

Consultation for under- standing carbon assessment in the frame of Green Screen project



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- Charles-Eric Carlsberg (France, advertising and corporate)
- Béatrice Chauvin-Ballay (France)

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- Marc Guidetti (Luc Besson's movies)
- Alexis Gireaudeau (The Collapse, Canal+, France)
- Benoit Loncan (AFR, France)
- Valentin Françoise (Corporate, Serie TV, long feature, France)

D. Carbon Specialists

- Jules Castro (Pur Projet)



Secoya



Funded by the European Union's Interreg programme, Green Screen is a project based in eight regions of the European Union to improve policies and practices in reducing the environmental impact of the film and television industries, and ultimately achieve quantifiable results.

The Green Screen project aims to pool already identified and emerging good practices, and to share experiences. Each partner is at a different stage of the process and has adopted these objectives. In the implementation of this approach, it is essential to provide the partners who need, and request, with expertise in sustainable development and eco-production.

Secoya is a French CSR consulting and support company specialized in the audiovisual world. Auditing, consulting, eco-support during filming, ecological and carbon balance sheets, training: Secoya is one of the specialists in Europe in the management of environmental impacts in audiovisual production.

The present expertise mission was the subject of a call for tenders "Consultation for Understanding Carbon Assessment in the frame of Green Screen project", published in 2019.

Secoya worked for 6 months on this study: stakeholder meetings, talking with specialists, carbon engineer recruitment, litres of (organic) coffee and long working hours led to this report.

Enjoy!



Part 1

Theory: a general analysis

I. General statement

To begin this study, a presentation of the audiovisual sector is useful to understand the issues and challenges we are facing.

A. Production figures (films and series)

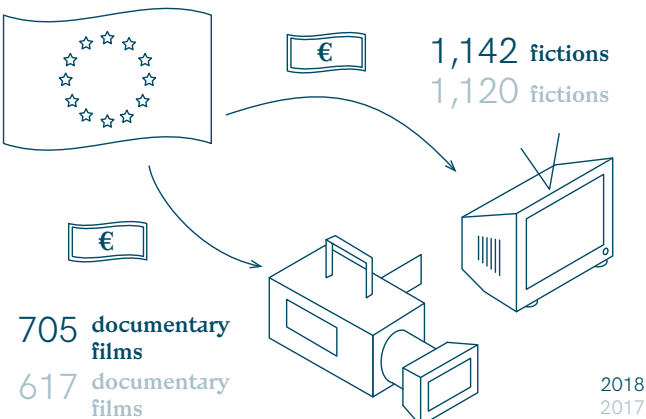
• European Union

In 2018, 1,847 films were produced or co-produced, i.e. almost a hundred more than the previous year, in 2017 (1737).

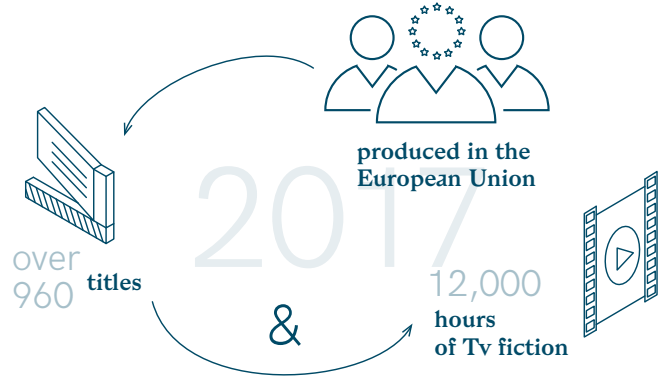
Feature Films:

The film landscape in Europe reflects this cultural diversity not only in artistic expression but also in film volume.

The Observatory estimates that around 1,000 fiction and more than 700 theatrical feature documentaries are produced annually in wider Europe (including e.g. Russia and Turkey).



Series:



TV series with more than 13 episodes represented the lion's share of volume produced, due to the weight of daily soaps and telenovelas.

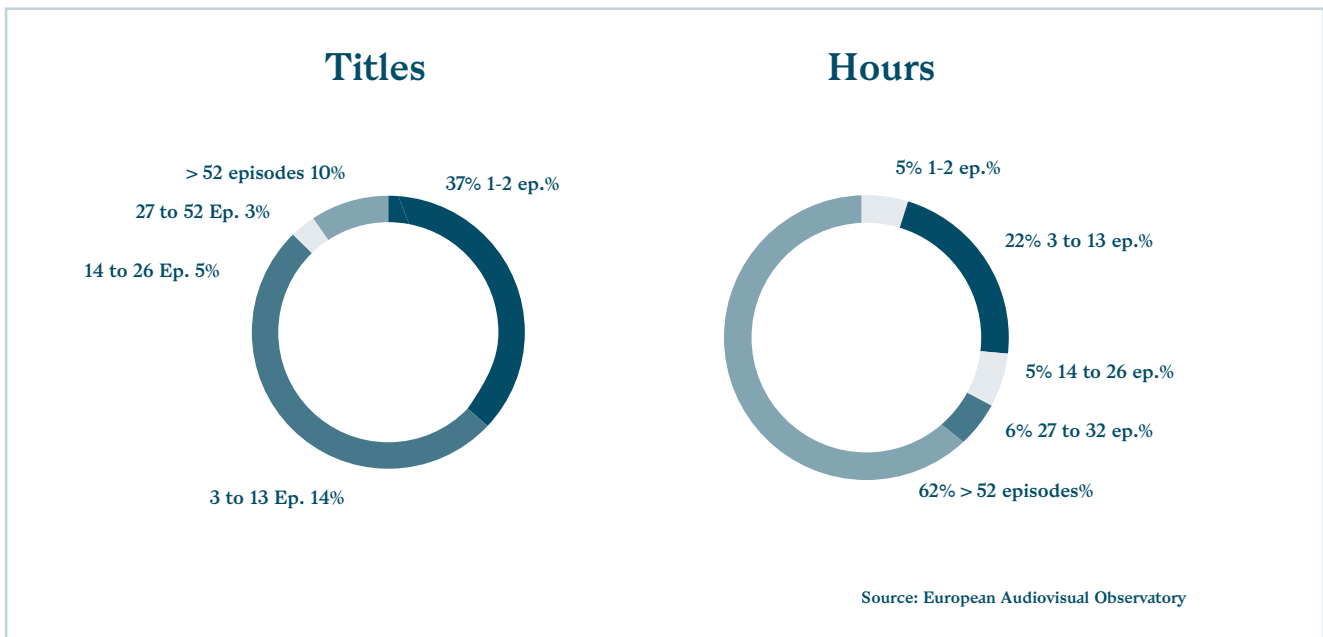
Miniseries of one to two episodes and 3-13 episodes series are considered to represent 'high-end drama' formats (bigger budgets; top writers, directors and cast), as opposed to longer formats (over 52 episodes), which correspond to soaps or telenovelas.

A total of 76% of EU-28 titles available on SVOD and TVOD are 3-13 episodes TV series. The vast majority of European non-national titles are 3-13 episodes TV series (77% for SVOD, 80% for TVOD) - evidence that high-end drama is the format that travels best.

A total of 436 three-to-13-episode high-end TV series titles were produced, 235 of them (54%) new projects, and the others new seasons of returning titles. Although the production volume of original TV fiction by subscription video on-demand services is expanding rapidly, it still only represented 4% of the titles and hours of high-end TV series in 2017.

Over 6 500 different titles broadcast per year: A total of 6,517 different TV series and TV films were broadcast by at least one EU-28 television channel in 2017. About 60% of these titles were European; and among the EU-28 titles, in terms of production Germany was by far the strongest country.

Breakdown of TV fiction production by format - 2017 - in %



• Focus on the principal producing countries

France:

France is the biggest producer in Europe with 300 movies per year in 2017 and 2018. They also produced most of the NIF with 237 national initiative films (100% or major co-production). A statistic which increased than 2017 with 222 national initiative films.

SVOD platforms such as Netflix and Amazon Prime Video will soon be required to invest 25% of their revenues in the production of French or European works. At the same time, the European regulatory framework has also

evolved: it now provides for a minimum of 30% of European productions within the catalogue of streaming platforms active on the continent.

In addition, Netflix just opened an office in Paris in 2020 January due to legal obligation. The company plans to inject some €100 million into French production. This should result in 20 films and series made in France being added to the catalogue over the year, compared with 24 since the service began in France in 2014.

NB: As a comparison, £400m will be injected by Netflix into UK productions!

UK:

Excluding movies costing less than 500k GBP, the United Kingdom produced 202 movies in 2018 compared to 315 in 2017. A significant decrease which did not have a notable impact on revenue. The national initiative films increased with 229 movies compared to 136 in 2018.

Germany:

Germany holds 4th place on the podium with 247 movies produced per year in 2017 and 2018. Its national initiative film production are also stable with 203 movies in 2017 and 193 in 2018.

Spain:

Spain is also stable in regards to production. A close neighbour to France, many co-productions are set up including major NIF* co-production: 248 films for a total of 264 in 2018 and 257 films for a total of 279 in 2017.

Italy:

Italy is also a historic producer, following France with 272 films in 2018 and 234 in 2017. Italy produced 259 NIF in 2018 and 228 NIF in 2017.

NB: Considering only these 5 countries, the European Union accounts for 1,285 films in 2018 and 1,375 in 2017!

Poland:

Poland produced 42 films in 2018 and 75 in 2017; a noteworthy decrease which has no particular reason. It may be a smaller interest from other countries for minor co-production. In fact, Poland produced only 29 NIF 2018 and 42 NIF in 2017.

Slovakia:

Slovakia is the smallest producer in Europe, with 33 films in 2018 and 27 in 2017. Only 7 NIF in 2018 and two less the year before. With a brand-new tax rebate, Slovakia should interest more and more countries in the following months/years.

Sweden:

For 2018, 51 films were produced by Sweden, including 31 NIF. A big difference compared to 2017, where Sweden produced 68 films for 25 NIF. This number includes only films on first release.

Belgium:

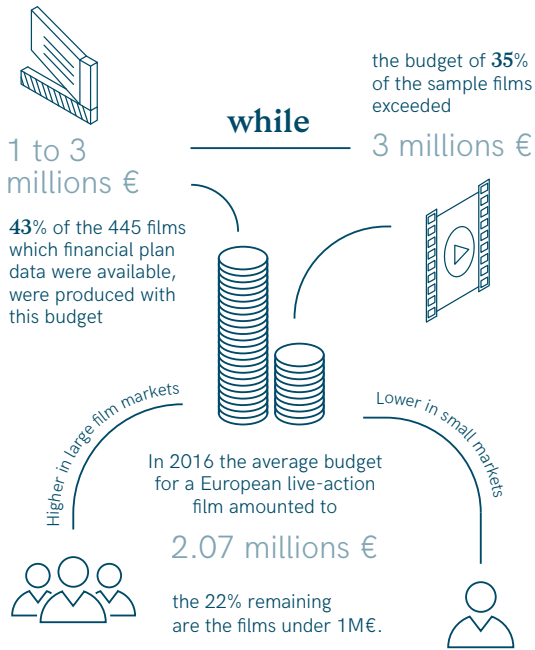
Our neighbour Belgium is France's favourite country for co-productions. For a relatively small country, Belgium produces volume, with a favourable financial system (Shelter Tax). They produced 75 films in 2018 with 27 NIF, and 89 films including 36 NIF in 2017.

NB: NIF refers to National Initiative Film

Country	Year	Number of movies	
		NIF*	Total
France	2018 2017	237 222	300 300
Spain	2018 2017	248 257	264 279
Italy	2018 2017	259 228	272 234
Germany	2018 2017	193 203	247 247
UK (1)	2018 2017	136 229	202 315
Belgium	2018 2017	27 36	75 89
Sweden	2018 2017	31 25	51 68
Slovakia	2018 2017	7 9	33 27
Poland	2018 2017	29 42	42 75
Romania	2018 2017	42 28	50 73
Europe	2018 2017	- -	1847 1737

2. The Industry's Financial importance

• Average budget



The 22% remaining are the films under 1m^{ds}€.

- Fiction budgets remained stable compared to 2017 (+0.2%)
- Documentary production budgets spent less than in 2017 (-6%)
- Animation production budgets tripled compared to 2017 (+146%)

On the other hand, 10 years ago, films had budgets of almost 5.1 m € on average.

NB: This focus is not considering the different tax credit system in the main countries.

NB on CSR:

Since January 2019, in an effort to further promote gender equality France has introduced a new subsidy bonus of 15% on top of the subsidy received from the CNC for films with women in key positions. For the past year now, the Paris region also provides an eco-bonus for sustainable production.

Rank	Country	Mean budget 2016 (in m€)	Median budget 2016 (in m€)	Number of sample films 2016
Countries with a median budget € 3 millions				
1	DE Germany*	4.62	4.06	52
2	FR France	4.61	3.49	159
Countries with a median budget between € 1 million to 3 millions				
3	AT Austria	3.04	2.32	14
4	NO Norway	2.98	2.26	17
5	IT Italy*	2.45	2.12	24
6	IE Ireland	2.61	2.02	13
7	BE Belgium*	2.03*	1.98*	16
8	GB UK*	3.13	1.96	10
9	SE Sweden	2.14	1.94	17
10	CH Switzerland	1.92	1.94	10
11	NL Netherlands	1.73	1.55	35
12	FI Finland	1.33	1.26	18
13	BA Bosnia-Herzegovina*	1.02	1.02	1
Countries with a median budget between € 500 000 and € 1 million				
14	PT Portugal	0.95	0.98	7
15	LT Lithuania*	0.84	0.84	2
16	CZ Czech Republic	1.03	0.83	22
17	HR Croatia	0.67	0.64	9
18	RO Romania*	0.80	0.63	7

* Due to either low coverage rates or a very low number of samples film the average values are to be considered "technical" values which describe the data sample rather than as a representative values for the respective countries

•A spotlight on the countries

General: The European Union has allowed more than EUR 900 million of funds to the media industry with its "*Creative Europe*" programme for the period 2014-2020.

France:

- CNC 2018: 803.5 m € automatic and selective aids.
- CNC 2017: For 799.3 m € of film supported.

Belgium:

- (VAF + ScreenFlanders + Wallimage + RTBF + CCA + ScreenBrussels)
- Screen Flanders (for the Flemish Region): launched in April 2012, it provides selective support for film and television, with an annual budget of 4.5 m €.
- Wallimage (for the Wallon Region): with an annual budget of 5.5 m €, it provides production support by acting as a co-producer.

