



## **Response to Arcom's public consultation**



*The future of DTT and of the television medium*

### **Submission to Arcom**

*French regulatory authority for audiovisual and digital communication*

Contribution from

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## Introduction

**Visionetics International has operated for more than 20 years as an industrial player in the distribution and redistribution of the audiovisual signal, at head-ends, over cable networks and over IP.** Our activity covers encoding, transport, IP delivery, DVB-T and DVB-T2 modulation, the monitoring of linear services, as well as IPTV/OTT architectures for audiovisual and radio content.

Visionetics International notably relies on Mediaproxy, a world-leading solution for monitoring and verifying the compliance of audiovisual and radio signals, from the output of the final gallery through to the reception of broadcast programmes.

We wish to state our positioning clearly at the outset: **Visionetics International is neither a service editor nor a multiplex operator.** Our perspective is that of a supplier of broadcasting technologies and equipment, in direct contact with terrestrial, cable and IP networks, as well as with the entire signal reception and distribution chain. Our contribution therefore focuses on the technical, industrial, economic and sovereignty issues associated with the evolution of the television medium.

Visionetics International is a member of the FAVN (Forum Audiovisuel Numérique) and of the DVB Project, the international reference body for the development of digital television standards. Its managing director, Mr Eric Hautefeuille, has been active in the DVB digital broadcasting ecosystem since 1994, with the first MPEG-2 DVB bouquet over DVB-S for Canal+ /CanalSatellite.

Through numerous projects carried out in France and internationally, Visionetics International has developed recognised expertise in DVB and IP technologies. The company has notably supplied several thousand DVB-T and DVB-T2 modulators for cable networks, operators and broadcasting infrastructures, both in mainland France and overseas.

As part of its commitment within the FAVN, Visionetics International currently hosts the DVB-I pilot project in Malakoff. This experiment aims to demonstrate the relevance of modernising the television ecosystem towards a hybrid model combining broadcast distribution and IP delivery. On modern television sets (Smart TVs), such an approach makes it possible to improve the visibility of Services of General Interest (GIS), to strengthen access to their content, and to simplify the user experience through the seamless integration of services delivered over terrestrial, satellite and broadband IP, alongside non-linear content.

**A central point of attention in our contribution.** DTT is not merely a broadcasting network: it is the technical foundation of a complete reception and distribution industry. Tens of thousands of sites — residential buildings, social housing, care homes, healthcare facilities, hotels, campsites, public-access establishments — today receive and redistribute television services from the terrestrial signal, via collective installations. Switching off DTT would therefore not amount to a simple shift to the Internet: it would entail the disappearance of an industrial ecosystem and of a whole set of trades (aerial installers, integrators, maintenance technicians), while placing a considerable load and dependency on IP networks alone.

We consider that television remains an essential medium for universal access to information, culture, major unifying events and pluralism. However, faced with changing usages and technologies, its historical model must evolve towards a hybrid architecture combining terrestrial, satellite, managed-IP and OTT networks in a complementary manner, in order to reconcile resilience, quality of service, cost control, energy sobriety and innovation.

## Part 1 – A television landscape undergoing profound change

### Question 1: Do you have any comments on this overview of the audiovisual landscape and the transformations it is undergoing?

We broadly share the observations made by Arcom. The audiovisual sector is undergoing a profound transformation driven by:

- the gradual migration towards IP and OTT usages;
- the fragmentation of consumption patterns;
- the rising power of international platforms;
- the evolution of connected devices;
- the increasing virtualisation of audiovisual infrastructures.

From a technical standpoint, this transformation profoundly alters content distribution and transport architectures. Legacy broadcast infrastructures are evolving towards hybrid environments combining DTT, satellite, managed-IP networks, OTT, CDNs, cloud infrastructures and real-time software-based monitoring.

This evolution raises several major issues: infrastructure resilience, cybersecurity, control of distribution costs, quality of service and technological sovereignty. It particularly reinforces the need for monitoring and compliance-verification tools able to cover broadcast and broadband flows alike. Mediaproxy, the monitoring solution on which Visionetics International relies, meets this need: it provides a permanent off-air comparison between the various delivery paths, verifies the technical compliance of the signals and adherence to regulatory obligations, and records the flows over long periods (from a few weeks to several years). This recording and extraction capability — of both video sequences and data — is an asset for broadcasters, operators and the regulator, who thereby have access to compelling evidence of compliance with standards and regulations.

