculate the emissions of a programmatic campaign. With the emissions calculated in this way, they can then optimise the campaigns in the next step and optimise the emissions per impression while maintaining the same media efficiency.

Dentsu

Their methodology enables carbon measurement, understanding and management throughout the lifecycle of media campaigns across media channels. The media carbon calculator aims to support informed decision-making in media planning and buying.
AdGreen

Estimate the level of greenhouse gas emissions resulting from creative production.

Scope3

Understand and quantify the level of emissions associated with advertising, quantify and facilitate reduction actions, and incentivise the creation of a positive cycle - biased media buying, more sustainable practices, and additional emissions disclosure.

Good-Loop

The intended use case of the Good Measures Technology is to allow agencies to conduct both live and post-hoc analysis of estimated GHG emissions from digital advertising campaigns. Current and future campaigns can then be optimised to reduce GHG emissions using their Publisher Optimisations and Creative Optimisations tool.

IMPACT+

- Evaluate GHG emissions for internal and external reporting purposes at various levels of granularity depending on need (campaign, platform, brand etc).
- Identify actions to reduce the carbon footprint of digital advertising campaigns.
- Assess the effectiveness of optimisations through reduced and avoided emissions evaluation.
- Track environmental performance against historic activity as well as country averages.
- Use the environmental data generated for further optimisation in additional platforms (e.g. custom bidding in DSP).
- Assess your potential environmental impact before you start the campaign.
- Optimise your creative weights to minimise environmental impact.
- Visualise reports in-platform for easy management or use a custom report builder to export exactly the data required.

Cedara

Their solution is intended for all companies involved in all of the marketing supply chains, including Digital, Print, OOH, TV, Radio, and Events. They measure corporate emissions for businesses and assist them with reduction and SBTI net zero submissions. Additionally, they help transmit corporate data across the supply chain to make third-party emission calculators more accurate by reducing the reliance on estimated data sets.

DK

DK provides solutions for measuring and optimising the carbon footprint of both online and offline ad campaigns (Print, Digital, Radio, OOH, TV, Cinema). DK assists advertisers, publishers, agencies, and media sales houses in managing their transition towards a more responsible and sustainable world. Developed with trade associations (SRI/Alliance Digitale, Bureau de la Radio, SNPTV, Union des Marques etc.), their solution is cross-media and proposes actions to reduce carbon footprint. Depending on the client's maturity and cross-media challenges, DK offers three levels of carbon evaluation and management:

- Audit and consulting: This includes audits of campaigns or tech across various channels such as Digital, CTV, linear TV, Radio, Audio, Streaming Video, and more.
- SaaS platform: This offers dashboards for data visualisation.

- Calculation API: This allows for easy integration of carbon data into the client's dashboard or any other BI tool.

SeenThis

SeenThis is contributing their methodology, validated by Doconomy, to the ongoing gap analysis, aiming to offer further perspectives for the development of a comprehensive industry framework. Developed at a time when the impact of data transfer on emissions was little understood and few frameworks existed, their contribution is intended to enrich the discourse and to foster collaborative advancement, not to promote the methodology, which they will not further develop. It is important to note that SeenThis remains focused on their core competence—optimising creatives and creative delivery—without any ambition to become an emissions assessment partner. SeenThis will be adopting the SRIxAD framework and will actively engage in the development of an industry-aligned framework.

4.2. Supply Chain Scope

A solution's supply chain scope refers to the stages in the digital advertising supply chain that are accounted for in terms of environmental impact.

Creative production includes shoots, editing etc., allocation & delivery covers ad selection and delivery, and consumer view covers the impact of rendering creatives on user devices.

Owner	Creative Production	Allocation & Delivery	Consumer View
SRI / Alliance Digitale		✓	✓
Climate Partner	✓	✓	✓
DIMPACT		✓	✓
GroupM	✓	✓	✓*
Omnicom Media Group	✓	✓	✓
Dentsu		✓	✓
AdGreen	✓		
Scope3		✓	✓
Good-Loop		✓	
IMPACT+		✓	✓
DK	✓	✓	✓
Cedara	✓	✓	✓
SeenThis		✓	✓

* recommended in full methodology once accurate use-phase data is available

Programmatic

Sourcing data points useful for estimating emissions can be a challenge in the current programmatic landscape. The following table outlines whether vendors collect demand-side data (e.g. DSP logs) or supply-side data (e.g. ads.txt).

Owner	Demand-side	Supply-side
Scope3	✓	✓
Good-Loop		✓
IMPACT+	✓	✓
DK	✓	✓
Climate Partner	✓	✓
Omnicom Media Group	As Climate Partner relies on a lot of assumptions within their methodology, they expanded their own programmatic carbon estimation and optimisation tool with technical report data of their DSP partner The Trade Desk to provide a more granular approach and derive more client-specific and actionable emissions reduction recommendations.	
Cedara	Read live data from clients to determine active paths and no. of bids in programmatic.	

