

Reducing the carbon impact of digital advertising

WHITE PAPER

Summary

Introduction

Digital Advertising

D3 Raising Awareness 04 Complexities + Opportunities

> How to Effectively Reduce Emissions in Advertising

Conclusion



Introduction

Introduction

The last 8 years have been the hottest on record according to the World Meteorological Organization (WMO). Global warming is here. Since the 1980s, each decade has been warmer than the previous one due to record levels of Greenhouse Gas (GHG) which traps heat in the atmosphere.

Human activity, including the exponential increase in the use of devices and digital services, has contributed significantly, despite the illusion of 'clean' and 'dematerialised' digitisation. Since the early 2000s, digital advertising has seen rapid growth, and is now the largest medium in terms of investment rising from \$10B to over \$600B in the last 20 years according to eMarketer. Many challenges arose during this period of growth, and the industry has always shown itself to be resilient and innovative in positively responding to each of these challenges.

Environmental sustainability is undoubtedly the industry's next big challenge, and one that is increasing with considerations including the use of abiotic resources such as metals, quantity of water, soil toxicity, and above all global warming.



84% of global consumers said they would be more likely to buy from

a company which practices sustainable media advertising.

Source: The Rise of Sustainable Media —Dentsu/Microsoft 2021 Introduction

01 -

03 +

04 +

IMPACT+

56 This is why we developed our white paper— Reducing the carbon impact of digital advertising.

Introduction

The technical complexities of advertising make it difficult to understand the drivers of pollution, and therefore reduces the ability of players to both measure and reduce GHG emissions. This is why we developed our white paper— "Reducing the carbon impact of digital advertising."

There is an urgent need to share knowledge and best practices, to support everyone in the industry on the path to a more sustainable advertising ecosystem.

Disclaimer

Beyond the guidance on carbon emissions contained in this white paper, we must not ignore the other environmental impacts of digital products and services, these include; the depletion of non-renewable resources (precious metals), the consumption of fresh water (by the processes of mining), and pollution (water, land, etc). - 01 Introduction

02 +

03 +

04 +

05 +

These impacts are significant and are mainly due to the manufacturing of hardware (devices, servers, etc).

While the focus of this white paper is on the climate, all of the recommendations listed look at the consequential impact of advertising distribution and therefore towards the mitigation of all the environmental impacts of this.





The expression 'global warming' refers to a long-term change in climate that has been occurring for several decades. It is caused by a rapid increase in Greenhouse Gas (GHG) in the earth's atmosphere, due to excessive emissions generated by human activities.

IMPACT+

These gases retain too much solar energy which leads to the heating of lands and oceans.

This has many visible consequences: rising sea levels, storms, changing ocean currents, precipitation, melting ice and glaciers, an increase in the frequency and intensity of extreme weather events...

These impacts are expected to continue and intensify in the future, affecting infrastructure, forests, agriculture and global food supply chains, freshwater supplies, coasts and marine systems.

According to experts, this could have other societal impacts including, difficulty in maintaining peace in many territories, mass migration and significant consequences on human health, and even on the very existence of species.

Radical changes to limit global warming

In order to limit global warming and its catastrophic consequences, we must radically reduce Greenhouse Gas (GHG) emissions.

For this, countries have aligned to set targets through international agreements. The Paris agreement, signed in 2015 sought to limit global warming to 1.5°C since 1850. This involves reducing global emissions by 55% by 2030, in addition to all offsetting and sequential actions that could be implemented. This would be equivalent to repeating the reduction of annual emissions that happened in 2020 due to the COVID-19 crisis. To achieve such drastic reductions, all sectors must commit to the fight against GHG emissions.



. . .

WHITEPAPER 7

Unfortunately, even with the current commitment from countries signed up to the Paris agreement, and other global efforts, we are not on track to hit these targets.

At present, despite a short-lived decline in GHG emissions caused by the COVID-19 pandemic, the world continues to head for a temperature increase of more than 3°C this century, the consequences of which will prove to be catastrophic.

Source: Global Energy Review: CO₂ Emissions in 2020–IAE



IMPACT+

The global digital industry emits 4 times more GHG than the United Kingdom

of global Greenhouse Gas emissions will be generated by digital technology in 2025.

As much as by global car traffic.