Poland:

The Polish Film Institute has a annual budget of USD 29,5 m = 26,7 m € (from 12 regional funds).

→ The average budget of a Polish full-length feature film amounted to USD 1,4 m = 1,270,320 €

Scandinavia:

Nordisk film & TV Fund: The annual funding budget is approximately NOK 100 m (EUR 10,500,000)

→ Nordisk Film = Denmark /Finland/Iceland/Norway/Sweden

FFA (German):

14.4 m € - around 3.6 m € less than in 2017.

Instead of requiring a physical shoot in the country, the new regulations require a simple 2 m € local spend to qualify for the DFFF II's 25% rebate. With the regional funding, VFX support can be up to 45%. Combined with the DFFF, the Ministry of Culture also took over the responsibility for the 15 m € German motion picture fund which supports the production of films and series to be released on TV or VOD Platforms. Also, since September 2019, Netflix agreed to make financial contributions to the national film fund.

AMICA (Italy):

The Italian film industry is hoping to benefit from the implementation of the new film law from 2017 through a series of decrees which is pouring some 400 m € annually into all film industry sectors (also news cinema's construction or refurbishment).

UK:

Funding institution	Geographical level	Legislation / Guidelines
British Film institute (BFI) ¹⁵²⁰	UK-wide	Funding guidelines (various) The Films Act 1985 ¹⁵²¹
		National Lottery etc. Act 1993 (as amended) ¹⁵²²
Screen Scotland ¹⁵²³	Scotland	National Lottery etc. Act 1993 (as amended) Public Services Reform (Scotland) Act 2010 ¹⁵²⁴
		Film Development and Production Fund Guidance 2018/19 ¹⁵²⁵
		Production Growth Fund Guidance 2018/19 ¹⁵²⁶
		Distribution and Exhibition Fund Guidance 2018/19 ¹⁵²⁷
		Market and Festival Attendance Guidance 2018/19 ¹⁵²⁸ Broadcast Content Fund Guidance 2018/19 ¹⁵²⁹
Ffilm Cymru Wales ¹⁵³⁰	Wales	National Lottery etc. Act 1993 (as amended) Production Funding Guidelines 2018 ¹⁵³¹
		Development Funding Guidelines 2018 ¹⁵³¹
Nothern Ireland Screen ¹⁵³⁰	Nothern Ireland	National Lottery etc. Act 1993 (as amended) Industrial Development Act (Nothern Ireland) 2002 ¹⁵³⁴
		Production Funding Guidelines ¹⁵³⁵
		Development Funding Guidelines ¹⁵³⁶

ICAA (Spain):

Basque Country department of culture:
The total allocation for production ONLY (w/o pre-production aids and others) aid is 2,26 m €.

General Funding:

When it comes to production support, most of the national/federal funds have a similar criteria:

- General aid intensity of 50% of the budget, which is always respected,
- Aid intensity for international co-productions: not always referred to, but when it is, it is limited to 60% of the budget,
- The aid intensity for difficult projects (usually because of the filming language, the topic or even the format) as well as for debut films and low-budget films, is usually between 75% and 90% of the budget – even 100% in exceptional cases.

Not surprisingly, it is standard practice for producers to invest in their own films, although this is not always the case as one in ten of the sample films were produced without any direct producer investment. In total, (co-)producers invested 216 m € of the cumulative sample financing volume of 1.41 m^{ds} €, representing 15%* of the total cumulative funding volume of the data sample.

The US Market:

The US audiovisual market is 50% bigger than its European counterpart:

US production figures of 187 bⁿ € in 2017 surpasses the European market of 127 bⁿ €, of which 112 m^{ds} € for the European Union). Measured per capita, the US audiovisual market is 3.6 times bigger than the European market, and 2.6 when only European Union countries are considered.

Three structural differences appear:

- The role of public funding is marginal in the US (where it represents less than 0.5% of the sector's revenues), but essential in Europe (22%).
- The pay-to-watch TV market is far more developed in the US, in terms of both penetration and revenues.
- Advertising spend per capita is higher in the US than in Europe; television and radio capture a higher share (38%) of it in the US than in Europe (35%).

Explosive growth of the SVOD market in terms of revenues and subscribers. SVOD services were once again the main growth driver of the paid video on demand market, which grew by 45.7% year over year; in fact, over the past five years consumer revenues have grown by a factor of 10, from € 363.7 million in 2013, to € 3.65 billion in 2017.

Out of the 53.9 million subscriptions to SVOD services in the EU in 2017, 80% were to Netflix and Amazon, which together also accounted for 74% of EU SVOD revenues.

II. Carbon emissions in Cinema & Series

A. The Environmental Impact of filming

• What are we talking about?

Good ecological practices have been tested and implemented on location filming for ten years in Europe, with pioneering countries such as France, the United Kingdom, Belgium... They are notably listed in the Green Report from the Ciné-Régio association. Their implementation is an indicator of a green strategy but does not allow the impact to be measured precisely and objectively, unlike a carbon calculator. Many eco-actions have a strong influence on carbon emissions and, conversely, reducing their carbon impact often does not involve the implementation of good practices. However, this is not always the case for all actions. We must therefore make this distinction.

A film shoot, whether it is a feature film, a TV series, a documentary, or a short film, uses very diverse resources: monetary, human, material... It therefore has an impact on the environment. Of course, the bigger the filming, the greater the impact. A film that mobilises a team of 100 people, who have to be transported, fed and housed on several sets around the world, does not have the same impact as a short film with a small team in a fixed location.

Generally speaking, the most sensitive areas will be travel (team and equipment, lighting cars and technical trucks), food (canteen, control table, set design), and energy (generator).

• Different departments = Different impacts

An audiovisual project is generally divided into 3 parts: pre-production, production (filming) and post-production. Each part has a different impact, and mobilises very specific human, material and financial resources. During these 3 phases, each department of a film has its own needs

and particularities. During the filming, a head cameraman assigned solely to camera movements does not have the same impact as an assistant director, in charge of the daily transportation of an actor, or a production manager during location scouting, who will travel a lot. The departments which generate the most pollution are generally decoration, direction, and production.

The decoration team, with its painters, builders and carpenters have a great need for raw materials (wood, metal, aluminium...) and generate a lot of waste. The management team, in charge of vehicles, whether technical trucks or gear vehicles, as well as the food section, have a particularly important impact. Directly linked to production, which also consumes kilometres with many trips that emit greenhouse gases, it is the cornerstone of filming. We will see below how to be part of the solution and not the problem!

B. Carbon Emissions

• The carbon impact of the audiovisual sector

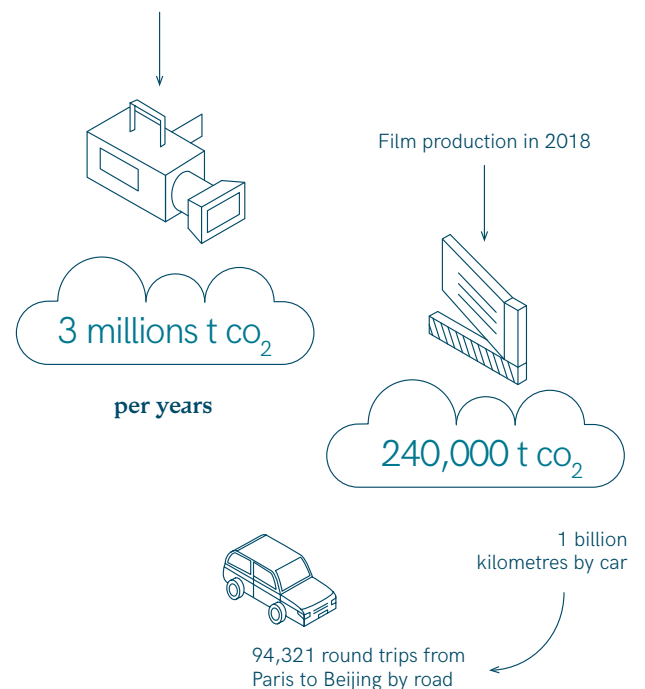
The importance, consequences and origin of global warming are now widely known and shared, in particular thanks to the work of the Intergovernmental Panel on Climate Change (IPCC), whose work was awarded with the Nobel Peace Prize in 2007. Where does this global warming come from? The work of the IPCC highlights the role of human activity. It causes an increase in the concentration of greenhouse gases (GHGs) in the atmosphere, and consequently accentuates global warming. Carbon dioxide (CO₂) accounts for nearly 3/4 of global emissions of human origin. It is the largest contributor to global warming. Reducing CO₂ emissions is a prerequisite for slowing global warming.

The IPCC states in its 2007 report that "Continued emissions of greenhouse gases at or above the current rate would cause further global warming and would lead to many changes in the global climate system during the 21st century. This would most likely be greater than those observed during the 20th century."

It is obvious that an audiovisual project, whether a small documentary shot with a small team around the world, or a major feature film shot in a studio, emits carbon. The audiovisual community has been working for ten years now to understand, identify, and reduce its carbon emissions. There is still a long way to go, and even if many actors of the audiovisual industry are reluctant on this subject, this new decade will be the scene of the fight against these famous carbon emissions. Nowadays, it is possible to know the carbon impact of our travel, purchases, food, etc...

For filming, a basic correlation allows us to make the link between expenses and carbon: indeed, each euro spent on a film has a carbon impact: whether it's a €1000 plane ticket for an actor's trip, the €150 spent on a full tank of diesel to transport the equipment in a camera truck, or the €25 lunch per technician every lunch during the filming... Everything is calculable!

France: Audiovisual sector in France

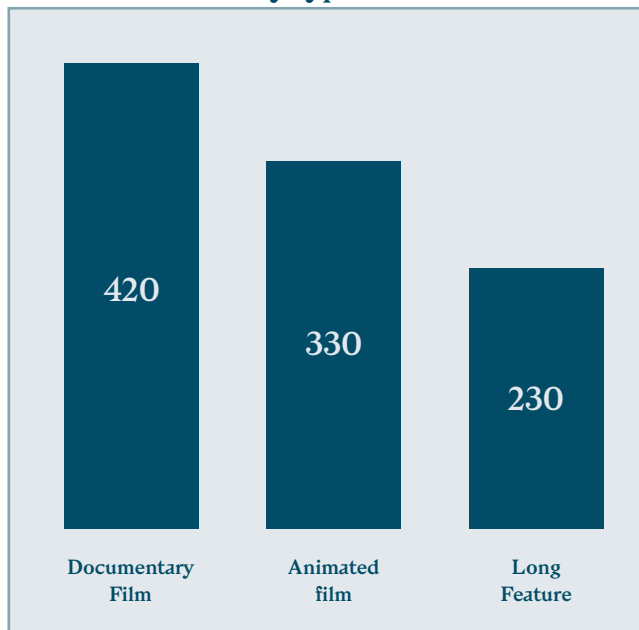


Importantly the production of a film with a budget of 1 million euros was equivalent to 240 t CO₂ €; this figure drops to 170 t CO₂ € for a classic audio-visual programme.

For fiction, the carbon weight of a feature-length film of 1H45, with an average budget of around 6 m €, is estimated at 1,380 t CO₂ €, equivalent to the annual emissions of 125 French people.

There are clear differences between the types of programmes: An animated film, on the other hand, has an estimated impact, on average, of 3,900 t CO₂ € (330 tCO₂/m€); a documentary, on average, 220 t CO₂ € (420 t CO₂/m €).

Carbon Emission by type of movie



NB: Documentaries have the greatest impact because of their large number of air travel (on average 50% more transport - in terms of production costs - than fiction films).

NB 2: Animated films make particularly heavy use of the means of filming (technical subcontracting, transport, control room, overheads, etc.) representing 67% of production costs compared with 28% for a fiction film.

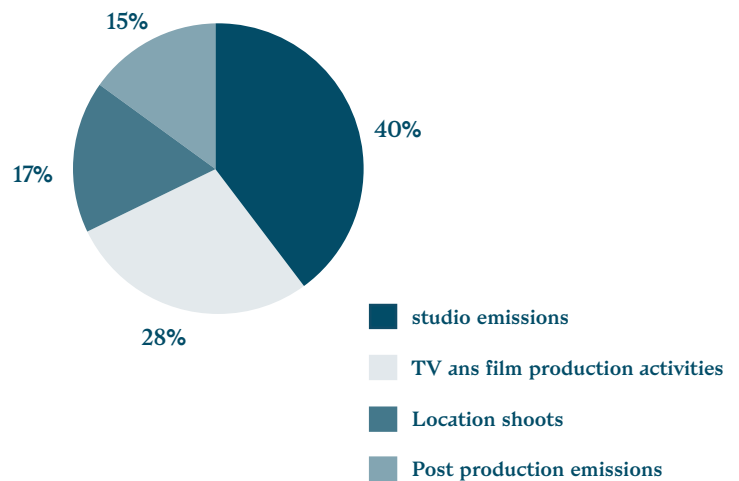
UK:

The total carbon footprint of London's screen production industry is approximately 125,000 tonnes a year. This is roughly equivalent to the annual emissions from almost 24,000 homes. This figure does not include emissions from international or employee travel, or those associated with the distribution, sales and exhibition of films and programmes.

According to BAFTA, the British film organization, a single hour of television produced in the U.K —fiction or nonfiction— produces 13 metric tons of carbon dioxide. That is nearly as much CO₂ as an average American generates in a year.

Study "Green Screen" by Film London and Mayor Of London - Greater London Authority April 2009

Total screen industry emissions
= 125 Tonnes/Year



USA:

There are only a few figures on the impact of the audiovisual sector in the USA. To date, no official study has been conducted to determine the carbon impact.

We managed to find an academic study, led in 2006 by UCLA (University of California Los Angeles). The study showed that the California film and television industry created; the number for the U.S. film and TV industry as a whole was 15 millions tons.



It seems to be a relevant number, even it is quite low (only 5 time more than France in a much bigger market!) but it is important to remember that this analysis was made 14 years ago. The production has significantly increased since that date..

New role players such as Netflix, Amazon, or the rise of Disney, have tremendously raised the number of productions. It would be interesting to figure out how the CO₂ impact has levelled up since.