Tracking

Tracking requires additional data transfer and processing, and is responsible for a component of the GHG impact of IT resource usage in digital advertising. The following table indicates which vendors incorporate tracking activity into their models.

Owner	Tracking Included	Notes
Scope3	✓	Tracking scripts included in creative payload.
Good-Loop	✓	Through integration with IAS.
DK		No tracking to avoid additional emissions.
Climate Partner	✓	Based on standard assumptions reflecting size of tracking scripts.
Omnicom Media Group		Depending on the campaign they are able to derive the client-specific file size from their technical reports to have the precise file and tracking file size for their estimations. If this isn't possible, they use the value that Climate Partner gathered in their work with their media partner.

Additional Information:

SRI / Alliance Digitale

SCOPE OF THE COMMON BASE			V2 (April 23)
ADVERTISERS & MEDIA AGENCIES: Communication strategy			
CONTENT PRODUCTION: CREATIVE AGENCIES, FILMING, ETC.			
BEFORE DISTRIBUTION & ADVERTISING ENVIRONMENT: Marketing, media planning, targeting (DMP), DCO			
AD SPACE ALLOCATION & ANALYTICS (SSP, DSP, ETC.)	ADTECH OPERATION		
	PROGRAMMATIC SERVERS		●
	OTHER SERVERS*		●
	NETWORKS		●
DISTRIBUTION OF ADVERTISING	SALES HOUSE OPERATION		
	SERVERS		●
	NETWORKS		●
	TERMINALS		●
THIRD-PARTY TRACKING: SOLICITATION OF ADTECH SERVERS AND NETWORKS			
POST-CLIC : Landing site / app, analytics			

SeenThis

SeenThis measures the actual data transferred when delivering creatives to end users across the globe. Their detailed measurement allows them to provide transparent and granular reporting of data transfers related to creative delivery for input into any framework.

The emissions methodology applies to data transfers across the internet, including:

• Data centres
• Core network
• Content delivery networks (CDNs)
• Access networks
• User devices

Cedara

Cradle-to-grave approach, capturing emissions from creative production, agencies, ad platforms, publishers, and user device experience.

The SRI / Alliance Digitale framework is used as a "minimum boundary" model to which other corporate emissions are added.

Good-Loop

"Top-down" approach which measures data transfer when estimating GHG emissions for digital advertising campaigns:

Total Data Transfer = Publisher Content Data + Ad-Tech Data + Creative Content Data

This incorporates data centre computations and data transfer for:

- AdTech including Wrappers and Trackers
- Bidding Process
- Creative

Green energy use and carbon offsets are accounted for.

DK

DK is fully compliant with the SRI/Alliance Digitale framework V2. They can add detailed campaign data as soon as they can aggregate ad servers data via their API connectors.

Dentsu

Dentsu have developed a proprietary methodology for calculating the carbon footprint of a campaign's lifecycle (based on the Product Lifecycle Assessment Standard). The scope of Dentsu's carbon methodology, crucially, covers the different lifecycle stages of media campaigns and is tailored to market nuances. To ensure accuracy of their emissions reporting, their methodology is created at a market level using the boundaries below factoring in key local data.
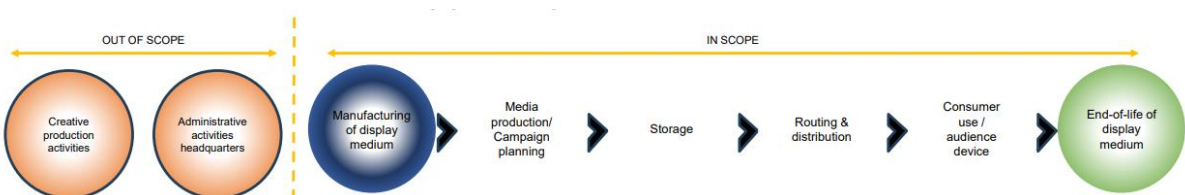
4.3. Device Lifecycle

Devices are responsible for GHG emissions during their use, arising from electricity generation, as well as their manufacturing and disposal.

The table indicates which life cycle phase each solution accounts for by device type.