Source: Global Energy Review: CO₂ Emissions in 2020–IAE Share of global digital GHG emissions compared to that of certain countries



Global digital Greenhouse Gas (GHG) emissions come from the manufacturing of user devices, and the production of electricity used by them:

+ The manufacturing of user devices accounts for 40% of these—the extractions of ores and their transformation into electronic components also have significant impacts on pollution and resource depletion.

 The production of the electrical energy consumed by the servers that host the content and applications (as well as data centres that physically house them), by the network, which allows the transport of data and by the user's device represents 56% of emissions.

The remaining 4% comes from the manufacturing of equipment for network and data centres.

01 +

02 -

Digital advertising globally emits as much Greenhouse Gas (GHG) as:



60m round trips London–New Yol

round trips London–New York by plane. The total emissions of a country like Ireland (23rd global transmitter).

2019 Digital Greenhouse Gas emissions report

GHG report	Manufacturing	Usage	TOTAL
Users	40%	26%	66%
Networks	3%	16%	19%
Data Centres	1%	14%	15%
+ + + •	44%	56%	+ + + +

Source: Global Digital Environmental Footprint (GreenIT-2019)

When using digital services, advertising is everywhere from search engine results, to viewing media articles, before or after watching a video.

Beyond what is transmitted to the end user's device, a large number of technologies (targeting, RTB, tracking, verification, impact studies etc) are implemented for the distribution of an ad, involving large amounts of data transmitted between the digital servers.

Sources: Environmental impact assessment of online advertising–M.Pärssinena, M.Kotilab, R.Cuevasc, A.Phansalkard, J.Mannere, 2018 OECD–Greenhouse gas emissions Digital pollution: manifesto for advertising sobriety–Théophine Mégali

Note: Data from 2016-since then, technologies have improved in energy efficiency but global advertising budget spend has doubled!

02 -Climate Change and Digital Advertising

03 +

01 +



The link between the amount of data transmitted and the use of primary energy by the service is proven. The greater the amount of data, the more energy the service consumes, and the greater the carbon emissions.

It is therefore easy to understand that digital advertising contributes significantly to the problem of alobal warming, even if the quantification of emissions still remains an industry challenge.

The double-digit growth of digital advertising, barely stopped by the COVID-19 pandemic, will amplify the problem very quickly in the years to come if nothing is done.



IMPACT+

01 +

02 -

03 +

04 +



03

Raising Awareness

Raising Awareness

While the Greenhouse Gas emissions of digital advertising were not really considered before 2020, since then awareness amongst consumers, businesses and industry players has grown considerably. Studies and surveys have been the subject of both trade and international news coverage, and sustainability has increasingly been a core topic at industry conferences and events.

2022 was the year of deeper general awareness for advertisers, publishers, and broadcasters who sought to equip themselves with better knowledge, as well as the tools to enable them to measure and reduce their impact.

Now in 2023 we are seeing that the vast majority of digital ad companies and the advertising ecosystem as a whole are beginning to act more effectively to address the problem.

66 Consumers, who are already well informed, expect the industry to evolve

Source: The Rise of Sustainable Media–Dentsu/Microsoft 2021

of global consumers said they would be more likely to buy from a company which practices sustainable media

advertising.*

61%

of people view

impact on the

experiencing an ad

planet. This jumps

to 81% of millennial

respondents in APAC.

*However, there is a generational gap:

They are 74% aged 15-24 compared with 52% aged 50-64

as having a negative

o nsumers uld be buy bany 7 72

of people globally says that in five years' time, they only want to be spending money with brands who practice green and sustainable advertising. - 03 Raising Awareness

04 +

01 +

02 +

Raising Awareness

66

Digital advertising professionals want to act, do more to educate and talk about sustainability

Sustainability is one of the Top 3 Challenges for Digital Advertising:

 Cookieless Targeting (35%)
Measurement (27%)
Sustainability (26%) **33%** of professionals from digital advertising cite the lack of education and industry standards as key challenges to overcome. of companies do not currently measure GHG emissions produced by the delivery of digital ads.

Source: IAB Europe's State of Readiness—Sustainability in Digital Advertising Report 2023 Advertising professionals including Advertisers, Agencies, Regulations and technology providers

Industry alignment and action

Sustainability is a key priority for the whole digital advertising ecosystem.

In order to drive the delivery of digital ads to net zero, industry alignment is required and the time to act is now.