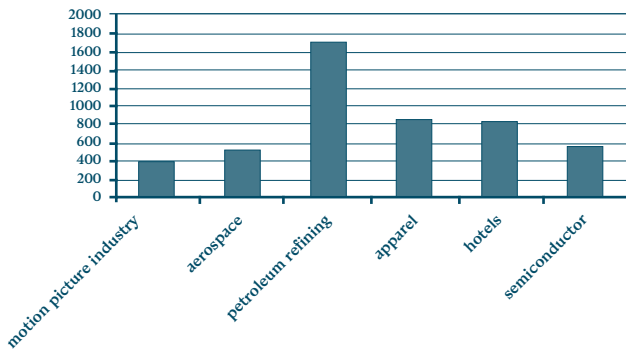
A more recent study into the environmental

impact of film-making in Hollywood, conducted by the University of California, showed that, in the Los Angeles region, it made a larger contribution, in relation to its size, to air pollution than most major industries, including aerospace manufacturing, clothing, and the hotel industry. Only fuel refining produced more emissions.

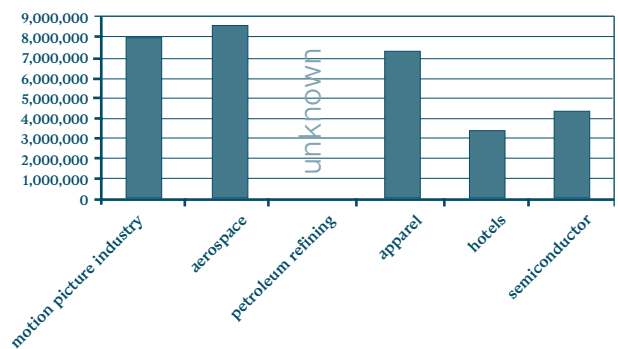
One key feature of the industry is the degree to which it is decentralised. The 7 major studios are likely the most visible part of the industry; most major distribution companies are owned by these 7 major studios. Knowing that, we can admit that most of the environmental impact in the US, is made by Hollywood and its major studios.

Figure 3: Greenhouse gas emissions (metric tons, CO₂ equivalents) for selected sectors (US)

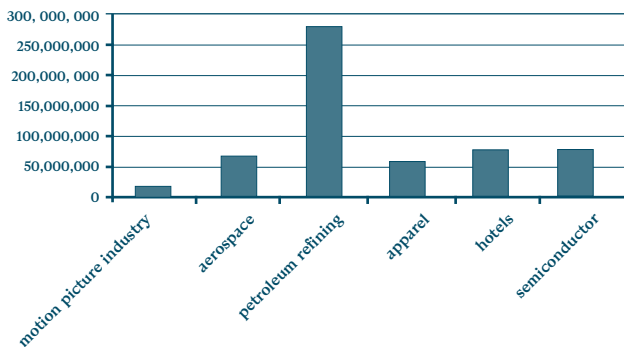
GHG emissions per \$1M output (metric tons CO₂ equivalents)



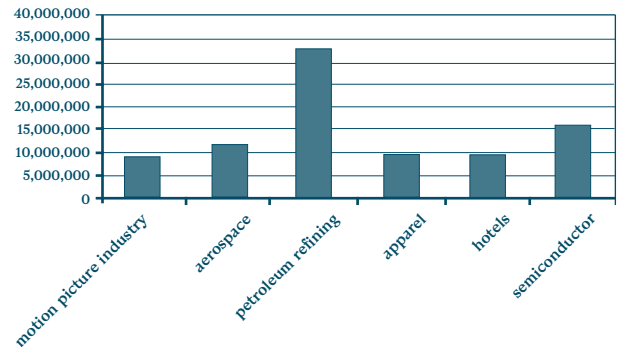
GHG associated with LA metro output (metric tons CO₂ eq.)



GHG associated with US output (metric tons CO₂ eq.)



GHG associated with California metro output (metric tons CO₂ eq.)



NB: It seems that most countries have not yet taken into account the carbon impact of this sector. We could not collect any more data on this specific topic.

III. The different carbon calculators

A. Overview of existing Carbon calculators

5 main calculators were examined during this study. Here are the main informations to remember about those:

• Carbon Clap (Ecoprod France)

(<http://www.carbonclap.ecoprod.com/>)

Carbon Clap is a French carbon calculator developed by EcoProd in collaboration with ADEME (Agence De l'Environnement et de la Maîtrise de l'Energie) in 2016. This carbon calculator can be found and filled online. It is filled in french, so it is mainly targeted to French producers. Based on several real-life experiments, ECOPROD has modelled the carbon emissions of each type of production in order to develop this software tool.

Carbon' Clap is meant to be simple and quick to use, that is why some approximations were necessary, and the result of the calculations is meant to be an evaluation to 30% accuracy and not an absolute value. The software enables the main emission items of a production to be understood and to start a continuous improvement process.

• Huella de carbon (Pro Malaga Espagne)

Green Globe Sostenibilidad & Proyecto Ambientale developed their Spanish carbon calculator a few years ago. Promalaga adapted it as part of Green Screen project and based on using VAF calculator. It can be found online and has to be filled using an excel format. It is written in Spanish, so it is mainly targeted to Spanish-speaking producers.

It is a tool used to estimate the total amount of greenhouse gases (GHGs) emitted directly or indirectly by an organization or during the manufacture of a product or supply of a service.

The objective of this tool is to facilitate the calculation of the carbon footprint of an audiovisual production. The spreadsheet has 2 functionalities:

→ The calculation of the minimum footprint. Launch a footprint result after entering your budget data. This data is used to display an estimate and to effortlessly compare several footprints. The calculation is not complete because it does not take into account transportation or accommodation.

→ The footprint calculation is complete. By completing this data, we obtain the GHG emissions generated by production. In the results, we can obtain detailed information on emissions, as well as recommendations for reducing the footprint.

- **Flander Carbon (VAF Belgique)**

Flanders Audiovisual Fund developed its carbon calculator in 2016. This carbon calculator can be found online and has to be filled in an excel format. It is written in dutch, French and English. Two excel sheets are furnished: one for movies and one for series (those two excel sheets are exactly the same).

- **PEAR (USA)**

PEAR is an American carbon calculator developed by the Green Production Guide in 2011. This carbon calculator can be found online where an excel sheet must be downloaded and filled. It is filled in English and is mainly targeted at big productions.

By launching its carbon calculator in 2011, Green Production Guide wants to make it easier to track the carbon footprint of films. Directors, producers, and other players in this field must do everything possible to achieve the objectives of reducing carbon emissions linked to film shoots.

Green Production Guide believes it is important to design systems that give constant feedback on progress.

In this way, GPG wishes to continuously update the strategies to be pursued to help solve the problems of the environmental crisis.

- **Albert (UK)**

Albert is a UK based carbon calculator. Using specific data, the calculator allows productions to quickly understand their environmental impact.

Albert is working with BBC, ITV, Channel 4, UKTV, Sky or Netflix...

The production needs to give some basic information about the production office, studio, travel, accommodation locations, materials used disposal and post-production...



B. A Technical analysis

• General remarks & summary

	CarbonClap	VAF	Promalaga	Production Environmental Accounting Report (PEAR)	Albert
Langage	French	Flemish	Spanish	English	English
Format	Online	Excel	Excel	Excel	Online
Calculator mainly dedicated to:	France	Belgium	Spain	All countries	All countries
Developed by:	EcoProd (2010)	Flanders Audiovisual Fund (203?)	Green Globe Sostenibilidad & Proyecto Ambientales	Green Production Guide (2011)	BBC
Emissions factors taken from:	Bilan carbone, Ecoinvent, CarbonClap	--	IPPC & del Ministerio de Transicion	U.S. Energy Information Administration (EIA), The Climate Registry (TCR)...	--
Calculator taking into account sustainable actions:	Moderately (questions about sorting plastic and batteries)	Yes (questions about electric vehicles, vegetarian meals, local meals, renewable energy (RE), green heating..)	Yes (questions about sorting, re-using, carsharing, electric cars, RE, sustainable hotels, waste of water)	No (calculator made for "big" consuming productions)	Yes (questions about electric vehicles, disposal recycling, REs.. form to get the Albert sustainable production certification)
Emission sources clustered into:	<ul style="list-style-type: none"> - Material resources - Immobilisation - Accommodation/ catering - Technical equipment - Transport of people - Transport of goods - Energie - Waste 	<ul style="list-style-type: none"> - Transport of goods - Transport of people - Material - Electricity produced - Electricity consumed - Heating - Accommodation - Meals - Post-production 	<ul style="list-style-type: none"> - Transport - Accommodation - Electricity produced & consumed - Catering - Scenography - Shooting equipment (rent &/or bought) 	<ul style="list-style-type: none"> - Electricity - Natural gas and heating oil - Fuel use - Air travel - Hotels & housings 	Not clear
Emissions due to the 'after-life' of the production (distribution, exploitation, streaming/ storage of the movie on the net):	Not taken into account	Not taken into account	Not taken into account	Not taken into account	Not taken into account



Structure of the calculator

		CarbonClap	VAF	Promalaga	PEAR	Albert
	Number of table to be filled	6	9	10	6	9
	General information/project information	X	X	X		X
Phase	Preparation & pre-production	X	X	X		
	Production		X	X		
	Post-production	X	X	X		X
Category	Accommodation/hôtel & housing	X	X	X	X	X
	Meals	X	X	X		
	Transport /travel	X	X			X
	Commercial flight		X		X	
	Vehicle & equipment fuel use		X	X	X	
	Charter, helicopter & jet flights				X	
	Energy					
	Spaces/ on location	X				X
	Electricity consumption		X	X	X	
	Production of electricity		X			
	Other fuel					X
	Natural gas & fuel oil consumption				X	
	Production of electricity		X		X	
	Technical equipment	X	X	X		X
	Settings	X				
Waste management			X	X		X

This table represents the structure of each calculator. It is not intended to be exhaustive on all of the emissions categories taken into account because there are disparities between them. Its purpose is to highlight similarities and a number of differences.

C. Issues

• Carbon Clap (Ecoprod – France)

Tool description:

Carbon Clap is structured as follows. It includes 6 tabs:

1. Project general information
2. Preparation and production offices (electricity and heating consumption, capital assets of electronic stock and buildings, employees commuting, paper consumption)
3. Filming: movie sets & energy (electricity and heating of all the sets, capital assets of the filming spots, special effects and stunts, costumes, make-up and sets conception)
4. Logistics and transportation (accommodation, catering, people's transportation, freight, waste, others)
5. Technical equipment used for filming (equipment for filming, power generators & technical vehicles used for filming)
6. Post production (computer graphics, video editing, laboratory effects, sound editing/foley/mixing)

In each tab, data should be filled. This data filled in Tonnes Equivalent Carbon (tCO_{2,eq}) using Emissions Factors (EF).

Carbon emissions are grouped along 8 categories:

- o Material means
- o Capital assets
- o Accommodation/catering
- o Technical means
- o Transportation of people
- o Freight
- o Energie
- o Waste

Comments on each tab:

1. General information

This tab is important as it contains data that is used to simplify the rests of the tabs. More questions could be asked here, such as:

- o Information about the number of production and preparation offices
- o Information about the amount of location scoutings
- o Information about the amount of roles, special features, extras.days

2. Preparation and production offices

- o Emissions due to electricity consumption in production and preparation offices: it is not asked in which country those offices are. The electricity's Emission Factor is not the same in different countries. Regarding the fact that the Carbon Calculator is used by French professionals, it is admitted that the Emission Factor are based on a French scale. If we consider that the production office might be in another country, then it should be an option to be chosen.

- o Emissions due to home-office or commuting: it is taken into account for the preparation offices but not for the production offices.

- o The value of Emission Factor corresponding to commuting (in kg CO₂/ (people.day)) is not given.

- o Are all the technicians taken into account?

- o Are all the technicians taken into the same consideration? What about the one living outside of Paris for example, or in the countryside? Shouldn't it be calculated? That is not totally clear

- o The Emission Factor is not indicated. How to calculate? Transportation has a huge impact; it should be taken into account.

- o Emissions due to capital assets: Is it necessary to take them into account (since the emissions linked

to this capital assets will be very low compared to other emissions) for: using parking spots? For using electronic stocks? For occupying buildings?

It seems difficult to take into consideration those points. If a production is coming to prepare a movie in a centenary building, right in the centre of Paris, and this production is staying 2 weeks there, would it make sense to have a calculation about the impact of the production regarding the whole life of the building? And if so, it doesn't seem relevant: the calculation is not simple and the error percentage is way too high.

This point seems to be a difficult one, not helping the general idea of the Carbon Clap. We believe that it should not be taken into account. It is not considered in any other carbon calculator.

o Emissions due to paper consumption: The question "Are you using an online tool?" should be clarified. Is paper still printed even though an online tool is used? How may the answer 'yes' or 'no' to this question impact the calculation of emissions?

What about the impact of the online tool? We know, by now, that the emission due do the digital world accounts (storing online also costs energy and emits) and that is huge (cf the study of The Shift Project in the sources).

There is no question about the paper used being recycled or not but the Emissions Factor for recycled paper and unrecycled paper are very close anyway. It should be interesting to ask this question (fun fact: 103 Millions of paper sheets used in 1993 by the studio Sony!). More than recycled paper, what would be interesting, is to point the reuse of paper in a production office. Do the workers use a bin to put just the paper, the draft one, that can be used again for other draft? At the end of a cycle, when a draft paper can not be used anymore, is it recycled? There are so many ways to use paper!

o It is better to buy normal non recycled paper and then re-use it multiple times, than buy recycled paper and use it once to print a small 10 line script!

o In the same direction, maybe it should be considered to differentiate between what needs to be stored online and what does not. An artist contract must be printed; a draft about a version 1 of a continuity should not, and could be worked on via an application (Ex: Setkeeper). Then, at the end of the project, the artist has his contract, but the different versions of the continuity can be deleted.

o Number of document (pay sheet, scenarios, etc...): It is some very difficult data to collect!

3. Filming: movie sets & energy

o Emissions due to heating the set: energy consumed to heat outdoor natural sceneries is taken into account but not the energy consumed to heat the studios. Why is that?

If the capital asset of the studio takes into account the heating, then there is a problem. When a production comes to a studio, it is using a certain amount of electricity. Normally, the location manager takes a reading when they are entering the studio, and then another reading on departure, to record what electricity/gas they have consumed. That is how it should be calculated and not in an other way.

Regarding the fuel consumption of the generator, it seems that what is taken into account is the "main" genny, the one using to power up the set. However, what about all the secondary generator? It is well known that the facilities team, can use small ones (3 KW, sometimes 6 KW). When they do so, they are filling it up with jerrycan, and put those expenses are attributed to the general one. It is thus not taken into account when the production manager receives the bill from the leaser who will ask for the material and the fuel.