We stress a point that we believe is insufficiently taken into account: the transformation of the television medium must be addressed as a **critical national infrastructure issue**. A shift to exclusively IP-based distribution does not eliminate costs or dependencies; it shifts them towards telecommunications networks, CDNs and a small number of platforms and interface manufacturers, often non-European. This concentration calls for particular vigilance.

This shift finally has a democratic dimension. A growing share of the public now gets its information via the Internet, social networks and video-sharing platforms, where information is subject to no editorial control and where false information spreads widely. By contrast, television services broadcast over DTT are provided by editors regulated by Arcom and subject to obligations of journalistic ethics, honesty of information and pluralism. This difference in guarantees should, in our view, be fully taken into account in the reflection on the future of DTT (see our answer to Question 7).

### Question 2: How do you assess the economic situation of television service editors, in the context of profoundly changing usages?

**As an infrastructure player, we do not have access to broadcasters' internal economic data** and will refrain from putting forward figures that fall outside our remit. We can, however, attest to the trends observed on the side of technical chains and broadcasting infrastructures.

The economic situation of broadcasters appears weakened. Historical revenues from linear advertising are under significant pressure, linked to audience fragmentation, the transfer of advertising investment to digital platforms and the changing usages of younger generations.

At the same time, technical costs remain high and increasingly diverse: distribution, video transport, rights acquisition, cybersecurity, infrastructure modernisation, cloud and CDN costs, and multi-screen adaptation. We observe, moreover, that the move to “all-IP” does not mechanically reduce these costs: it substitutes per-unit distribution costs (bandwidth, CDN), which grow with audience, for the pooled and predictable costs of terrestrial broadcasting.

We anticipate a continued decline in traditional linear audiences, growth in hybrid TV + OTT usage, an increasing weight of addressable and digital advertising revenues, and a strengthening of broadcasters’ direct-distribution strategies. Distribution revenues are likely to remain under pressure owing to the growing power of platforms and interface manufacturers.

### **Question 3: What is your assessment of the competitive dynamic between television and “digital” advertising? What value-sharing issues and what sources of growth?**

The digital advertising market exerts very strong pressure on television. Digital platforms benefit from structural advantages: advanced targeting, fine-grained audience measurement, automation, algorithmic power and proprietary ecosystems.

The result is a significant competitive asymmetry. Audiovisual editors bear regulatory, editorial and content-financing obligations far heavier than those of many digital players. Value-sharing therefore becomes a central issue, all the more so as control of the access interface to the television set (operating system, home screen, remote control) gives manufacturers and major platforms decisive prescriptive power.

We consider that the main sources of growth for the television sector will be:

- broadcasters’ OTT platforms;
- FAST offerings (free ad-supported linear channels);
- segmented and/or addressable advertising;
- the use of data within a GDPR-compliant framework;
- hybrid broadcast/IP offerings, notably via DVB-I;
- the pooling of technical infrastructures;
- enriched services around live events.

## **Part 2 – The future of DTT**

### **Question 4: Do you share the findings regarding the situation, economic context and prospects of DTT?**

Yes, in their broad outlines. DTT is experiencing a gradual decline in exclusively terrestrial reception, but it retains significant strategic value. It remains a free and universal means of distribution, a resilient infrastructure, a tool for the continuity of information and a vehicle for national sovereignty.

We wish, however, to qualify the reading of penetration figures. The number of households receiving DTT **exclusively** does not measure the real use of terrestrial broadcasting. A very large share of reception passes through **collective installations** (buildings, social housing, care homes, healthcare facilities, hotels, campsites, public-access establishments) that capture the terrestrial signal at the head-end before redistributing it internally. These usages, which are structural for the industry, are poorly reflected in individual-reception statistics. The decline in exclusive individual reception should not therefore lead to this network being prematurely considered obsolete.

We consider that a strategy of gradual transition, rather than an abrupt switch-off, should be favoured.

### **Question 5: Is there an economic model for DTT in an enhanced format (UHD) or in mobility (“5G Broadcast”)? Over what horizon? Is a new technological evolution opportune?**

As a preliminary point, since Visionetics International is not an editor, our assessment concerns the technical and industrial relevance of these developments, not a commercial interest as a programme broadcaster.