We can do this by measuring the impact of digital advertising on GHG emissions, taking consistent actions to minimise these, creating consistent standards, and by providing tools and solutions.

Raising Awareness

IMPACT+



Complexities and Opportunities

Complexities and Opportunities

While the digital advertising sector has not yet made changes at scale, many factors make it possible to realise a change more radical and rapid than for other industries.

Due to the dynamism of the advertising industry, the culture of digital innovation, and the advanced use of technology, the industry is better placed than most to develop and deploy products and services to support the measurement and reduction of emissions. However, the complexity of the software and hardware infrastructures across the supply chain, and the multiplicity of actors involved in it, leads to difficulties in understanding the volumes of data and campaigns, and measuring the effectiveness of the actions implemented.

The diversity of services, offers, and their technological differences makes it impossible to use average emission factors and apply these to all campaigns in all contexts.

However, once a sufficiently granular measure is implemented, two actions can be highly effective: firstly the selection of media placements including inventory, targeting, timing, and format, and the creative itself.

A measurement of emissions made more challenging by the complexity of the ecosystem

Dozens of technologies are used in the delivery of advertising.

Some are required for the delivery of the ad itself. However, on top of these can be verification systems, or additional targeting and synchronisation systems.

The use of these depends on the goals of each campaign, the way it is delivered (direct sales, programmatic) or the advertiser's quality standards.

In any given supply chain, there may be multiple vendors offering similar technology, each with different specifications, making measurement even more complex. For example, at the end of the supply chain, publishers use different video players, each having different energy consumption and therefore environmental performance.

As a result, the distribution of the same ad using different systems and providers induces extreme variables in energy consumption and Greenhouse Gas emissions.

Key players and technologies involved in the advertising distribution.



Source: Luma Partners LLC-2021

04 -Complexities and Opportunities

01 +

02 +

03 +

Complexities and Opportunities

Contexts and delivery technologies have very different impacts

The use of average quantity of emissions for an advertisement delivered by format, by actor or by country is therefore not sufficient, and the use of granular measurement tools is required for an accurate quantification.

Sources: Values measured by IMPACT+ in 2022–energy consumed and emissions due to the distribution of advertising creatives

With equal duration of use—The shift project "Climate: the unsustainable use of online video": <u>https://theshiftproject.</u> <u>org/article/climat-insoutenable-usagevideo/</u>-and "1 Byte model"

For an equal amount of transferred data— Environmental assessment of digital equipment and infrastructures in France (2nd section), ADEME-ARCEP, 2022 (p.71)



Wi-Fi networks consume

less energy than cellular connections.

A smartphone consumes

less energy than

Connected TV.

04 – Complexities and Opportunities

05 +

01 +

02 +

Complexities and Opportunities

Simple actions can lead to a drastic reduction

Whilst the complexities of the technology makes measurement challenging, it also offers the sector a unique opportunity. Digital advertising has many tools and processes that allow for the implementation of easy and effective actions to reduce carbon emissions, without negatively impacting media performance. As we will see in the next chapter for example, we can leverage adtech platforms to configure media plans in a precise way to select the least energy-consuming contexts, or creative tools that offer advanced features that enable eco-design to reduce the weight of creatives without impacting quality.

-60%

the possible reduction of emissions

through the implementation of

selection of the best contexts and the eco-design of advertising

creative and the media plan).*

*Reduction of emissions due to the electricity consumption of the campaign

reduction actions (including the

The main challenge is therefore to build a greater awareness of the practices to adapt and optimise each media plan, and to ensure that everyone in the supply chain takes actions aligned with their own unique goals and objectives.

-80%

emissions induced by the

same advertising campaign by modifying its delivery period.

(Simulated carbon emissions

for best 2 week period vs worst 2 week period in France).

the possible reduction of carbon

02 + 03 +

04 -Complexities and Opportunities

05 +



05

How to Effectively Reduce Emissions in Advertising

As we have seen previously, the subject of carbon emissions from advertising is complex to grasp.

But like other industry issues, such as fraudulent ads or non-viewable ads, increased awareness needs to be followed by proactive actions.

The mobilisation of all players (advertisers, agencies, broadcasters, publishers, ad tech) around the same goals is required to move towards more responsible advertising and in turn gain more confidence from the end consumer.