Owner	Servers	Networks	User Devices	notes
SRI / Alliance Digitale	🔘 🟠 🔵	🔘 🟠 🔵	🔘 🟠 🔵	
Climate Partner	🟠	🟠	🟠	
DIMPACT	🟠	🟠	🟠	Users able to add embodied emissions.
GroupM	🔘 🟠 🔵	🔘 🟠 🔵	🔘 🟠 🔵	Embodied intensities recommended
Omnicom Media Group	🟠	🟠	🟠	
Dentsu	🟠	🟠	🔘 🟠 🔵	
AdGreen	Does not apply to creative production.			
Scope3	🔘 🟠 🔵	🟠	🔘 🟠 🔵	
Good-Loop	🔘 🟠 🔵	🔘 🟠 🔵		
IMPACT+	🟠	🟠	🔘 🟠 🔵	Modular
DK	🔘 🟠 🔵	🔘 🟠 🔵	🔘 🟠 🔵	
Cedara	Follows SRI methodology.			
SeenThis	🟠	🟠	🔘 🟠 🔵	Set ratio for including embodied emissions.

Key: Manufacturing emissions 🔘   Use-phase emissions 🟠   End-of-life emissions 🔵

4.4. Transparency

Transparency is important for firms to understand and retain the opportunity to compare different solutions. Disclosing documentation and indicative data enables transparency.

While "open-source" refers to a specific type of software licence, here it refers to documentation being publicly accessible. All solutions are open-source or based on publicly available frameworks or research.

The public data column refers to whether owned data sets used or produced by a GHG model have been made publicly available, including anonymised data.

Owner	Open Source	Based on Open Source	Public Data
SRI / Alliance Digitale	✓		✓
Climate Partner		✓	
DIMPACT	✓	✓	✓
GroupM	✓		
Omnicom Media Group		✓	
Dentsu	✓		
AdGreen	✓		
Scope3	✓	✓	✓
Good-Loop		✓	✓
IMPACT+	✓	✓	

Owner	Open Source	Based on Open Source	Public Data
DK	✓	✓	✓
Cedara		✓	
SeenThis	✓	✓	✓

Additional Information:

Climate Partner

Advertisement impression methodology is based on open-source research and proprietary data from scientific databases (e.g. Ecoinvent). In general, they follow international accounting standards like the GHG protocol as well as industry-specific guidelines in their calculation of corporate- and product-related emissions. For this they use scientific databases, research studies and customer data to calculate robust carbon footprints. They provide detailed explanations of their methodologies to customers. On request, they provide further information on individual calculations (e.g. used emission factors).

Omnicom Media Group

As their methodology is based on Climate Partner and also uses databases with emission factors, they are not allowed to share as raw data and are currently not able to disclose their detailed methodology.

Dentsu

They do not publicly publish their methodology across channels. However, they do share details of their approach, boundaries, assumptions etc. with their clients when they engage on the MCC and are under confidentiality agreements. They gave their digital methodology to DIMPACT as the basis of their model – this is public knowledge and is disclosed.

Good-Loop

They provide demonstrations on how to use their solutions and have produced supporting documentation for their solutions and methodology. Their methodology is based on open-source calculations from Sustainable Web Design's data-to-electricity formula and is certified as fit for purpose after an external audit by Greenly.

Values used in the calculations are taken from open-source research modelling internet electricity usage from 2020 to 2030 (Andrae, 2020).

They utilise publicly available data for carbon factors including values for both global grid electricity (442 g/kWh) and renewable energy sources (50 g/kWh) which are from EMBER World Data website and a report from the National Renewable Energy Laboratory (NREL).

SeenThis

The sources of data used to perform the calculations were selected based on the following criteria:

- **Overlap and completeness in relation to the selected scope:** ensures relevance and reduces the margin of error in the calculations
- **Stemming from recognised and specialised research or institutions:** provides credibility and robustness
- **Publicly available:** helps to ensure transparency

The calculations are partly reliant on the sources but also on discussions with subject matter experts. Given the magnitude of the Information and Communication Technology (ITC) field and its rapid evolution, recent publications and studies would need to be investigated on a regular basis. Underlying assumptions and sources would also need to be challenged from time to time to ensure an updated and relevant calculation model.

Cedara

They use public GHG emission calculation models and public emission factor databases for measuring corporate overhead. They use industry approved frameworks as well as Cedara emission factors to calculate product-level emissions.

They integrate their technology directly with businesses to obtain their operations data which they then convert into emissions data. They provide transparency on the total emissions by company, corporate intensity, and emissions factors utilised (if allowed by company).

IMPACT+

Full methodology documentation available online. While not open source from a licensing point of view to reuse their methodology or their tools for free, they offer the same level of transparency to their prospects and clients as any open-source framework.

DK

DK provides full transparency about their methodology (Bilan carbone or GHG protocol) and the databases they use which can be either public or private (e.g. SRIxAD database, base Empreinte de l'ADEME or NEGAOCTET). They also provide the percentage emissions estimates for each step in the model (hosting, delivery, servers, activation, consumer view, etc.).

When they provide the calculation, they also indicate the framework on which the calculation has been based. They have also produced methodological calculation documentation for TV/Radio/Digital measurement.