So, in the end, in order to have a proper calculation, the different generators should be taken into account: the one for the set only (lights), secondary ones (facilities, set design...), and the one for the actor's dressing room and catering.

o Emissions due to renting a spot for filming: The value of the Emission Factor is given in kg CO₂ e/m² and not in kg CO₂ e/(day.m²). Is it necessary though, to take into account the emissions of a spot capital asset?

If a commercial shoots 3 days in a studio, it is being calculated, regarding the whole life and impact of a studio? If the studio is 40 years old or if you are filming in a centenary building or monument, how can the ratio be impactful?

o Carbon Clap only mentions outdoor natural sceneries and studios but does not mention clearly indoor natural sceneries.

o Emissions due to electricity consumption in the set: the Emissions Factors value per country are not given. Is it considered because Carbon Clap is only for French users?

If so, it should be possible to choose between different energy. Some studios have a deal with green energy providers, which is not the same that the classic national providers (EDF).

o Emissions due to special effects, costumes conception, make-up & hairdressing, set design: the emission factor is the same for all those categories (110 g CO₂/(euros spent)). The emission factor should be recalculated, it is definitely not the same between those 3 departments.

o Regarding wardrobe, a difference should be made about second-hand costumes and costumes that are new. There is a huge difference.

o Emissions due to make-up & hairdressing : should not the information be asked in "make-up stylists.working days" rather than in euros spent

on make-up? For example, if you consider that a hairdresser or a makeup assistant spends generally X €, and that he uses 30% of product placement, then there should be a ratio calculated, which then could be used to record to the presence of each technician. It could be more accurate than with euros spent.

4. Logistics and transportation

o Emissions due to catering: only the amount of total meals consumed during filming is required. There is no question about whether some meals are vegetarian or are made with local ingredients. Organic products should also be taken into account.

o Emissions due to crew transportation: the data required about the crew transportation based on cars is not clear. What type of trips are comprised in the question about business trips by car? Location scouting among others? This point is unclear.

o Emissions due to crew transportation: there is no question about the type of cars used (whether they are electric or hybrid).

o Emissions due to crew commuting from home (if local crew) / hotels (if not local crew) to film sets: it is not clear if those emissions are taken into account. To approximately estimate them, how many "working-day.people" were spent on each film filming should be asked. What does 'Business Trips' signify ?

o When a calculation is made about a person going on set. How do you calculate that? If the filming is in Paris intra-muros, and the technician is a Parisian, there is a 90% chance that he will travel by soft mobility (walk or bike) or public transportation. However, if he lives in the suburb, he will take his car. Shouldn't that be taken into account with the crew list? Should an average be established?

o Emissions due to public transportation: should it be put in the category "Technical means" (as is the case) or the category "Transportation of people"?

o Emissions due to plastic waste: there is a question about whether waste plastic is recycled or not but it is not clear how the fact that plastic is recycled impacts the Emission Factor (only one Emission Factor is given).

o Emissions due to battery waste: there is a question about whether used batteries are recycled or not but it is not clear how the fact that batteries are recycled impacts the Emission Factor (only one Emission Factor is given).

o There is a case where the weight of the truck multiplied by the kilometres gives a result. How is it possible to calculate that? It seems rather complex to get this kind of information.

o Also, what type of batteries are we talking about? Camera, light, sound, facilities...

5. Technical equipment used for filming

o Emissions due to drone use: there is no value given for the Emission Factor (kg CO₂/flying-hour) for the drones.

o Emissions due to equipment destruction/crash: no questions are asked to take into account the emissions due to cars, planes crashes. It might be important data to add, especially when it is an action movie.

General info: the three tabs "Film filmings: movie sets & energy", "Logistics and transportation" and "Technical equipment used for filming" should: either all be put in the same tab as they all concern

filming, or be divided differently.

6. Post production

o Emissions due to video editing, computer graphics, sound editing, laboratory effects: the Emissions Factors were calculated by EcoProd for CarbonClap but calculations are not explained. How were the calculations made?

o No emissions due to electricity and heating consumption are taken into account (or are they taken into account in the above Emissions Factors?) There is a huge consumption of energy in a building that hosts a post-production company. Therefore, those calculation should definitely be taken into account.

7. CO₂ emissions calculations

CO₂ emissions results are calculated:

o Even though the production of an audiovisual project stops when the project is completely edited, the way of distributing the production has an impact on carbon emissions. It could be taken into account in a future development of a carbon tool.

o Carbon Clap should deliver a report to explain how they calculate the Emissions Factors that do not come from an Emissions Factors Database.

• Huella de Carbon (ProMalaga - Malaga - Spain)

Description of the calculator:

Green Globe Sostenibilidad & Proyecto Ambientale developed their Spanish carbon calculator a few years ago. This carbon calculator can be found online and has to be filled using an excel format. It is written in Spanish so it is mainly targeted to Spanish-speaking producers.

Two carbon footprints can be calculated based on two excel sheets:

The one that should be filled first is called "Minimum Footprint" ("Huella minima"). It calculates a minimal and approximate footprint of the audiovisual project based on the project's budget (the producer has to fill an official document from the Ministry of Culture).

This is a very good method: we believe that is one of the most important figures to fill in on the carbon calculator. It is a simple way to collect the necessary data, but because some of the numbers are quite confidential, it might also be a problem for producers and line producers to authorize their use.

This document is sufficiently detailed and the budget of each of the following categories has to be filled: "script and music", "artistic team", "technical team", "scenography", "studios filming/sound", "equipment for filming", "trips, accommodation and meals", "laboratory effects", "insurances", "general costs", "exploitation, commercial and financial costs".

Based on those costs, a first carbon footprint is calculated.

However, this way of calculating the project's carbon footprint is not precise (this is why it is called "minimum footprint"). It should be interesting to know the emission factors. It seems that the calculation is relatively vague. It might have a high error margin.

In order to calculate it in a more precise way, another excel sheet can be filled at the end of the project: this excel document is called "Complete Footprint" ("Huella completa").

This allows the production to develop their carbon calculator use.

This carbon calculator is structured as follows. It has 3 tabs:

1. Preproduction phase
2. Production phase
3. Postproduction phase

In each tab, data has to be filled. This data is translated into tons equivalent carbon (t CO₂, eq) using Emissions Factors (EF). Carbon emissions are grouped into 6 categories:

- o Transport
- o Accommodation
- o Electricity produced & consumed
- o Catering
- o Scenography
- o Filming equipment (rent &/or bought)

Comments on each tab of the document "Complete Footprint":

- o There is no "General information" tab to start with. This should be added.
- o The emissions due to storing/streaming/distributing the production are not taken into account.
- o The emissions due to electricity and heat consumption (for preproduction and postproduction phases) are not taken into account. The emissions due to heat consumption are not taken into account for the production phase.

1. Preproduction phase:

- o Emissions due to cars trips (owned or rented car): data are to be filled in litres and the type of

fuel (diesel, petrol, gas). This is quite a difficult information to collect on a set, especially if there is no eco-assistant during the project.

o What about electric vehicles or hybrid? It is not taking into account.

o What about train/plane trips? It can be a significant impact for the carbon emissions.

o Accommodation: the hotel type is not required.

o Meals: are not taken into account

o Heat production in the office: it is not taken into account

2. Production phase:

o Emissions due to cars trips (own or rented car): data should be filled in litres and the type of fuel (gazole, gasoline, GLM) used should be This is quite difficult information to collect on a set, especially if there is no eco-assistant during the project.

o There is no distinction made between cars and trucks transport for freight. There is a huge difference which should be taken into account.

o Emissions due to train, bus and plane trips: data has to be filled in approximative km. The type of flights are not taken into account: there is a key difference between a short-courier and long-courier flight. It makes a significant impact difference whether the flight is domestic or if it is to the other half of the world.

o Emissions due to accommodation: the type of accommodation is not asked. There is a big difference between a one-star hotel and a five-star hotel. Tools exist nowadays to calculate a hotel room's carbon impact.

o Lighting: question about the type of LED used and their efficiency. This question is also asked in

the VAF carbon calculator (but not in the other 2 calculators).

It is not explained though how those questions impact the emissions due to lighting. It could be interesting to understand how the emissions factors are calculated. Do they evolve with time? The technical aspects of gear is fast changing.

o Emissions due to purchases: answers are only qualitative (about reuse, 2nd hand purchase...). It is not explained however how those questions impact the emissions due to purchases. It is good that this specific point is taken into account. It might be rather vague to calculate those factors. Also, it might be interesting to separate these into: facilities, make up, wardrobe, light, etc...

o Waste: answers are only qualitative (purchase of waste-free products? sorting? plastic reduction? use of digital tool instead of printing?...) It is not explained though how those questions impact the emissions due to waste.

o Water: there is a question about the amount of water used on stage. This is very complex data to collect. Water is bought all the time, especially if it is a movie shot in summer. It is quite impossible to have this data; then, you can be sure that the answer are going to be quite vague, which is not good for the calculation's accuracy.

o The emissions due to make-up, hairdressing, special effects and special technical equipment used for filming (such as drones, planes, trucks...) are not taken into account. It should be, as it is very important data. If helicopters are used everyday to shoot, it has a huge impact.

3. Post-Production phase:

o Emissions due to foley: only taken into account in the Promalaga/VAF carbon calculators. Data to be filled in (working-day.people).

o Special effects: data to be filled in €. It is rather vague.

o Laboratory effects: what does it correspond to? What is taken into account?

o This section is clearly not precise enough. Post Production can have a huge impact, regarding the different machines used, the building that are the postproduction companies in, etc...

4. The CO₂ emissions calculations

CO₂ emissions results are calculated:

- o Per activity
- o Per production phases
- o Per budget and per working day people. This last section asks an interesting question: what would be the impact of one person on a film shoot? However, can we really consider that every technician on a set has the same impact?

A director flying overseas, a makeup artist staying on set all day long, or a chauffeur driving all around every day?

In conclusion, it appears that this Carbon Calculator might be for production teams that are already quite committed to green methods, at least, the second part. We believe that the first part (only with budget) is to raise production awareness where they are absolutely not green. Then, for more sustainable productions, they can use the second tool.

- VAF (Belgium)

1. Description of the calculator

(<https://www.vaf.be/duurzaam-filmen/co2-calculator>)

Flanders Audiovisual Fund developed its Flemish carbon calculator in 2016. This carbon calculator

can be found online and has to be filled in an excel format. It is written in Dutch, French and English. Two excel sheets are provided: one for feature films and one for series (the two excel sheets are exactly the same).

This carbon calculator is structured as follows, with 9 tabs:

1. **Project general information** (type of production, number of people.days for preproduction, number of people.days for production, number of people.days for post-production, location details on the production)
2. **Transport** (transport of people and of material for pre-production, production and post-production)
3. **Production of electricity** (questions on the sustainability of the power generator used, kVA of power generator, consumption data for own production of electricity)
4. **Electricity purchase** (questions on the sustainability of the electricity used, electricity consumption for pro-production and post-production, electricity consumption per each production location)
5. **Heating** (questions on the sustainability of the heat used, fuel consumption to heat for pro-production and post-production, fuel consumption to heat per each production location)
6. **Waste** (questions on measures to reduce waste, amount of waste)
7. **Meals** (questions on catering measures, amount of meals)
8. **Accommodation** (total nights at the hotel for pre-production, production and post-production)
9. **Equipment and post-production** (technical equipment, decor and costumes costs, visual effects, video editing, laboratory effects, sound

editing/foley)

In each tab, data has to be filled. This data is translated into tons equivalent carbon (t CO₂, eq) using Emissions Factors (EF). Carbon emissions are grouped along 9 categories:

- o Freight,
- o Transportation of people,
- o Material means,
- o Consumption of electricity,
- o Production of electricity,
- o Heating,
- o Accommodation,
- o Catering,
- o Post-production

2. Comments on each tab

1. General information

This tab is important as it contains data that can be used to simplify the rest of the tabs. The location details of pre-production and post-production could be also asked.

2. Transport

o Lots of questions about the cars used (for the production phase it seems): if they are hybrids, if carpooling was promoted, if bicycles were used... It is not explained though how those questions impact the emissions due to car usage (it looks like those questions are only used to get the emission label. They could however have an impact on emissions). What is the method of calculation?

o The information is asked in km. Maybe the calculation in tons.km could be a more precised question. However, the collection of this kind of data is rather challenging on a film shoot.

3. Production of electricity

General questions are asked about the sustainability of the power generator used, the power lighting on set in kW...

o It is not explained though how those questions impact the emissions due to electricity production (it looks like those questions are only used to get the emission label. They could however have an impact on emissions).

o It is interesting to take into account different sources of energy: sets are going to use more and more different type. We are aiming toward a mix of energy, so it is good to take this aspect into account.

4. Electricity consumption

o Questions are asked about the sustainability of the electricity used for preproduction and postproduction: green electricity consumed, green electricity produced onsite (with solar panels...). It is not explained though how those questions impact the emissions due to electricity consumption (it looks like those questions are only used to get the e-mission label). They could however have an impact on emissions.

5. Heating

o Questions are asked about the sustainability of the heating used for preproduction and postproduction (if wood pellets were used for example). It is not explained though how those questions impact the emissions due to heating (it looks like those questions are only used to get the emission label. They could however have an impact on emissions).

6. Waste

o Emissions due to special effects, hairdressing and make-up use are not taken into account. It

should be.

o Numerous questions are asked about the handling of waste. It is not explained though how those questions impact the emissions due to waste (it looks like those questions are only used to get the emission label. They could however have an impact on emissions). What can raise or decrease the emissions factors on this topic? It is important to know how the calculation is made.

7. Catering

o Numerous questions are asked about the type of ingredients used to cook, local, veggie, more white meat than red... It is not explained though how those questions impact the emissions due to catering (it looks like those questions are only used to get the emission label. They could however have an impact on emissions). It is, however, a very good idea to take this kind of information into account. Once again, what can raise or decrease the emissions factors on this topic? It is important to know how the calculation is made.

8. Accommodation

o Emissions due to accommodation: the total number of nights spent in hotels are asked. It is not asked to detail which type of hotels those nights were spent. For example, in Huella de Carbon, there is a huge difference between a one star and a five star hotel. This should be taken into account.