The reduction of the industry's overall emissions beyond offsetting is the purpose of the process, and everyone can contribute by activating different levers in line with their business objectives. Here is an overview of the possibilities.

01 Adopt environmental performance indicators

Two types of indicators are required for the effective management of reduction actions

- + The total volume of carbon emissions which makes it possible to manage the reduction in absolute value over time, year after year and therefore achieve real environmental progress.
- + A unit value making it possible to compare campaigns, activations, actors or contexts with each other, independent of the volume of advertising. For example, the Wh/1000\$ (energy consumed per \$1000 spent) indicator makes it easy to compare the energy efficiency of campaigns, regardless of their type (video, display, search)...

Rapid and urgent system-wide transformation



The window is closing! The world is not on track to reach the Paris Agreement goals and global temperatures could reach 2.8°C by the end of the century.

56 The world must cut emissions by 45% to avoid global catastrophe and solutions to transform exist but the time for collective action is now.

Source: UN Environment Programme–Emissions Gap Report 2022

05 – How to Effectively Reduce Emissions in Advertising

Three environmental indicators to monitor the impact on global warming:



Electricity Consumed (Wh, kWh...)

Quantity of electrical energy required for user devices, hosting servers and network infrastructure used in the transmission of an advertisement.



Carbon Intensity of Electricity Production (gCO₂eq/kWh)

Volume of Greenhouse Gas (GHG) emissions due to the production of one kWh of electricity. It varies a lot during the year and depends on the electricity power plan mix, which results in a variation of emissions for the same campaign according to its delivery period.

Carbon Emissions (gCO₂eq kgCO₂eq...)

By combining electricity consumed and carbon intensity, we obtain a volume of carbon emissions. Real emissions are in fact composed of different Greenhouse gases, which are brought together to the equivalent volume of GHG in potential global warming, as well as emissions due to the lifecycle of the user device. After a few days of measurement, each player in the value chain can then adjust their media plan, their targeting or even the delivery timing and volumes according to the unit performances observed.

By combining electricity consumed and carbon intensity as well as emissions due to the life cycle of the user devices, servers and routers (production, transport, etc), we obtain measurable data and environmental impacts. 04 + 05 -

01 +

02 +

03 +

How to Effectively Reduce Emissions in Advertising

5 tips for setting up a carbon impact measurement tool

- Use measurement solutions that are granular enough to be actionable (e.g. in terms of media devices, equipment or networks used).
- 2. Choose a scalable tool, which is automatically updated according to state of the art research on the impact of digital.
- 3. Monitor the impact of your reduction action during the campaign.
- 4. Benchmark your environmental performance to that of other players to assess your effectiveness.
- 5. Ask your measurement partner how they can support you in your reduction strategies.

02 Eco-design your creatives and your site

Eco-design is the integration of environmental impacts over the entire life cycle of a service (its design, maintenance, usage and end of life).

In the case of digital advertising, the work of the creative teams who will produce the graphic elements and the click-through website is key. The implementation of practices makes it possible to considerably reduce the quantities of energy required for their distribution. Two simple business metrics can help minimize content's impact:



Weight of content

The amount of data to be loaded is a good indicator of the effort required to transport the content from the servers that host it to the device that will display it. The heavier the content, the greater the amount of electricity consumed and therefore the carbon emissions will be significant.

Number of items to load

The more elements an advertising content or a site has to load, the greater the number of HTTP requests (the number of exchanges between the device and the servers), and the higher the server load. Server resource requirements to serve the same amount of data are higher, leading to increased environmental impact.

05 -How to Effectively Reduce Emissions in Advertising

IMPACT+

WHITEPAPER 22

Quick and easy checklist for creative teams

Actions to select according to the business objectives of your campaign

Reduce the weight of images and display formats

- □ Have you limited the images and graphic elements to what is strictly necessary?
- Are the visuals at a reasonable size for the targeted media and devices?
- □ Have they been compressed?
- Did you use illustrations or glyphs instead of photos when possible?
- Did you choose the correct file format for each element (jpeg for photos, svg or png for illustrations, glyphs or CSS for icons)?

Reduce the weights of videos

- Have you limited your use of videos and their duration to what is strictly necessary?
- ☐ Have you correctly compressed the video and reduced its size according to the context of use? (mobile vs desktop?)
- Did you compress the soundtrack? Can you switch it to mono instead of stereo?
- □ Is sound necessary? Can it be replaced by subtitles?