4.5. Inclusion of Uncertainty

Solution owners that were asked about accounting for inaccuracy in GHG estimates expressed that this remains a challenge. The data that GHG estimation relies on is rarely packaged with figures describing uncertainty.

Still, there are options for qualitative data assessment, as well as evaluations of where uncertainty might be entering different models.

Owner	Inclusion of Uncertainty	Notes
SRI / Alliance Digitale	*Data Availability Gap:* There are gaps in where uncertainty is considered among data sources. GHG estimates rely on allocation methods using figures from corporate emissions reports, which are not scientific in nature. LCA database figures may also lack descriptions of uncertainty.	Qualitative assessment of data quality.
Climate Partner		
DIMPACT		
GroupM		
Omnicom Media Group		
Dentsu		
AdGreen		
Scope3		Limitations and assumptions highlighted. Attempting to source higher quality data.
Good-Loop		
IMPACT+		Limitations and assumptions highlighted. Continuously source higher quality data.
DK		Upcoming feature to highlight assumptions with the addition of a "box plot diagram"

Owner	Inclusion of Uncertainty	Notes
Cedara		Limitations and assumptions highlighted.
SeenThis		Limitations and assumptions highlighted.

Additional Information:

SRI / Alliance Digitale

Two main sources of uncertainty in calculating emissions

**Level of input data retained by the advertising sales houses**
- precise 0 - Input data / Level 1 calculated on an average - average values for levels 2 & 3
1 - Level 1 as input data for calculations - average values for levels 2 & 3
2 - Level 2 specified by the sale house - average values for level 3
+ precise 3 - Level 3 specified by the sales house - no average values used

Robustness of the sources used
- precise 0 - Factors and modelling based on estimates
1 - Factor & modelling from private studies with scientific advice / old LCAs
2 - Factors & models from private studies with scientific advice / recent LCAs
3 - Factors & models taken from old official reports / peer-reviewed scientific studies
+ precise 4 - Factors & models taken from recent official reports / peer-reviewed scientific studies

The uncertainties of each calculation can therefore be modelled qualitatively as follows:

Level of input data retained by the advertising sales houses

Low uncertainty

Medium uncertainty

High uncertainty

Robustness of the sources used
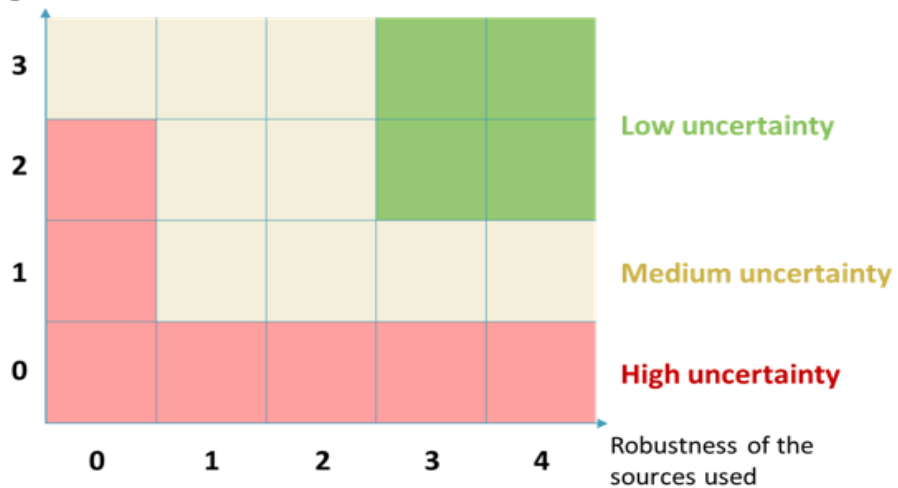
Climate Partner

They use activity-based data for all campaign-level emissions. However, within these emissions, they recognise that there is a significant source of uncertainty for network emissions and the programmatic auction process.

They do not incorporate specific assessments of uncertainty but aim to reduce it through pilot projects that include an increasing degree of primary data which increases the robustness of their calculation method.

Omnicom Media Group

Akin to the Climate Partner approach, they add 10% on top for their general emissions estimation results and use conservative assumptions if they don't have more detailed information, so that to the very best of their knowledge and due diligence, they report higher emissions than were actually caused.

Cedara

On a general basis, spend-based data has higher uncertainty than activity-based data. They calculate all campaign level emissions with activity-based data. Within campaign-level emissions, they are aware that transmission network emissions are a source of high uncertainty in the model, due to the lack of available, transparent data from the main internet service providers. Another area of high uncertainty is found in the programmatic delivery, related to the bid requests and data transfer during bidding.

They do not provide any specific uncertainty assessment or confidence interval, but they are engaged with players in the digital supply chain to reduce the uncertainty.

IMPACT+

They describe their methodology as an evaluation and explain there is inherent uncertainty of environmental impact models.