9. Equipment and post-production

o No questions are asked about special technical equipment used for filming (such as drones, planes, trucks...). This is a very important detail: like for Malaga CC, if we imagine filming using helicopter, it should be taken into account.

3. CO₂ emissions calculations

CO₂ emissions results are calculated:

o For the whole project

o Per phase of the project (pre-production, production, post-production)

o Per categories (8)

o Per phase and categories

o With a focus on transport, waste and catering/accommodation categories

This carbon calculator is quite well done. It takes into account a lot of sustainable measures that can make a difference for audiovisual projects.

• PEAR (PGA Green – USA)

1. Description of the calculator

PEAR is an American carbon calculator developed by the Green Production Guide in 2011. This carbon calculator can be found online where an excel sheet has to be downloaded and fulfilled. It is filled out in English and is mainly targeted at big productions.

PEAR is structured as follows.
It has 7 tabs:

1. **Production information** (number of working days.people for preparation, number of filming days.people, number of working days.people for post-production, location of each filming set)
2. **Electricity** (the consumption of electricity at each location, preparation, filming sets and post-production)
3. **NG & fuel oil consumption the consumption of Natural Gas and heating fuel at each location** (preparation, filming sets and post-production)
4. **Fuel use from technical equipments & vehicles** (consumption of fuel for each equipment use)
5. **Hotels & housings** (number of nights spent per type of hotels)
6. **Commercial flights**

7. Charter & helicopter & jet

In each tab, data is required from the production. This data is translated into tons equivalent carbon (t CO₂ eq) using Emissions Factors (EF).

Carbon emissions are grouped into 5 categories:

- o Electricity
- o Natural gas and heating oil
- o Fuel use
- o Air travel
- o Hotels & housings

2. Comments on each tab

1. Production information

For location type, what is the difference between "on location" and "warehouse". What do we put if we shoot outside? On-location? When do we use a "warehouse"?

2. Electricity

The total amount of kWh of electricity consumed during the project is asked. It is not clear what to examine: production sites, preparation sites, stages... This is a very vague question. Also, green electricity is not taken into account. It seems quite difficult to get all the data to answer that.

3. NG & fuel oil consumption

Same remark: it is pretty hard to obtain information.

4. Fuel use from equipment & vehicles

The total amount of fuel (and its type) consumed for the equipment is asked. However, it is not well explained what aspects to look at (only car consumption for crew transport? What about freight?). Also, it seems difficult to find the amount of fuel in litres consumed during a trip. It means that someone has to check all the gennies, all the cars, all the trucks, the helicopters, planes, etc... It is a massive job! And what about ecological

transportation? If the production use hybrid cars for example! It should be more specific and separate into several subsections.

5. Hotels & housings

Emissions due to accommodation: data required concern hotel types and number of nights spent there. How is the Emission Factor used to calculate the emissions due to accommodation? The tool provides a choice between 7 different hotel types. This is a particularly good feature of this carbon calculator.

6. Commercial flights

Data about all the flights taken by the crew. 3 types: short, medium, and long flights. This is also a very good detailed question. There is significant particularity between all the flights taken during a project. important to highlight the difference between them differences between those.

Trains are not taken into account, but we presume that is because of the US distances, the train is not always an option.

7. Charter & helicopter & jet

Data about special air transport means are asked (such as charter, helicopter and jets). This is a good question, and important to ask. Such transportation has a huge impact on the planet and are used significantly more in the US than in Europe.

8. The CO₂ emissions calculations

CO₂ emissions results are calculated:

- o In total
- o By category

Here are the main differences with the other calculators:

- o This carbon calculator is easier to fill because it only asks for the minimum of information
- o For each emission calculations, 3 different options are given (with a preferred one): this is easier to fill in

o Special effects, stunts, make-up, sets, meals, special equipment for filming, employee commuting, freight, post-production and waste are not taken into account for the emission calculations

o It seems that this is a carbon calculator that is preferable for big productions. For example, they consider useful to know the impact of helicopter transportation, but not the problematic of food or waste. They are right to do so because the impact is totally different from a carbon point of view, but in order to raise awareness, it is not the correct way to proceed

• Albert (UK)

1. Description of the calculator

Albert has been developed by the BBC. It is a carbon calculator originally developed for TV series (in house BBC) that over the years has been expanded to be used widely by broadcasters in the UK. The steering group which included all broadcasters is chaired by BAFTA (The British Academy of Film & TV Awards). The calculator has recently been updated for feature films.

This carbon calculator can be found online and is easy to fill in data has to be filled using drop-down lists. It is written in english and is dedicated to all types of productions.

Albert offers to the producers 3 things:

o Calculate a "prediction of the carbon footprint" at the beginning of the production (exact same form as for the "final carbon footprint"). It is a good point because the person in charge of filling it can already know what data are important to keep during the project for the real carbon footprint calculation!

o Calculate a "final carbon footprint" (to be filled at the end of the project)

o A certification form to apply for the Albert sustainable production certification. Questions are asked about different actions taken to reduce the emissions/waste during the project. Documents should be provided so the Albert team can verify if the mentioned actions were truly taken. That is another very good point, because questions for certification and questions relatively to the carbon calculations are not mixed.

Also, for each tab, a guidance button explains what should be filled and especially where to look at for the information and/or whom to ask the information to. The way of calculating a carbon footprint using Albert is well explained with the videos on the "Production tools" page.

The predicted/final carbon footprint is structured as follows. It comprised 9 tabs:

1. **General information** production type, production dates, running time of the feature, budget, possibility to copy the footprint of another production, certification undertaken.

2. **Spaces** amount of electricity, gas, fuels for generators (choice between 22 types of fuels for the generators) consumed in the different spaces (offices, studios, other spaces...) during the whole production.

3. **On Locations** consumption from mains electricity and from generators' fuel use on locations (battery charging in spaces listed above does not count for example)

4. **Travel & transport** every transport means used for passengers and freight)

5. **Other fuels:** fuels (other than gas and electricity) used for heating, for special effects, for cooking or others...

6. Materials materials' use for paper, paint, timber and textile. Data can either be filled using the amount "spent" or using the "dimensions" of the material bought.

7. Disposals general/mixed, food/compostable, timber, textiles, electronic waste, paper/cardboard, plastic, construction. Questions if those will be : incinerated/energy recovered or landfill/unknown or recycled or donated (either in weight or volume)

8. Accommodation 7 choices like for the US carbon calculator

9. Post-production (questions about the total amount of days spent on edit suites).

In each tab, data is required from the producer. This data is translated into tonnes equivalent carbon (t CO₂ eq) using Emissions Factors (EF). Carbon emissions are grouped along the 9 tabs mentioned above. Predicted and final carbon footprint results are displayed next to each other so the producer can see the impact of the actions taken after calculating the predicted carbon footprint to cut off the emissions. The producer can also compare the emissions of its project with the emissions of other projects the company made and with the emissions of similar projects.

2. Comments on each tab

1. General information

More questions could be asked here, such as:

- o Information about the number of production and preparation offices
- o Information about the amount of location scoutings
- o Information about the amount of roles, special features, extras.days...

2. Spaces

- o All energy used in the different spaces (offices, studios, other spaces...) during the whole production: electricity, gas, fuel for generators (choice between 22 types of fuels. There is not this amount of fuel choice for the other carbon calculators). The country of each space is asked.
- o All different types of spaces are mixed (offices and studios for exemple). Maybe it is better to separate them because their consumption of energy is very different (use of power generators for example for studios, not the case for offices. A question about the amount of persons.days working in the office for the project should be added.
- o Are the "spaces" mentioned in this tab only closed spaces?

3. Travel and Transport

- o For every transport means used, different options can be chosen to fill the information. There is a command box to add some notes, but maybe an obligatory title for each transport means could be added in case the person filling out the form comes back to it with more information and does not remember what she/he already filled.
- o For freight on road, only information in km is asked, not in tonnes.km. Is it for simplification? They should explain it then. It appears to be easier to use km instead of tonnes.km like for the Carbon Clap, but it is then not precise. It could be interesting to give a size for the trucks for example, and even if the concrete weight is not known, it gives a basic information (Emission Factor should of course have to be clarified).
- o Maybe the amount of trailers could be asked?

4. Materials

- o It is not asked if those materials (such as timber and textile) come from a second hand shop (which impacts the emissions linked to them).
- o There are no questions about the technical materials used.
- o No questions about make-up and hairdressing

5. Waste

A question is asked about food disposal but there is no question about the number of meals prepared during the shootings.

6. Accommodation

Albert gives 7 choices like the US carbon calculator.

7. Post-production

Questions about the total amount of days spent on edit rooms (in which country and if green electricity is used) so all the different steps of post-production (sound editing, foley, computer graphics...) are grouped together. Shouldn't they be separated as they emit differently?

Conclusion of this chapter:

The preferred format for the calculator would be English and online (Albert's format is the most suitable).

Regarding the documentation/guide to explain how the carbon calculator works: CarbonClap details each piece of information requested, giving in addition the Emissions Factor used to calculate the associated emissions and where it comes from. This is important!

Albert explains with videos how to fill in the carbon-clap calculator, they are very well done

and quick to watch. The 5 carbon calculators would benefit from detailing why x and y are asked and what are the assumptions behind it to calculate the associated carbon emissions.

VAF and Promalaga are the carbon calculators which take the ecological actions of the project into account the most account the ecological actions of the project. However, it would be in their interest to do as Albert did and separate the questions whose answers have no impact on the project's carbon balance and which only serve to obtain certification from the questions whose answers have an impact on the project's carbon balance. That would be clearer!

Post-production is not very important for the 5 carbon calculators. However, most of the time it is largely involved in total emissions, so this phase should certainly be explored further.

Knowing that digital technology has a significant impact on carbon emissions today, it is absolutely necessary to mention it and see how to account for the carbon emissions due to the storage of audiovisual production on the internet.

To conclude, it would therefore be beneficial to develop a new Europe-wide carbon calculator. Why not make it compulsory for producers to fill it in so that a database of emissions from audiovisual productions can be established and their evolution over time can be monitored.

This is why Green Screen Partners (Film London, VAF, Pro Malaga, and Slovak Film Commission) are working on Eureka ("European Environmental Calculator"), an online tool based on the interregional learning of Green Screen (see Chapter about Sustainable Production/Financing/ European support).

IV. Direct connection with the making of a project

A. Link between carbon impact and production

- Budget

The budget for a project generally depends on the size of the project. Even if this does not apply 100% of the time, in general, the more resources the project requires (human, material, logistical...), the bigger the budget is.

The reverse applies directly: the larger the budget, the more resources are consumed, and the greater the environmental and carbon impacts.

We will see further how the link can be made between the money and the carbon.

- Size of the team

Similarly, the size of the project will determine the size of the team (technical and artistic). Usually, a big American production requiring many stunts for example, several special effects, endless complicated scenes with numerous extras, implies a significant consumption of resources (food, travel, hotels...). This also implies a greater carbon impact.

Again, the direct correlation between project size and environmental impact is therefore evident.

- Filming location

Depending on the project, different sets will be chosen by the director and team. These artistic choices will be directly related to the carbon impact of the project. Several possibilities exist:

Studio:

The studio has advantages and disadvantages.

Advantages:

Working in one place, it will allow the transport sharing. It is often possible to propose car-sharing plans, but also to open up the debate on alternative forms of mobility (electric cars for example) or soft mobility (bicycle, scooter, etc.).

It is much simpler to set up a waste management plan in the studio. Whether it is with the builders and more broadly the decoration team, with the stage managers, or with the canteen and set design, it is simpler to manage the materials consumed.

Some studios have begun their ecological transition: reinforced insulation, low-energy building, LED light sources, storage of the sets... This drastically reduces the studio's carbon footprint.

Disadvantages:

The studio is, by definition, empty, so it will be a matter of creating a set from scratch. The first problem that arises is the creation of this decor: it will require important raw materials (wood, paint, aluminium, adhesives ...). Deadlines are generally quite short, and the eco-design of decors is rarely considered. Waste is then the rule, waste is not sorted, the materials used are not responsible...

The studios are often aging constructions, and generally not yet up to the new eco-responsible standards. The light sources used are energy consuming, vehicles consume too much fuel, the walls are poorly insulated (energy loss, too hot or too cold)... Their construction dates from a period when environmental criteria were not yet sufficiently taken into account.

The studios need to implement a real green

strategy that make sense and that has a sustainable vision for the next years.

Natural Scenery:

The natural scenery also has advantages and disadvantages.

Advantages:

Natural decors have this eco-responsible nature that they do not require large constructions: they are generally chosen for artistic criteria in the first place, but also because they offer something that exists, that can be used as it is. Of course, there is always accessorising, furnishing to be done, and sometimes some construction. However, this usually requires few constructions and therefore few resources.

The environmental impact on the construction part is therefore limited.

Disadvantages:

The natural setting generally offers less latitude than the studio in terms of logistics: it is more difficult to store equipment, manage waste, offer joint travel...

In addition, shooting "on location" can have a huge impact on the fauna and flora. Crews, material, trucks, stepping all day long on nature, has a tremendous impact on the location. It becomes more and more impactful if the project is a big one.

• Travels

The choice of filming locations for a project also has a great impact on the "travel" part. The sets chosen in the countryside, or abroad, see the carbon impact take off.

The more that filming takes place in remote

locations, the more important travel will be. It is always possible to reduce this impact, by recruiting crews locally, by buying or renting equipment locally; however, whatever the country, there are always audiovisual strongholds where most of the filming takes place (Paris for France, London for the United Kingdom, Madrid or Barcelona for Spain, Berlin for Germany, Brussels for Belgium...).

Equipment rental companies and technicians are generally located in these places. Going to shoot on an island in the middle of the Mediterranean Sea, in a Mongolian steppe, or in the Swiss mountains, requires significant travel.

In addition, when we consider travel, we consider carbon consumption, such as airplanes (largely preferred by production teams) to have the biggest carbon impact.

• Gear

Renting:

Audiovisual material is very specific and needs to be updated very regularly. Equipment rental companies know this, managing a fleet of equipment which is at the cutting edge of technology (and is fashionable!) is quite difficult!

Generally speaking, the equipment is mostly rented by the production teams. The equipment evolves so fast, it is hard to shoot a film with an obsolete camera bought ten years ago...

As far as the technology (camera, sound, light, machinery) is concerned, the productions go through rental companies.

This has the advantage of greatly limiting the environmental footprint of the equipment, with the purchase being the greatest impact. It is therefore particularly important to be able to make productions aware of the need to favour

rental over purchase.