Limit the number of loaded items

- Are the animations limited to what is strictly necessary?
- Did you use standard fonts when possible?
- □ Did you generate CSS sprites?

Others

- Are your CSS and JavaScript files minimized?
- □ Have you validated your JavaScript code?

01 +

02 +

05 – How to Effectively Reduce Emissions in Advertising



Don't forget the post-click landing page!

- + For some campaigns, the impact of the landing page can represent up to 100 times that of the advertising message itself!
- + According to HTTPArchive.org, the average size of a web page in 2022 was 3 times higher than in 2012.
- + To optimize the carbon footprint of your website, you can analyse it with <u>https://www.ecoindex.fr</u> which allows you to quickly identify what can be improved quickly.
- + You can also consult <u>https://eco-conception.</u> <u>designersethiques.org/guide/en</u>. This guide presents design best practices to help create digital services with a minimal environmental footprint.

03 Think about your ad-tech stack

The more technology services involved in ad serving, the more resources it uses and the more carbon it emits

The programmatic distribution of advertising has notably led to an explosion in the number of technical intermediaries who multiply technical operations in a few thousandths of a second. The data transmitted for the implementation of an advertising impression has multiplied in recent years: The increased use of video, the integration of tracking, the multiplication of measurement, and even the implementation of header-bidding in search of the best bid have contributed to this increase.

05 -How to Effectively Reduce Emissions in Advertising

IMPACT+

When designing your media plan, consider whether or not to use an additional service: Is this verification system really necessary on all impressions of my campaign?

Will I use all the data I collect? Is the use of programmatic RTB necessary or could I obtain the same result via direct sales?

For publishers, the use of good digital eco-design practices must be encouraged.

Every feature or data collection should be questioned: Is it necessary? Has it been designed to use the least amount of resources? Has the data transmission chain been optimised to reduce the data transmitted?

For your technical teams, training exists to build skills on these subjects. The choice of your host and in particular its type of power supply, its location and its energy performance is also key in reducing emissions.

Limit waste when buying or selling programmatically.

What are the features of my tech stack aimed at reducing traffic between actors? SPO, ability to filter unnecessary or duplicate bid request traffic, statistics on the number of intermediaries? Can I limit the number of intermediaries (resellers, costs, added value...)? Are my deals up to date and all used? Is their win/impression rate normal?



01 +

02 +

03 +

04 +

05 -

Reduce energy loss due These efforts, which are often Finally, avoid Made for Advertising Assuming budget remains to advertising waste still limited to paid-for-display sites and content, and look out for same, the number of impr

How to Effectively Reduce Emissions in Advertising

An advertisement that does not reach its target induces a dead energy loss and therefore unnecessary carbon emissions. Under these conditions, an effective lever for the environment is to raise the quality standards of advertising distribution by continuing the industry's efforts to optimise the viewability of advertisements and lower the rate of fraudulent impressions.

These efforts, which are often still limited to paid-for-display (CPM) campaigns to improve campaign effectiveness, need to be applied to other buying models. (CPC, CPA, CPI...).

Quality beats quantity

Each advertising buyer can review their purchasing methods to focus on KPIs that drive higher conversation rather than the higher reach and volumes, and avoid piloting at low CPM, which involves multiplying the number of impressions which leads to significant energy waste in our industry.

Ask your media partners about frequency capping and build this into your objectives.

Are three daily exposures more effective than two of better quality? Finally, avoid Made for Advertising sites and content, and look out for placements with ad clutter and the attention paid to your ad.

05 Measure the impact of your action against the counterproductive effects

The same action can have a positive or negative impact depending on the nature and parameters of the campaign. An effective action in one context is not necessarily effective in another.

For example, we can, by measuring a given campaign, realise that an interactive video represents a large amount of a campaign's energy consumption and we can choose to transfer the budget to another format. But choosing a less energy-intensive format for advertising (for example, banner ad) can lead to a drop in the cost. Assuming budget remains the same, the number of impressions distributed will then be higher and the drop in emissions due to better energy efficiency could then be erased by this increase in volume. Depending on the format chosen or the price list applied, this change can also have a contrary and virtuous effect.

To avoid an increase in emissions from a campaign, it is recommended to measure each campaign, and to check each implementation of optimisation and the impact on environmental and media performance.

environmental ance.