They concentrate on educating clients to help them understand that while figures may have some variance, reduction actions are not in question and that directionally they help to minimise the environmental impact independent of evaluation methodology.

Scope3

Assumptions and limitations of the methodology are highlighted in its documentation. Considering uncertainty is contingent on uncertainty being included in corporate sustainability reports as well as more firms issuing such disclosure. Scope3 is trying to improve the quality of data through its verification program.

Scope3 takes a conservative approach with renewable energy and offsets.

Dentsu

They fully disclose that media suppliers are not fully onboarded, meaning that their calculations have the potential to become more accurate in the future. Their methodology is evolving like all others, a fact which they communicate with their clients.

They use public emissions factors where possible, real campaign data from their systems, and benchmarks from Dentsu databases where data is missing. They also engage with media partners to get real and accurate data at a global and local level. Finally, they engage with multiple forums and groups (e.g. DIMPACT, Ad Net Zero) on the evolution of assumptions and methodologies to stay aligned and ensure accuracy.

DIMPACT

In 2024, they intend to conduct a detailed parameter review of their model, to review assumptions and data sources that underpin their methodology and model, respectively. This includes exploring further opportunities to offer regionalised/countrified estimates and offer estimates of embodied emissions for components (e.g. end-user devices, server) within the model.

4.6. Data Integration

The custom dataset column indicates whether data points with specific activity or GHG intensity data can be integrated into the solution. More advanced firms may be able to provide additional data and lower the need for reliance on default values. The actual level of detail of a GHG model can vary even if custom data is used. The default values column indicates whether fixed data points are available in case firms are missing information. The availability of default values makes GHG estimation easier for firms that are not able to provide granular data that describes their activity, due to technological barriers or cost.

Owner	Custom Dataset	Default Values Available	Notes
SRI / Alliance Digitale	✓	✓	Tiered data system.
Climate Partner	✓	✓	
DIMPACT	✓	✓	
GroupM	✓	✓	
Omnicom Media Group	✓	✓	
Dentsu	✓	✓	
AdGreen		✓	
Scope3	✓	✓	User devices emissions can be included / excluded. Data contextualised through direct communication.
Good-Loop		✓	Data captured by proprietary ad tech.
IMPACT+	✓	✓	Hourly / daily emissions factor based on location.
DK	✓	✓	API allows custom KPIs on top of standard frameworks.

Owner	Custom Dataset	Default Values Available	Notes
Cedara	✓	✓	Scalable data infrastructure / aggregation using APIs.
SeenThis	*N/A*		Collected data points (e.g. data transferred) can be integrated into any platform and framework)

Additional Information:

SRI / Alliance Digitale

		FORMAT 1	FORMAT 2	FORMAT N
DATA TO BE ENTERED WHEN USING		Number of impressions	Number of impressions	Number of impressions
		Sales mode: programmatic or direct without competitive bidding	Sales mode: programmatic or direct without competitive bidding	Sales mode: programmatic or direct without competitive bidding
LEVELS OF COLLECTION	**Level 1 DATA TO BE COLLECTED OR ENTERED DURING INSTALLATION**	Size 1	Size 1	Size 1
		Average viewing time / exposure	Average viewing time / exposure	Average viewing time / exposure
		Audience location: % France vs Intern.	Audience location: % France vs Intern.	Audience location: % France vs Intern.
		User terminals: % PC, % tablet, …	User terminals: % PC, % tablet, …	User terminals: % PC, % tablet, …
	Level 2 DATA FOR REFINEMENT	Audience location: % by country	Audience location: % by country	Audience location: % by country
		Type of network: % fixed, % mobile, …	Type of network: % fixed, % mobile, …	Type of network: % fixed, % mobile, …
	Level 3 DATA FOR REFINEMENT	Server impact (space allocation and campaign delivery)	Server impact (space allocation and campaign delivery)	Server impact (space allocation and campaign delivery)
	MARKET DATA	Network impact (space allocation and campaign delivery)	Network impact (space allocation and campaign delivery)	Network impact (space allocation and campaign delivery)
		Impact of user equipment (manufacture, use, end-of-life)	Impact of user equipment (manufacture, use, end-of-life)	Impact of user equipment (manufacture, use, end-of-life)

Climate Partner

Their tool provide customers with the possibility to calculate their emissions based on a varying degree of primary data. In case of data gaps, default values are provided. Customers are encouraged to provide as much primary data as possible to enhance the robustness of the calculated emission results.

Scope3

Clients select whether to include or exclude user devices in estimation.

Scope3 reads ads.txt, sellers.json and works with other vendors to produce a vendor graph which is improved through direct communication with firms so that nuances in the supply chain are reflected.

Information is collected from publishers and vendors to contextualise ads.txt data.