Moreover, it is necessary to use hire companies as much as possible who signed an eco-responsible charter, and who commit themselves to propose well inspected material, manufactured in good conditions, with ethical materials, etc...

Other departments, such as decoration or management, often favour purchases over rentals. The environmental impact is then much more important, and difficult to compensate because it is much harder to measure.

It is important to have in mind that a real deep planification must be done in advance, before the renting to ensure that the material will be used during the shooting. This optimization is important when considering the loading of the different trucks: the more material there is, the more CO₂ emission there will be during transportation.

Purchase:

Other departments, such as decoration or management, often favour purchases over rentals. The environmental impact is then much more important, and difficult to compensate because it is hard to measure.

Equipment rental companies have appeared in recent years, in response to the problems faced by stage managers, particularly regarding the storage of purchased equipment. There is still a lot of small equipment that is bought, often in poor conditions (supermarkets, lowest price chosen...).

It would be interesting to work on the use of second-hand, reusable equipment, in order to limit the impact.

Modern and low-consumption equipment:

Rental companies try their utmost to remain competitive by offering equipment that is always at the cutting edge of technology. This has a major

advantage, namely the constant novelty offered: the equipment is always better, less energy consuming, made with better materials... but it also raises a major issue: the race to always “brand new”, the race to the latest gadget... which implies an ever-increasing consumption of resources, in a world of finite resources.

How can we reconcile high-tech and top-of-the-range equipment with limited resources and the use of second-hand and products?

B. Link between budgets and carbon

• Reduce impact = reduce carbon

1€ = 1kg eq CO₂?

It is interesting to develop the idea, admittedly generalist but coherent, that one euro spent could be the equivalent to one unit of carbon. It is not easily definable to say that one euro is equal to one kilogram or one gram; the conversion factors are variable and differ enormously.

However, in the collective understanding of carbon, it is necessary to suggest that monetary expenditures represent carbon expenditures.

We could use the simple calculation that 1€ = 1 kg Eq CO₂. It requires specific calculations, that need to be adapted to the audiovisual field. For example, flying has an impact: it would be necessary to make a link between the euro spent for the plane transportation and the carbon. It could not be 1,000€ spent on a flight ticket = 1,000 kg Eq CO₂, because of the emission factors already existing.

There is lots of work to be done on the conversion factor between the euro and the carbon. In doing

so, it could offer the production company a real methodology to use during projects.

This makes it easier to manage one’s environmental impact by making people think about their carbon expenditure. Indeed, just like a budget, it is possible to make a provisional budget, then an actual budget. The actual budget will be adaptable according to expenditure; if, like the financial budget, the carbon budget is managed, the producer will be able to take better account of the impact.

Let’s take a simple example:

- Vehicle department: budget of 50,000€ is foreseen for vehicle rental. The work plan has been carried out, all the information is available on the sets, and the Unit Production Manager has given his Production Manager a transport forecast. He thinks he needs X cars, and his estimate is 50,000€.
- Thanks to the carbon 2.0 calculator, the updated emission factor of renting a passenger car for a shoot in a big city is 1€ / kg (again, this value is just an example). This implies an average calculation made by the calculator, which knows, according to the information entered at the beginning of the film, that the emission factor will be as follows (calculated according to the average kilometres driven per day, according to the type of car rented, the city, etc.).
- The producer thus immediately sees that his carbon impact on the vehicle department is 50,000 x 1, i.e. 50,000 kg or 50 tonnes (number not accurate).
- If the producer had established a provisional carbon budget, for example of 40 tons, this allows him to understand that the impact of the vehicles is going to be greater than expected. After discussing this with his team, he realizes that by bringing a chosen set closer from the far countryside to the near countryside, he can reduce

his overall carbon impact. After calculations, he managed to lower this figure to 45 t; which, in the end, lowered his provisional budget for the vehicles from € 50 k to € 45 k.

We can see from this example that the link between € and U eq CO₂ is very close. One does not work without the other. It clearly allows the producer, by working on their budget, to work on their CO₂ impact.

The major difficulty today is to succeed in linking these two factors, in order to be able to convince producers and principals to work with both tools.

The challenge is now, in 2020, to link all those good practices to the carbon calculation.

The perfect line would then be:
Project → budget → green tips → saving carbon → saving money

*In the end: you can save money
AND lower your carbon impact!*

Communication and awareness-raising on this conversion rate:

Communication is vital for this carbon rating system to be able to communicate massively on this carbon rating system.

By applying this formulation to a large number of films, it would make it possible to know the impact of each project, upstream and downstream.

This would also make it possible to determine the rating criteria: for example, from 1 to 10. A discreet but visible sticker with the numbering scale would make it possible to know what the impact of the film was. A film rated 3/10 means that a lot of energy and environmental expenditure has been made. It's important for the audience to know that a project like Avenger has a huge impact

on the planet, compared to a small independent film shot behind closed doors in a small town.

Determining the carbon ratings of a project would above all make it possible to carry out a very important follow-up and monitoring of our sector. It would make it possible to know the emissions of films, and thus to work on their reduction and compensation. Aiming for a carbon-neutral audiovisual sector can be a superb challenge at the dawn of a new decade in which climate issues will be decisive for the survival of our planet and therefore, of course, of our industry.

Art cannot be exempt from ecological supervision. Consumers want products that are healthy, organic, clean, locally sourced, etc. It is the same with film.

Parents want wooden toys, made in France, without chemicals; why wouldn't they want films made in good conditions, where part of the budget has been donated to associations, where food hasn't been thrown away, where waste has been sorted?

Why not insert, at the beginning of the film, an optional sticker with the film's eco rating, as well as a brief 30-second video explaining that the filming was made in a responsible way?

Raising public awareness is very important and must be taken into account in eco-responsibility measures for the audiovisual sector.

• Offsetting: the ton of carbon (explanation and cost)

What price should be given to the equivalent of one ton of CO₂ released into the atmosphere by the most polluting industries and countries? The debates are continuing in a time of urgency. It is obvious: the debate on carbon pricing, between tax and the creation of a real CO₂

market, is far from closed. The debate has been going on for many years and is gradually moving forward, taking into account all the data on technical progress.

However, without a universal dimension and an European dimension either, there is no salvation for the fight against global warming. Whether fiscal or technological, the issues at stake will always carry significant economic weight. This calls for a general mobilisation of all players and decision-makers, much more than just on ideological grounds.

How can a fair carbon ton price be identified?

For example, some countries, such as France, have increased the cost of carbon over the years. As part of the Energy Transition Law, prices have been raised: € 22 in 2016, then € 56 in 2020 to aim for € 100 in 2030.

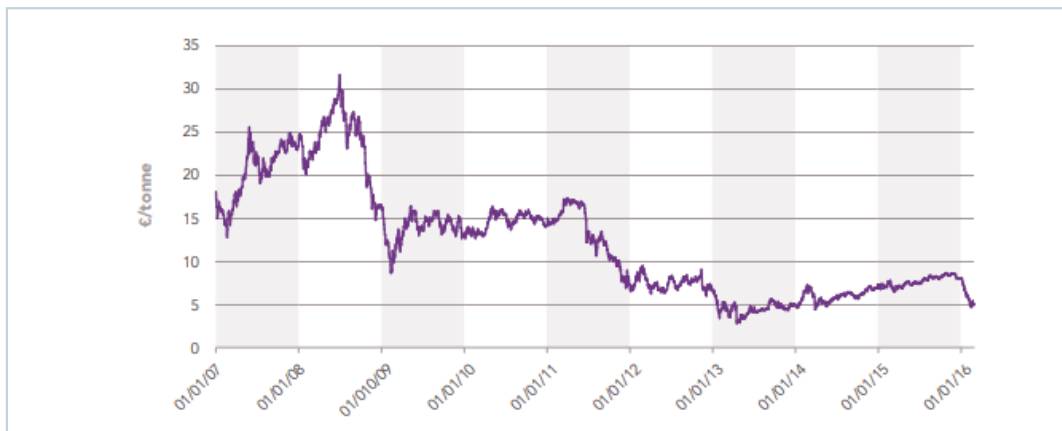
On a global scale, there is also a very high price variability, which vary from 1\$/t (in Mexico) to 168\$/t (in Sweden), which shows that there is no single price for CO₂.

The world average is around 30€/t.

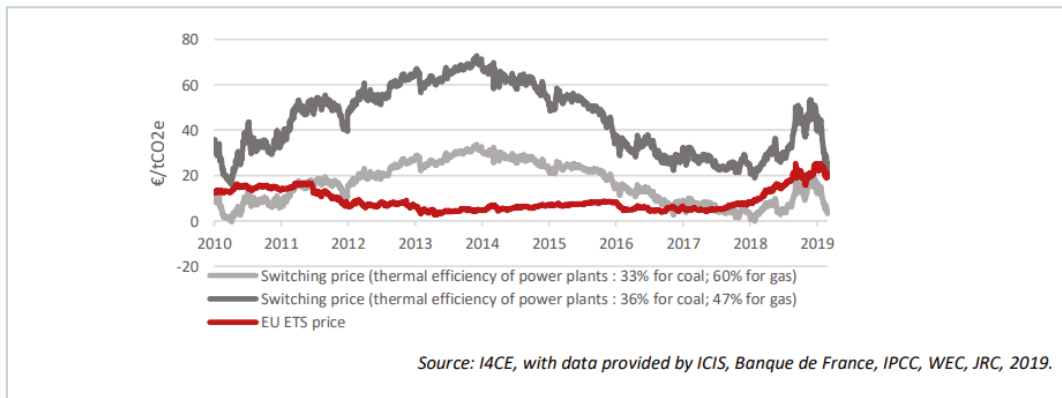
According to the OECD, carbon pricing simply does not impose a binding enough price at present. According to the OECD, "carbon prices need to rise much faster than in recent years to ensure an effective transition to a low-carbon economy".

Nowadays, the IPCC recommends a price of 100\$/t CO₂ eq.

Evolution of the carbon ton price 2007-2016



Evolution of the carbon ton price 2010-2019



C. Case study: serie xxx (name hidden for confidentiality)

• General Carbon Impact

Serie xxx is a major series in the French audio-visual landscape. 103 days of filming, 122 sets, 73 people daily, 2500 extras, 2,700 hotel nights, 7,100 meals served, dozens of filming locations... Serie xxx is the archetype of a project with a significant environmental impact.

Secoya advised, then accompanied the daily Serie xxx, in order to reduce the footprint of the filming. Waste reduction, recycling, awareness raising, fight against plastic and food waste, are all eco-responsible actions that have made this filming a committed and sustainable project.

Daily monitoring has enabled Secoya to establish a precise calculation of the carbon expenditure over the entire duration of the project.

A total of 2,293.81 Tons CO₂e has been calculated by the Carbon Clap.

• Carbon impact by department (Secoya's results)

We can extract some data though, which are very interesting to analyse:

Transport:

- o Vehicles: 154 tons CO₂
- o Trains: 1.4 tons CO₂
- o Plane: 3.9 tonnes CO₂

NB: It is noteworthy that the impact of 889 train journeys made by 73 people during location scouting and filming is almost three times less than the impact of 28 air journeys made by 6 people.

Accommodation:

- o Hotel night: 18.64 tons CO₂

Lunch:

- o Canteen
- Number of meals: 7,100 meals

Over the entire shoot, the savings of 49,567 cups, 35,405 bottles of water, 13,920 sheet prints, and 35,405 coffee capsules saved 4 tons of carbon, which offsets all of the project's air travel.

Carbon Clap Results:

- o Material means: 28,5 tons CO₂
- o Workers: 0,12 tons CO₂
- o Capital assets: 0,03 tons CO₂
- o Accommodation/catering: 48,52 tons CO₂
- o Technical means: 19,08 tons CO₂
- o Transportation of people: 119,64 tons CO₂
- o Freight: 2060,98 tons CO₂
- o Energie: 16,93 tons CO₂
- o Waste: 0 ton



Part 2

Future:

Today is

already

tomorrow

I. Sustainable Production

A. Financing

• Financial assistance

Eco Bonus (Area: Ile-de-France)

Many institutions have positioned themselves, or are in the process of doing so, with regard to an eco-bonus, which would reward the responsible approach undertaken in not through production.

In France, and more particularly in Ile-de-France, there is an eco-bonus of up to 100,000 € for responsible production. This bonus is subject to conditions (for example, first obtaining the support fund of the Ile-de-France region).

With many productions having requested this bonus, the specifications are likely to become stricter, in order to highlight only those productions that are really committed to a green approach.

How it works: production can have a 10% bonus on the regional funding, going from 25 K€ to 100 K€. The average fund is around 50 K€ per project. There is no requirement specification so far. This fund is paid out after the filming on presentation of proof of specific sustainable expenses..

The region of Corsica, also in France, has also set up a green bonus, with more or less the same operation. Other regions are expected to join in the future.

In Belgium, and more particularly in the Flanders

region, VAF (Flemish Audiovisual Support Fund) also supports committed productions: in order to obtain the remaining 15% of the requested funding, the production must carry out a carbon calculator and show what virtuous actions have been put in place.

Sofica:

In Europe, there is a means of financing called "SOFICA". The Sociétés de financement de l'industrie cinématographique et de l'audiovisuel (SOFICA) was created by the law of 11th July 1985. They are investment companies designed to raise private funds dedicated exclusively to the financing of film and audiovisual production. SOFICA are set up either on the initiative of cinema and audiovisual professionals or on the initiative of operators in the banking and financial sector.

There are 12 SOFICAs in France, all of which have their own specificities and characteristics. There is a charter regulating investment in SOFICAs.

A coherent idea could be to integrate an eco-responsible dimension into this charter: in order to apply for funding, the production should establish a sustainable strategy. This would make it possible to define very precise specifications, which would be the same for everyone.

Even more ambitious, the idea of a new "sustainable" SOFICA could raise. This one could be a support for investors who want to participate to a green fund. The criteria should be very high, in term of CSR. Investors who want to invest in this specific SOFICA could then see their tax debate

be a bit superior. The tax credit would “thank” the investor for putting money into a sustainable cause.

Then, the producers using this money should of course show all the strategic CSR plan that they build on their project, with performance indicators during the whole creation time (from script to the theatre!).

This would first of all involve filling in a carbon calculator, (the best would be a European carbon calculator, unified, usable in all languages, and adapted to each country). The first step is to know its impact; of course, it is delicate to define it to the nearest kilo. However, making an estimate gives a good forecast and, above all, makes it possible to define the strategy to be adopted to reduce it.