* * * * * * * *

05 -How to Effectively Reduce Emissions in Advertising

01 +

02 +

03 +

We can also use A/B testing to compare the media and environmental performance of each device or over several versions of the creatives.

Beware of the rebound effects (see opposite): The improved return on investment due to certain environmental optimisations could lead to an overall increase in the volumes distributed. It is therefore important to measure all campaigns from year to year to measure and reduce the total emissions of your communications. Do you know the Jevons paradox or rebound effect?

Named after the British economist **William Stanley Jevons**, this paradox is as follows:



Therefore, the progress brought by technology is often offset,

or even cancelled out by the change in behaviour induced.

For example: the improvement in the energy performance of cars in recent decades has not reduced the demand for fuel. Motorists have done more miles (because travel has become cheaper), more cars have been sold and as a result, the impact on the GHG emissions has not diminished.

There are many rebound effects with digital technologies, and they put a halt on the ecological progress. It is therefore important that everyone knows how to measure them and take them into account in their business strategies.



01 +

04 +

05 -How to Effectively Reduce Emissions in Advertising

What are the impacts for the media performance of my campaigns?

When the subject of carbon footprint reduction is addressed by digital advertising players, one of the first concerns expressed is the possible negative impact that the actions implemented could have on the media performance of campaigns.

On the contrary, actions to reduce the carbon footprint often have a neutral or even a positive effect on the KPIs measured. For example, the eco-design work on creatives allows advertising formats to load faster, and therefore improve viewability or completion rates. In addition, the use of sufficiently granular measurement and management tools make it possible to consider media performance and environmental performance in parallel according to multiple dimensions, and to take this analysis into account to choose which reduction actions will be most suitable for the campaign goals.

Finally, some players who have compared devices optimised to reduce carbon emissions and the same non-optimised devices also report stable performance on advanced KPIs such as improved message recall or impact on brand awareness.

Become an ambassador for the more responsible advertising

Reducing the emissions of any given player or process is a positive start, but in order to deliver real change it must be actioned across the entire supply chain. There remains a lack of knowledge and understanding of digital advertising's carbon footprint, and informed participants can help in raising awareness in the sector.

Here are three additional actions that can increase your impact and help to drive the snowball effect necessary for transformation in the industry.

How to Effectively Reduce Emissions in Advertising

Three additional actions



Ask your partners and service providers how they act to reduce the emissions of their products. Increase your impact by communicating your efforts and results to the industry and the general public. Share this white paper with your contacts.

WHITEPAPER 28

Conclusion

Global warming is all of our problem

The environmental challenges of the coming decade are such that every industry has a responsibility to take action to fully understand it's Greenhouse Gas emissions, and look at what can be done to reduce these. Digital advertising emits an enormous amount of GHG emissions, and while consumers have been clear on their expectations, and the participants increasingly understand the need to act, the industry is still lagging behind many others, and without radical action, the problem will increase with growing budgets and an increasingly complex supply chain.

The fight against carbon emissions is the concern of all the links in the chain. From the advertiser responsible for the impact of its investments, to the agencies which have many optimisation levers, to the broadcasters and publishers, and finally the adtech partners in between. The solutions which enable the systematic measurement and implementation of reduction actions are the keystones of their fight, but their adoption requires a good understanding of the issues, and close collaboration between buyers and sellers.

Those who are taking action today are driving meaningful results in the fight against climate change, as their consumers expect them to do. Our industry is better placed than most to be able to meet this challenge at scale, and while the best time to get started on this journey has passed, for those who are yet to start, the next best time to get started is today.



Thanks to our reviewers/contributors:

- + Véronique Fima
- + Elie Kanaan
- + Leksi, digital agency serving the general interest
- + Julia Meyer (ADEME)
- + Yannig Roth
- + Adeline Gabay

+ + + + + + + + + + + + + + + + + +

About IMPACT+

IMPACT+ is an award-winning sustaintech solution enabling digital advertising players (brands, agencies, publishers, adtech and adnetworks) to evaluate and reduce their environmental impact.

IMPACT+ builds new performance indicators and tools to help this ecosystem to use GHG emissions and electricity consumption to inform their digital advertising strategy.





<u>contact@impact-plus.fr</u>



www.impact-plus.fr

+ + + + + + + + + + + + + + + + + +