Cedara

Their solution is built in a way that can be used by companies at different stages of their sustainability journey. They provide fallback values that can be used in the absence of actual data and be replaced when the company gathers sufficient primary data. This way, companies can improve the quality of their GHG inventory over time to get a better understanding of their total emissions.

They scale data aggregation via the use of APIs and other methods and have built a data infrastructure enabling them to measure all historical data on a continuous basis for businesses.

Good-Loop

The methodology is highly adaptable and scalable as it is a top-down approach that looks at the overall energy usage for data transfer of an advertising campaign with the data for calculations captured by their proprietary AdTech.

SeenThis

SeenThis optimises data transfer and measures data points, such as actual data transferred, device types, locations, which can be integrated into any emissions platform and framework. As the emissions methodology is a top-down assessment of emissions, there are aspects that restrict its adaptability and scalability, which they would like to share as relevant considerations for an industry aligned framework, such as:

Granularity of data: It is important to be able to identify emissions hot spots, without having perfect data, which allows for significant impact through the focus on "low hanging fruit". This model can support that. When it comes to more granular analysis, two aspects are needed: a model that can consider specific and granular data points, and the collection of said data points.

The former is related to the methodology, where this methodology is limited in its granularity. The latter is related to the data measurements of vendors, where SeenThis can collect very granular data, across the entire supply chain, including data transferred, location, and device types. It is also important that it is clear what level of granularity has been used to create any output, as making decisions based on a comparison between average data and actual data might have adverse effects.

Reporting and optimisation: This methodology provides a carbon footprint per GB data transferred, which if related to digital advertising could be converted into carbon footprint of an impression, of a campaign, or all campaigns. These are metrics to measure and report on. However, when it comes to optimisation, advertisers need to consider that all data transferred, or all impressions, do not create the same value. Carbon cost of relevant business outcomes should be taken into account and be a key metric produced by any methodology intended for optimisation.

Proxy: In this methodology, emissions quantification relies on using data transferred as the proxy throughout the entire value chain. A more detailed model should tailor the proxy to the specific stage in the value chain. While data transferred remains the relevant proxy for activities associated with data transfer, for rendering on devices, viewed seconds would be more relevant.

IMPACT+

They have a range of solutions that are fully adaptable and scalable to fit global or local partners of any size or advancement in their sustainability efforts.

They work globally with one of the top 5 advertisers in the world, and leaders in sustainability as a brand, but also with several local startups who are environmentally conscious and want to limit their impact.

They can provide deep analysis on a campaign-by-campaign basis, global management via their SaaS platform, API connections for both input and output to integrate systems or anything in between to suit any business looking to evaluate their digital advertising emissions.

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4.7. Geographical Flexibility

The geographical reach of a GHG model is limited by the availability of data that ties electricity consumption to GHG impact. Most GHG estimation solutions feature regional intensity factors and rely on a common global factor where regional data is unavailable. Regional intensity data can be sourced through purpose-built database services or reports from energy companies, government agencies, etc.

Owner	Intensity by Region	Common Global Factor	Notes
SRI / Alliance Digitale	✓	✓	Database developed for France, global emissions intensities available.
Climate Partner	✓	✓	
DIMPACT	✓	✓	
GroupM	✓	✓	Regional intensity suggested if location is known.
Omnicom Media Group	✓	✓	
Dentsu	✓	✓	Digital model available globally.
AdGreen	✓	✓	
Scope3	✓	✓	Representation of supply chain refined based on location.
Good-Loop	✓	✓	Integrated IPCC 5th Assessment intensity values.
IMPACT+	✓	✓	
DK	✓	✓	

Owner	Intensity by Region	Common Global Factor	Notes
Cedara	✓		Integrated emissions factor database.
SeenThis		✓	

4.8. Development

SRI / Alliance Digitale

Scale out framework and achieve buy-in. Achieve international support then improve the framework collaboratively. Expand geographical reach.

Climate Partner

Climate Partner is committed to continuously update emission factors used for their calculations as well as keeping the calculation methodologies aligned with international frameworks and guidelines. In addition, insights from new projects are used to inform the further development of their tools and methodologies.

Omnicom Media Group

Their solution is still in development at the moment as they are trying to use the most recent and scientifically agreed data points available. They are always looking to be more granular and provide their clients with increasingly better optimisation.

Scope3

Actively improving estimations. Facilitating harmonisation across markets and granularity of power mix data (by country, by state when available). Expanding scope to creative production. Expanding supported channels (e.g. search / DOOH / OOH). Developing API that enables programmatic stakeholders to share data (e.g. no. of requests) depending on granularity that they can support.

Good-Loop

They will continue to develop their solution and plan to extend the scope of their methods to capture a greater scale of greenhouse gas emissions produced by digital advertising.