European support:

At the European level, it would be wise to create a common fund for all countries producing audiovisual content, dedicated to eco-responsibility. A sort of «kitty» at EU level, where each member country could participate. By structuring aid on a European scale, this would make it possible to raise awareness and support productions in this committed approach.

This fund could work more or less the same way as the “green” SOFICA. When the countries participating to this fund are putting money into it, they can choose which movie can be selected to use the fund. In order to do so, the producer should also demonstrate all the strategic CSR plan that they build on their project, with performance indicators during the whole creation time (from script to the movie theatre!). Carbon calculation could once again be on the main theme of the verification.

However, some European initiatives already exist. Cine-regio, the regional film funds network in Europe, launched a Green group which aims to raise awareness and share knowledge on sustainable film production tools, measures, and policies. Since 2014, it published the Green Report, gathering all the green initiatives from the European film funds. It launched in 2019 the Green Manifest for all funds to support and champion environmental sustainability and associated costs.

• **Carbon Tax**

Another way of thinking about sustainable production would be to integrate a tax, or a kind of malus, for all productions. Each country could force production to define a low carbon strategy and a carbon price.

Again, the European Carbon Calculator should be use to do so (same as for the SOFICA or the European Fund).

An obligation to use a carbon calculator could thus launch the beginning of a vast awareness campaign in the world of audiovisual production; it would also make it possible to know the precise impact of the latter.

Saying for example that 1 ton of carbon equals 5€; a production filling up its carbon calculator, and having the result of 1,000 ton, should pay 5,000€. Forcing all the productions to do that, a global fund could be created; this fund, could then be used to finance sustainable production. The malus is then becoming the bonus!

Those ideas could be used on a national scheme too, not a European scale.

B. Filming

• Knowledge

Awareness raising:

Today, ecology and sustainable development are on everyone's lips. Few people can say that they have not heard about global warming. It seems logical for everyone to take into account, at their own level, the changes in habits that need to be put in place.

However, it appears that in audiovisual production, despite general knowledge, this subject is not yet a priority. Indeed, making a film is the most important thing: the way of doing it is often incidental!

It seems certain and absolutely necessary to be able to raise awareness of as many stakeholders as possible about the eco-responsibility of this environment. From the German producer, to the French camerawoman, to the Slovakian film commission; all individuals in the field must be made aware of these subjects.

A committed and responsible communication campaign, to raise awareness, must be implemented as soon as possible, in order to change mentalities.

Training:

In the same sense as well as raising awareness, the second step is training. Knowing its impact is obviously essential, but if we want to reduce it, we must have the tools to do so.

Offering training, starting in film schools, is the second priority. We must succeed in making the people who make up this world want to work to reduce their environmental and carbon footprint. To do this, training is a formidable lever that would give filmmakers the means to build sustainable and responsible projects.

• Reduction

Consulting:

Initially, the eco-responsible approach of a project must pass, once the carbon calculator has been completed, through a reflection on the different ways to change production methods.

Pre-production and then preparation are the best times to set up a committed and responsible approach.

In 2020, most countries have good practices (guidelines) for reducing the environmental impact of production. Whether it is through the implementation of soft mobility, waste management, plastic reduction or sustainable food, there are many solutions to be greener on a plate.

Production should use the help of green consultants, or eco-advisor, or Eco-Manager (the typology can change regarding the country). They are the most able to create a strategic plan to help reduce the impact of the production!

Smaller productions can of course decide to make up good practices by themselves; the results might be lower, but it is still a good start.

Eco-support:

The problem that underlies the slight progress of responsible production is that of "who does what". In fact, despite the good practices identified, there is still a huge restriction, which is that of getting things done.

The eco-support on set seems to be the only reliable option nowadays.

To do this, what seems to be the best solution is the creation of a tailor-made position specific to the eco-responsible issue. It is absolutely necessary that one person, or even several depending on the project, be in charge of this section.

Of course, it must be adapted according to the size of the project. On a small short film without too much of a budget, it seems certain that there will be no specific hiring for eco-responsibility. This can be one of the missions of a unit production manager or location manager assistant.

On a project with more means, and therefore, as explained earlier, with a greater carbon impact, it seems essential to hire a collaborator whose only mission will be the responsible management of the project. Several possibilities exist: a person may have been trained (importance of training, see above), or an outside company may be contacted. There are experts in sustainability on set, in France, in the UK, in Belgium, in Germany...

It is essential to be accompanied by experts on the subject. It is an important subject, in its own right, which cannot simply be dabbled in. The more complicated the project, the more difficult it will be to implement an eco-strategy. It is vital to institute a sustainable approach, which will thus make it possible to anchor the sustainable approach in time.

In addition, as we developed earlier, carbon monitoring must be carried out. This is currently the basis of the approach, and it must be done in the right way. We will develop further how the creation of a new tool could simplify this part of the approach.

Offset:

Following a project, it can be interesting to set up a carbon compensation policy.

Indeed, despite all the efforts made to reduce the carbon impact of a project, emissions cannot be totally eliminated.

Once the project is completed, it is therefore important to do the end carbon calculation: this will allow, initially, a comparison with the provisional carbon calculation at the beginning of the project. Then, once the end calculation has been made, a figure will remain (in kilo/tonne CO₂ eq).

This figure will therefore be used to offset the project's carbon emissions. As explained above, the purchase of a tonne of carbon for offsetting is different from one country to another. It will be a matter of getting closer to a partner who can enable the purchase of a ton of carbon, for example by offering in return the regeneration of habitats, tree planting, etc...

II. The tool of tomorrow: the link between CO₂ et €

A. European Carbon Calculator

• Quote + Carbone

Financial overview:

We have identified that the main leverage was monetary. In fact, the film's budget is what will drive the entire production.

A striking example is a passage from a UCLA study on the financing of American films.

"A typical breakdown of a \$50 million film budget would include \$5-10m^{ds} for an A-list director, \$15m^{ds} for an A-list actor and appropriate cast, and \$2.5m^{ds} for an A-list producer. The remaining \$22.5-27.5m^{ds} becomes the physical production budget, or the below-the-line part. If the budget needs to be cut, the producer will first start cutting shoot days, which cost about \$150,000 per day for actors, crew, catering, vehicles, etc. This means removing pages from the script. Another option is to remove stunt sequences."

This is a good example, very true, about the budget management.

The creation of a new carbon calculation tool should therefore absolutely take into account the financial issue. The study to be carried out must be based on the ratio between € and t/CO₂ eq. As indicated above, the creation of a carbon/€ unit could be interesting for these calculations.

First of all, the carbon calculator must therefore present a rough method, which would translate the line producer's figures into carbon figures. The first problem that will arise will be that of approximation. Indeed, we have been able to establish that a calculation of this type would lead to a fairly large margin of error.

However, this could be corrected by the emissions factors in a second step, as we will develop below.

General:

In a second phase, it would be a question of getting much more into the heart of the matter. In

order to be able to propose something coherent, the calculator should be structured as follows.

General:

Language: English and the language of the country (ex: English/Spanish, or English/Slovak)

Needs to be done online

Needs to take in sustainable actions (important to establish a scale of those, from 1 to 10 for example, and then define emission factor to rate them)

The emission sources of the calculator should then be separated as the following:

- o Material resources (costumes, make-up, special effects...)
- o Accommodation/ catering
- o Technical equipment
- o Transportation (of people and of goods): by road, train, air and cargo transport
- o Energie (electricity, natural gas and heating oil)
- o Waste (set-up waste, plastic waste, costume waste...)
- o Post-production

Which make 7 main important sections, that can then be subdivided.

Each section should therefore be subdivided into more specific sub-sections. The task would be to determine each of these sections, in order to be as precise as possible, but without being too time-consuming. The great difficulty is to come up with a tool that is both simple and fun, but at the same time coherent and professional.

The consideration of the emission factors of each of the sub-parts must be studied very rigorously. It must be possible to determine factors that are in line with current global standards and figures. It

must be possible to vary these figures over time. This would mean that each factor can change over time. Care must be taken, however, not to bias the cacluls methods. If Mr. A makes a calculation in March, and Mr. B makes a calculation in April, there must be a regularity in the taking into account of the emission factors. In order to overcome this problem, the emission factors could for example be reworked every year.

The result is that the perfect formula would be a mixture of financial consideration in the first instance, and then "carbon" consideration in the second instance.

The first part could be raising awareness, for example, carried out at the beginning of the project. Then, through monitoring throughout the project, the carbon data would be filled in. At the end, the tool could make an average, if by chance a conversion between € and t eq/CO₂ has been defined.

• Standardised tool

Used in every country and on a European scale:

The tool should be usable throughout Europe, in order to simplify data collection, awareness raising and communication on the subject.

Indeed, more and more co-productions are taking place all over Europe; in an ideal of a unified calculator, it should therefore be possible to work on a continent-wide basis.

It would make no sense to have a carbon calculator in Germany for the beginning of a project, but not in Italy for the end of it.

Each country has its own emission factors, which are defined by the relevant experts. It is absolutely necessary to take these data into account and to respect them in the calculation. An electric car

recharged in France does not consume the same energy as an electric car recharged in Poland.

In order to provide a simple tool, the user should therefore be able to choose his or her country: from there, the calculator would choose the emission factors specific to that country. The user could also, for example, choose the language of use.

The skeleton of the calculator would be the same for everyone, however, this choice of country would allow the calculation to be guided by the factors specific to the location where the project was carried out.

Mandatory for coproductions:

With this in mind, it might be interesting for the European Union, or even the various countries that have agreements between them, to agree to oblige co-productions to use this carbon calculator.

This could be a huge part of the uniformization of the carbon calculation. Every country should use it in the framework of a co-producing project. This could improve the knowledge about carbon impact in audiovisual sector, and helps smaller countries to develop their methodology of calculation.

Eureca, a pilot project:

Considering these elements, a pilot project has been launched by three of Green Screen (Film London, Promalaga, Slovak Film Commission and VAF) to work an standardised carbon tool that can work across regions and nations. "Eureca"'s goals are measure the carbon footprint of audiovisual productions, include resources to raise producers' awareness of the impact of their activities on

the environment and assist them with planning, include conversion factors for CO₂.

This will facilitate sustainable filming across different regions of Europe and provide a monitoring tool which will enable the film funds in the partner regions to implement carbon savings incentives schemes for the AVP productions to which they provide support. It will be testing in a pilot action funded by Interreg Europe.

B.Implementation

• Manufacturing

In our view, this is the most important and complicated work to achieve: collecting all the data (and the need to work closely with scientists!).

There is then a major task of collecting all this information, from a scientific point of view. Such data needs to be challenged on a regular basis, annually for example, to remain valid and up-to-date.

This will allow the production of a tool that is completely succesful and can be used by everyone, everywhere in Europe. We believe that the creation of such a tool would require multiple people, including specialist (developer, carbon expert, communication manager, etc...).

Conclusion!

We have seen through this study, that the lack of knowledge on the audiovisual impact on the planet is important. The slow movement of “sustainable production” might come from this. It is absolutely necessary that the sector starts monitoring and understanding the ecological and carbon impact that it has.

Knowing the impact, it is therefore much easier to work on its reduction. Working on something that is not quite “real”, so to speak, is difficult. But aiming the green forces on a concrete impact would be much easier for producers to get behind.

To do so, we showed that the creation of a unified standard carbon calculator would be a great start. This would be the real base in order to monitor the impact. Collecting this data would be a true asset, to convince all the stakeholders to have a real global attitude on those topics, and then use all the forces necessary to lower the ecological impact of the sector.

Working on good practices, using a good European tool, and involving all the actors of this challenge would definitely be the next big step in the sustainable production in Europe.



ANNEX

Case Study: Welcome "on set"

I. Meet up with experts

A. The Producers - Finding the budget!

• Marie Legrand (Film du Tambour - France)

What is the biggest difficulty in producing and financing a film today?

To me, the main problem we face as producers, is the decrease in the amounts granted by TV channels and distributors; on the other hand, it is also the increasing competition from public funds and subsidies. It is a funding jungle and harder every day to pilot the financial strategy.

What does "making an eco-friendly film" mean to you?

Strangely, the first thing it reminds me of is to shoot a film where the main topic is the eco-responsibility. It wouldn't be "how to make a sustainable movie" but more "how to shoot a movie about sustainability".

Would you be willing to invest more money to make your film eco-responsible?

It would depend on what kind of budget... On 1 million euro film like what we do at Les Films du Tambour, we can't even manage to close the budgets! So it would be too difficult to invest

money in anything else... So the answer is pretty much no.

What is the responsibility of the State and the EU in this ecological shift?

Totally. They must accompany the sector in this transition by financing the extra costs of eco-responsible measures until, having become a new classic model, prices fall and no longer have an impact on the global budget.

Would you agree to use monitoring/calculation/data tools to improve your knowledge and thus work on reducing your carbon impact?

Yes, of course! It would be very useful.

• Julien Tricard (Lucien Prod - France)

What is the biggest difficulty in producing and financing a film today?

The decrease in financing is coming from all sides: broadcasters, institutions, partners... all the traditional actors are decreasing their investment and producers have to be more and more creative. There is a multiplication of the numbers of producers, and they all want to sell series to tv.

What does "making an eco-friendly film" mean to you?

Reducing the impact of filming, in terms of waste production, energy consumption, water

consumption, responsible, organic and local catering, reducing transport as much as possible and making the means of transport used cleaner, ensuring that the film's financing complies with the United Nations' ODD, and finally, ensuring that the energy consumption of post-production (editing, effects, 3D, VFX, etc.) is as low as possible.

Would you be willing to invest more money to make your film eco-responsible?

Yes, as long as I don't affect my structure's ability to make a significant - and necessary for its survival - margin on production.

Yes, insofar as it allows me to comply with the rules that will inevitably be imposed on the sector. Yes, insofar as I will be able to communicate positively to my teams, clients and prospects, on the interest of the approach.

No, if it is going to become too big a cost item. No, if it affects the quality of the final product.

What is the responsibility of the State and the EU in this ecological shift?

It is necessary that rules (at the local, departmental, national and transnational levels) impose a transversal level of ecological requirements that apply to the entire sector. Institutions must wield both the stick (mandatory rules, sanctions in case of non-application) and the carrot (incentives, eco-bonuses, etc.).

Institutions also have a very important role to play in terms of structuring the sector (e.g. highlighting and promoting virtuous actors, green, organic, proximity suppliers, etc.).