IMPACT+

They continually strive to improve on their modelling, both by incorporating additional scopes to ensure as much digital activity as possible can be tracked for their clients and by refining elements within their existing methodology as more data becomes available or as scientific research unveils potential improvements.

They are also actively involved with industry initiatives looking to build frameworks to standardise the scope, terminology and methodology for evaluating carbon emissions. As a global provider, they strive to keep up to date with the latest developments wherever they take shape – France, Europe and California typically leading the field.

DK

DK is committed to adapting and implementing new frameworks as they evolve. For example, the SRI/Alliance Digitale/IAB France's V2 framework has been integrated into their platform since September 2023. Their approach to updating public data carbon databases is similar. Their carbon engineers review these databases monthly to ensure accurate calculations and make necessary updates. Furthermore, they add new channels every quarter. Creative production coverage is planned for late Q2 through a partnership with EcoProd. They're also establishing a partnership with another green tech company to enhance data quality and map the supply chain.

SeenThis

SeenThis believes it is crucial for the industry to align behind a common framework to quantify the carbon footprint of online advertising, where it is clear that data transfer make up a significant share of the emissions related to e.g. asset delivery.

The methodology developed by SeenThis, and validated by Doconomy, is to large extent based on a top-down approach, focusing solely on data transfer, assumed to flow uniformly through all parts of the horizontal supply chain, with a fixed share of embodied emissions across the supply chain, and was developed as an early attempt to create awareness of and estimate the carbon footprint of data transfer. For more granular analysis considering the specific settings and scenarios related to vendors, network type, device type, and local emissions factors, a bottom-up approach would be needed.

SeenThis will therefore not further develop this methodology, but adopt the SRIxAD framework, and support the alignment of an industry aligned framework, and considers that the SeenThis methodology is best used as a reference and contribution specifically related to data transfer in the development of an industry aligned framework, specifically in areas related to:

Scope: The methodology considers the full value chain, including hosting, processing and data transfer, in and from data centers as well as CDN servers, and differentiates data transfer related energy consumption from rendering and other processes in the user device.

Data transfer rather than file size: The methodology has a focus on data transfer, rather than file size. While file size is an important variable in estimating data transfer, depending on the technology used to deliver the file, it is not necessarily connected (consider streaming and buffering). It is also evident that a file would be transferred more frequently between CDN servers and end user devices, than in the earlier stages.

Comparability across types of data: The methodology makes no difference in between the type of data that is transferred, which also allows for comparability, disregarding file type, e.g. video or image, and across channels.

Temporal Considerations: The methodology assigns all emissions under the assumption of variability with data transfer. While acknowledging its limitations (as explained on the next page), it is crucial to recognise that what might be perceived as fixed in a shorter time frame becomes variable over an extended period. When considering the global impact of internet expansion on emissions, it is imperative to adopt a temporal perspective of 5-10 years to account for the growth associated with increased data transfer.

Synergistic Validation: As the methodology intends to allocate all emissions from the internet top-down, it can serve as validation for any bottom-up approach.

Dentsu

They see their GHG estimation solution as a fundamental part of their services for clients and partners. They intend to update their methodology and factors according to market developments such as GARM standards and local emission developments.

4.9. Compliance Orientation

Compliance orientation refers to the extent to which the solution can help firms meet non-financial disclosure obligations. The compliance potential column expresses whether owners indicated that their solution has the potential to be used as such, and the use case column expresses whether owners are aware of specific examples where their estimates have been included in non-financial disclosures.

Owner	Compliance Potential	Use Case	Notes
SRI / Alliance Digitale	✓	✓	SeenThis applies the framework in its emissions reporting.
Climate Partner	✓		If agreed with the customer at project start, ClimatePartner can provide additional necessary information on methodologies, emission factors etc.
DIMPACT	✓	✓	Estimates featured in financial reports, e.g. Schibsted, Channel 4, Netflix.
GroupM	✓	✓	
Omnicom Media Group			
Dentsu	✓		Figures compatible with CSRD.
AdGreen	✓		
Scope3	✓	✓	Axel Springer has used Scope3 data in its annual emissions report. Currently working with both brands and publishers to do the same as part of their submission to Australian regulator Climate Active.
Good-Loop	✓		Enables disclosure as regulation emerges.
IMPACT+	✓	✓	Data could help compliance with upcoming regulations such as CSRD or corporate social responsibility agreements like Contrat Climat or AdNetZero.

Owner	Compliance Potential	Use Case	Notes
DK	✓		Can be used for extra-financial reporting and CSRD compliance.
Cedara	✓		GHG Protocol compliant reports can be used for SBTi submissions.
SeenThis	✓		Validated by Doconomy, up to the reporting firm to determine suitability for reporting.