Would you agree to use monitoring/calculation/data tools to improve your knowledge and thus work on reducing your carbon impact?

For sure!

• **Josefine Madsen (Jordnaer Film - Danmark)**

What is the main difficulty in producing and financing a film nowadays?

It totally depends on what kind of film project it is. If it's a commercial one the main difficulty in producing is communicating with and satisfying the customer, and then money is usually not an issue. If it's a feature film/documentary I would say just getting enough funding is the hardest part and in television, time and money are both big challenges.

What does it mean to you to "produce a sustainable film"?

To produce a sustainable film, to me, means to be responsible when acquiring, applying and destroying resources in the process -like in any other industry really. It is to be creative within our planetary boundaries and instead of wasting or polluting, making things matter and last longer.

Would you be willing to invest more money to make your film sustainable?

I would definitely be willing to invest more money into making a film sustainable if it didn't cut down on the payments of people involved.

How much responsibility does the country you are working in, and the UE, have for this ecological shift? Should they support/finance the audiovisual sector in this transition? If so, how?

So far no official eco-guidelines or sustainable standards have been made in Denmark, which makes it hard to move towards a green transition. However, a bigger political effort led by Caroline Gjerulff from Copenhagen Film Fund is happening which will hopefully lead to a change in our funding system where care for the environment will have a place. Since the audiovisual sector is already working on very tight budget I think it is of huge importance that there are financial incentives and support to get from the funding institutions - or from private sponsors.

Would you be willing to use data processing monitoring tools (mainly financial) to work on reducing the carbon impact of your project?

You cannot manage what you don't measure so I think such a tool is an (evil) necessity. That being

said I would never use it alone, and I think the mindset and the way you engage people should be through actions and communication and not numbers.

B. Line Producer Managing the budget!

• Nicolas Trabod (France, TV Series)

If your producer tells you that the project will be eco-responsible, what is your reaction?

I would ask myself and take time to understand his intentions and what he means by eco-responsible. Has he ever filmed anything like this before?

What does it mean for you to "shoot an eco-responsible film"?

For me, it's a question of controlling the impact of filming on the environment. Controlling single-use consumables, controlling the costs and impact of travel by giving preference to trains rather than planes, for example by carpooling...

Knowing how to adapt the project to its environment: if filming in a natural environment not introducing foreign species to the initial environment, knowing how to adapt the working tools.

Do you think it is possible to rework budgets to adapt to an eco-responsible ambition?

Absolutely, and I remain convinced that this is not an additional financial cost.

Your position puts you at the centre of many exchanges with stakeholders. Do you think that eco-responsibility should be the backbone of your work?

It already is and it should be at all levels.

Would you agree to use monitoring/calculation/data tools to improve your knowledge and thus

work on reducing your carbon impact?

Yes if it is properly thought out!

• Charles-Eric Carlsberg (France, advertising and corporate)

If your producer tells you that the project will be eco-responsible, what is your reaction?

Oh, well, that's a new one! I'd be surprised at first because it's unusual, but then I'd be delighted with this new direction.

What does "making an eco-responsible film" mean to you?

Limit travel and executive productions abroad when there is no artistic added value.

Do you think it is possible to rework budgets to adapt to an eco-responsible ambition?

I think that eco-responsible criteria should be quoted separately "take it or leave it" and leave it to the customer to choose this option.

The habits are too entrenched but little by little we can integrate it into the initial budget!

Your job puts you at the centre of many exchanges with stakeholders. Do you think that eco-responsibility should be the backbone of your work?

It should be, but it isn't yet. On the surface, everybody wants to be sustainable, but in practice it doesn't move much.

Would you agree to use monitoring tools (especially for financial data) to track the carbon impact and thus be better informed about reducing your carbon impact?

Oh yes, that would be great!

• Béatrice Chauvin-Ballay (France, Long Feature, TV Series)

If your producer tells you that the project will be eco-responsible, what is your reaction?

I think it's a good idea, but the first question I ask myself is the constraint it will entail - logistical and financial.

What does “making an eco-responsible film” mean to you?

It means thinking at every stage about how to limit our carbon footprint - sorting out what can be done - recovering everything that can be, etc...

Do you think it is possible to rework budgets to adapt to an eco-responsible ambition?

Currently the big problem is time and money. Our preparation times are reduced and it is almost always in urgency that we make our studies and estimates.

You must therefore have the tools to think about it systematically when you make an estimate. But accurately quantifying the impact is a complex exercise!

Your job puts you at the centre of many exchanges with stakeholders. Do you think that eco-responsibility should be the backbone of your work?

I talk about it more and more

For example, I ask the rental companies to give me the possibility to “group” the pick-ups or returns. don’t make a guy drive 20 miles just to return something that can be returned three days later. It works with some people - who are always surprised at first that I mention the carbon footprint (and the time lost!), but with others it’s impossible!

You have to put suppliers in the loop of this eco-responsibility thinking to get better results.

Would you agree to use monitoring tools (especially for financial data) to track the carbon impact and thus be better informed about reducing your carbon impact?

Why not? In any case I would be interested to know about these tools .

C. Location Manager - Adapting to new practices!

- Marc Guidetti (France, Long Feature,

all the Luc Besson’s movies)

If your producer tells you that the project will be eco-responsible, what is your reaction?

Only one reaction: can I afford it or not? Do I have the people to do it?

Is the production company never going to take care of that? The location teams are not the maids! Stage managers don’t have to take care of that. Someone has to do it, someone trained.

If the stage manager does it, no training, no time, it doesn’t work. It’s a new job.

What does it mean to you to “make an eco-friendly film”?

To be eco-friendly? It’s awesome, it’s life-saving, and it’s in the sense of the story. Okay, but what is it? Explain to me, it’s not my job. It’s another job. There’s no point in me going undercover on a job I don’t know about.

It’s going to get restrictive at some point: with local government, for example. The temptations don’t come up. As long as we don’t have to, nothing’s going to happen. At that point, there’s going to be a period, where they cheat, until it becomes the norm.

Do you think it’s possible to rework budgets to adapt to an eco-responsible ambition?

Of course, there has to be a budget for that. The professionals must be encouraged to do that. We need the carrot and the stick. A producer must provide a budget line BUT won’t do it if they are not encouraged. In France we always try to get around it, to change.

So step 1 is the incentive and step 2 is the penalty. Example: In Belgium, if you go green, you can have 100% of the fund asked. If not, you don’t get the totality of the sum. But in France it won’t work! 1% of the budget for green.

5 million - 1% Green: is it possible? Complicated to answer.

It’s really just a pittance 1%! It would be a serious job to get out of that amount of money for that.

Yes we are going to create new jobs : so it will cost money, so the producers will lose money, so they don't want to !

What are the complexities you may encounter on a daily basis on an eco-responsible project?

Decisions in high places and no concrete accompaniment for everyday.

Being green okay, with common sense, but with injunctions coming up, and obligations, you have to be helped.

It can't come from the top without help.

Would you agree to use monitoring/calculation/ data tools to improve your knowledge and thus work on reducing your carbon impact?

I would, but I'm not the best contact. The best is the production manager and his administration (provided with admin daily).

I am willing to give my figures, no problem. But be careful with the limit: time and energy. I can't take too much time for this kind of data to give. We'll get there for sure but be careful it's not the job of the management. It's also out of the question that my team spends time doing that: ex the assistant who notes the kilometers !!! No time to do that!

• Alexis Giraudeau (France, Long Feature, TV Series, L'Effondrement)

What does "making an eco-friendly film" mean to you?

Filming an eco-responsible film means rethinking all your work and practices so that they have the least possible impact on the environment. It also means putting meaning back into one's daily work and learning to communicate between departments to look in the same direction.

What are the complexities that you may encounter on a daily basis on an eco-responsible project?

Rethinking your work takes time. But in recent years, the contraction of preparation times

(and often also filming times) is already a major problem in our professions. It will be essential to put the preparation time issue on the table. By going further, ecology at work can be a vector of transformation and modernisation of our professions that goes well beyond environmental preservation. Let's take advantage of this ecological impulse to rethink everything.

New ways of filming means new uses and with these new uses, we have to confront new services. As these new services sometimes do not exist yet, we can find ourselves doing DIY, which is not really compatible with the professional world. We will therefore have to encourage our service providers to take the plunge by exchanging ideas with them and by increasing aid for development and innovation.

Let us also be aware that some of these new services could represent an additional blow to production. They are sometimes even new lines to be included in the quotations. This will have to be accepted by production.

Sometimes, the technicians are reluctant. By asking them to question their practices, they have the impression that their skills and professionalism are being called into question. So there's a lot of education to be done, which again requires extra time or the creation of a dedicated position. Finally, I think that the technicians do not want to become green washers by helping companies to buy a green deposit solely for communication purposes. Production will therefore have to show total commitment to this new approach.

Do you think that local authorities/departments/ regions should support you in this approach?

Obviously it is a collective fight to be led, from the film crews and the individual responsibility of the employee to the production. All the parties involved are therefore concerned, whether they are service providers or of course public institutions at all levels.

The label or certification of eco-responsible filming and service providers seems to me to be a decisive step (and the controls that go with it).

Including the financial support in the criteria for granting aid seems to me to be indispensable. With regard to transport, the installation of electric recharging stations in all municipalities or the generalisation of gas-powered lorries also seems to me to be indispensable in the short term. The city councils must facilitate access to sorting. All communes should have freely accessible compost bins.

To give a concrete example, where the public authorities must intervene, we have great difficulty in dispensing with filming generators because it takes 4 to 5 weeks to get a temporary connection to a set (and often with great difficulty). This delay is often incompatible with the realities of our profession.

Would you agree to use monitoring/calculation/ data tools to improve your knowledge and thus work on reducing your carbon impact?

Yes, of course, if this tool is not intrusive and is designed and thought out specifically for our business and its realities. And I insist, all this again takes up extra time that should not be charged to the employee.

• Benoit Loncan (France, Long Features, TV Series, AFR)

If your producer tells you that the project will be eco-responsible, what is your reaction?

Finally! It is quite obvious that I agree with his decision and ready to present him solutions to set up a viable and efficient system by contacting eco-management companies like Secoya, that we have in France.

What does "making an eco-friendly film" mean to you?

Sustainability = Healthier world Limiting or even cancelling plastic packaging for food, consuming in an intelligent way (no food waste, no over-consumption (as far as possible)), recycling, sorting, limiting our impact on nature...

Do you think it is possible to rework budgets to adapt to an eco-responsible ambition?

I am surprised that this is not already the case, given the budget allocated to things that are so unhelpful but are still there by convention. For example, the paper service sheets!

What are the complexities you may encounter on a daily basis on an eco-responsible project?

Electric vehicle that are not very practical in the conditions of a filming, poor management of food stocks, management of waste bins for selective sorting (not practical to transport 10 different bins on each set).

Would you agree to use monitoring/calculation/ data tools to improve your knowledge and thus work on reducing your carbon impact?

I would love to!

• Valentin Françoise (France, Corporate, Long Feature)

What is the biggest difficulty in producing and financing a film today?

Competitiveness during the financing phases through selective aid.

What does "making an eco-friendly film" mean to you?

To produce a project with the least possible impact on the environment in any form of footprint.

Would you be willing to invest more money to make your film eco-responsible?

Yes, definitely! It is a very important topic to me.

What is the responsibility of the State and the EU in this ecological shift?

I believe it is enormous: in my opinion, real change can only be made through political directives.

Would you agree to use monitoring/calculation/ data tools to improve your knowledge and thus work on reducing your carbon impact?

Yes! Totally!

D. The Carbon Specialists

• Jules Castro (Pur Projet)

General: What is the need today to integrate the concept of “carbon calculation” into the audiovisual industry? Beyond the awareness of the need to produce in a more responsible way, why is it important to take into account the carbon impact of productions?

Many companies are entering the “race” for voluntary carbon neutrality, even if in reality it is very difficult to announce that a company is carbon-neutral on its three scopes. As if it were a must be ethical and market-ing.

The amount of carbon released by an activity is proportional to the amount of energy used for this activity (energy, transport, suppliers...).

Everything, absolutely everything, requires energy, even reading a book in a hammock burns glucose and your book is made like your hammock, thanks to energivorous processes and machines!

The greener the energy is, the less carbon it emits (on the paper at least, and it depends on the country).

unfortunately, you must understand that carbon is not the only cause for concern: there is plastic, biodiversity, soil artificialisation, destruction of natural habitats... in short, it is not only a matter of CO₂!

So I would like to tell you that knowing its CO₂ impact as an audiovisual company is essential but not sufficient; we need to know its global impact but carbon remains a reliable indicator that can be understood by almost everyone. On the contrary, nobody knows anything about biodiversity!

Innovation: Is there today a range of solutions and more specifically innovations that would

allow producers to reduce the carbon impact of their productions?

I couldn't say!

Financing: In your opinion, how can we encourage productions to work on reducing their carbon footprint? Does it necessarily have to be through a financial incentive (malus or bonus)? Carbon reduction must lead to a reduction in costs and move towards greater sobriety. On the other hand, according to Gildas Bonnel (president of French communication agency Sidièse), being more responsible is a survival issue, because companies that are not responsible will not win any more contracts, nor customers...

What do you think of “carbon neutrality”, or “contribution to a carbon neutrality”? Are these concepts that should be integrated into every industry, including the audiovisual industry? Delicate subject...! I myself asked for clear instructions on the subject at Pur Projet!

Anything to say about carbon impact and carbon calculation?

Integrating carbon offsetting into its activities is the minimum, choosing qualitative projects is important and financing carbon sinks is a necessity.

Now it is not the most important, it is the reduction, sobriety and change of mentality that will make the sector evolve, not a trendy offsetting certificate !



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Green Screen

Interreg Europe

Green Screen works across eight EU regions to reduce the carbon footprint of the film and TV industries, which are a successful driver for growth across the European creative industries economy.

www.interregeurope.eu/greenscreen

An interregional cooperation project for improving low-carbon economy policies.

Project Partners

Film London (UK)

- Flanders Audiovisual Fund (BE)
- Municipal Company of Initiatives and Activities of Málaga S.A. - Promálaga (ES)
- Paris Region Entreprises (FR)
- Rzeszow Regional Development Agency (PL)
- Bucharest-Ilfov Regional Development Agency (RO)
- Municipality of Ystad (SE)
- Slovak Film Commission (SK)

Photo: Green Screen - Image © Adam Johnson



European Union
European Regional
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