5. Gap Analysis

A broad variety of challenges to GHG estimation for digital media products surfaced in our exchanges with solution owners. Among these, we identified common themes to highlight the areas in which additional work may be required as the industry evolves towards a more sustainable mode of operations.

5.1. Reliance on Fixed Data

The primary bottleneck for GHG estimation currently is data availability. In the absence of granular data that describes different processes that are activated to facilitate the sale of digital media products, estimations must rely on fixed data to model the value chain. This is a natural first step, but additional work is required to increase transparency and facilitate the exchange of data that accurately describes value chain activities and their environmental intensity. Furthermore, while some overlap may be observed in the data sources (e.g. academic research, LCA databases, common data sets) used by the industry, fixed factors that are common across GHG models, such as the energy requirement for transferring data, are yet to be harmonised. Finally, there is currently no system in place to ensure that when GHG models implicitly or explicitly describe the environmental performance of a value chain stakeholder, such as a publisher or an ad tech provider, the opportunity to provide specific data is offered to the firm whose activity is targeted by the estimation.

Supporting the development of more robust GHG estimation solutions requires further work to create consistent data sets of common factors, update these on a regular basis to reflect market conditions, and source supplier data with increasing levels of detail.

5.2. Information on Estimate Confidence

As aforementioned, multiple sources of information are used by GHG model owners to populate their data sets. The current sources of activity and intensity data do not enable analysis of the confidence level with which GHG estimates are generated. Corporate emissions reports, LCA databases, government agencies, and even research papers may not offer information on how accurate the figures they present are. As such, understanding which parts of each GHG model are accurate and which require additional attention can be a challenge. Moreover, from the perspective of a firm interested in GHG estimation, it can be difficult to understand how robust estimates are, how different GHG models fare against each other in terms of accuracy and precision, and whether the estimates are representative enough to rely on for decision-making.

Qualitative data source assessments are being used as a stop-gap solution in some cases, and vendors do highlight the assumptions and limitations in their models. Moving forward it is vital to expand the conversation on how GHG models can be improved and which decisions GHG estimates can meaningfully inform. While inherent in any estimation model, clearly outlining the uncertainty within GHG calculations will improve trust in results and guide targeted reductions.

5.3. Methodological Alignment

Differences in the way the emissions relating to supply chain activities tied to digital media products are modelled represent an additional barrier to comparison across different vendors. A standardised framework can create consistency, ease comparisons, and accelerate industry-wide progress. Individual solutions will continue to innovate within this broader structure. Next to the underlying methodology, it will be paramount to commit to default values that can be used as GHG estimation parameters for anyone not being able to provide or access more granular, robust default data, similar to device lifecycle data. This approach could be applied to screen sizes or data transmission parameters for example.

5.4. Geographical Discrepancies

Regional GHG intensity values are ubiquitous among GHG models, meaning estimates incorporate the environmental impact of different power grids around the world. Power grid intensity databases allow vendors to easily expand their GHG estimation offerings. However, intensity factors are not available for every market and may be offered with varying levels of accuracy or refresh rate. Additionally, GHG models have to revert to a global common intensity factor where more specific data is unavailable. As a result, the quality of the model and the final estimate may vary from region to region. This phenomenon is exacerbated by inconsistencies at a technical level. For example, Scope3 noted that it is harder to map the supply chain in markets where ads.txt files are outdated or non-existent.

Within European scope, geographical discrepancies in model quality should be reduced over time as intensity data becomes richer and more widely available.

6. Conclusion

Through an in-depth exploration of various GHG estimation models and methodologies, this report underscores the critical importance of fostering a cohesive and transparent ecosystem wherein industry stakeholders can effectively navigate and utilise emissions data. The digital advertising landscape's complexity presents a significant challenge when quantifying associated greenhouse gas (GHG) emissions. Nevertheless, a growing array of specialised solutions is emerging to help organisations understand and mitigate their impact. This mapping reveals a diverse set of approaches, each with strengths and limitations, and calls for greater harmonisation and consistency to facilitate meaningful comparisons and informed decision-making.

It is paramount to recognise and address the existing gaps and challenges in accurately assessing and mitigating GHG emissions. The mapping above helps professionals navigate the range of emission models available and provides a basis for the improvement of models and industry collaboration. Industry professionals can contribute to the refinement of GHG estimation in digital advertising by:

- Selecting solutions thoughtfully: Evaluate tools based on your specific goals, data readiness, and desired level of detail.
- Fostering collaboration: Participate in working groups or initiatives focused on standardising methodologies and addressing data gaps.
- Engaging in advocacy: Promote the importance of emissions assessment within marketing teams, encouraging the integration of environmental considerations into decision-making processes.

By taking collective action, the industry can establish reliable benchmarks, accelerate decarbonisation efforts, and create a more sustainable future for digital advertising.

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