The development of UHD appears technically relevant within the framework of an overall modernisation of the DTT platform. The move to DVB-T2 combined with the HEVC codec would enable:

- a significant improvement in spectral efficiency;
- better video quality;
- next-generation audio (NGA) services, offering in particular unprecedented sound personalisation (dialogue enhancement, immersive sound, native accessibility);
- optimisation of the number of multiplexes;
- a reduction in the energy cost per broadcast service;
- better preparation for UHD and HDR usages.

From an industrial standpoint, this evolution would foster the modernisation of audiovisual processing chains (encoding, transcoding, multiplexing, monitoring, IP distribution). We consider that UHD should not be seen solely as a comfort improvement, but as a lever for technological rationalisation and energy sobriety — the latter being documented in Annex 1.

Regarding 5G Broadcast, this technology is of strategic interest for event-based distribution, mobile distribution, emergency networks, civil-security alerts and as a complement to OTT architectures. Its economic model nonetheless remains emerging and will depend on spectrum availability, integration into terminals, European standardisation and the ability of industrial players to build a viable ecosystem. We recommend treating it as a medium-term prospect, to be tested without prematurely substituting it for existing broadcast capabilities.

### **Question 6: Do you have any comments on the planned reduction in the number of DTT sites?**

A gradual and controlled reduction in the number of sites may be considered, subject to compliance with several principles: maintaining sufficient coverage, preserving rural areas, ensuring service continuity, resilience in crisis situations and support for the affected publics.

This rationalisation must be based on objective analyses: real usage rates (including collective and not only individual reception), genuinely available IP coverage of sufficient quality, local dependence on DTT and the risks of a digital divide. We draw attention to the fact that “theoretical” mobile or fixed coverage does not guarantee a real capacity to absorb a massive shift of television audience, particularly at peak viewing times and during unifying events.

### **Question 7: Below what penetration rate would DTT cease to be profitable? Over what horizon? Should it be maintained for reasons of sovereignty or security? What collective strategy? Should switch-off be considered now?**

It seems reductive to us to approach the question solely from the angle of an economic profitability threshold. The analysis must take into account the diversity of reception situations. In particular, a distinction should be drawn between:

- households depending exclusively on DTT for access to television services;
- households with simultaneous access to DTT and IP via a set-top box or a connected television;

- collective-reception sites (buildings, social housing, care homes, hotels, campsites, public-access establishments, etc.) that redistribute the terrestrial signal to a large number of users;
- households benefiting from hybrid solutions combining several reception modes.

The evolution of distribution standards, notably DVB-I, opens up new prospects. Within the DVB-I pilot project hosted by Visionetics International at the FAVN, service-continuity mechanisms are being tested to allow automatic switching between broadband flows (OTT/IP) and broadcast flows received via the DTT tuner built into the television set or set-top box, or vice versa. This approach demonstrates that broadcast and broadband networks are not competitors but complementary: DTT can become an essential element of a hybrid architecture guaranteeing continuity of reception in the event of IP network failure, broadband saturation or an incident affecting distribution infrastructures.

**On sovereignty and security, our answer is clear: yes, the network must be maintained.**

Terrestrial broadcasting offers a specific contribution that no other network can replicate. In a crisis — natural disaster, massive cyberattack, power outage or failure of telecommunications networks — DTT makes it possible to keep informing the population from a limited number of transmission points, whereas exclusively IP-based distribution requires the simultaneous proper functioning of the entire chain (core network, local loop, set-top box, home Wi-Fi, CDN, platforms). If the Internet goes down, no one can any longer receive the messages of the public authorities or the programmes: this is a national vulnerability that broadcast distribution precisely makes it possible to cover.

Beyond its direct economic balance, DTT therefore retains several fundamental values:

- strategic, as a national mass-distribution infrastructure;
- democratic and informational, by guaranteeing free and universal access to information produced by regulated professional editors;
- territorial, by ensuring homogeneous coverage of the territory;
- security-related, thanks to its resilience in crisis situations or when telecommunications networks degrade;
- energy-related, broadcast distribution serving a very large number of viewers simultaneously with overall consumption lower than that of individual distribution relying exclusively on IP networks (see Annex 1);
- industrial, by supporting a reception and distribution industry (aerial installers, integrators, maintenance technicians) and all the collective installations that depend on it.

We wish to stress the informational value of DTT, too often overlooked in the debate on its future. A growing share of the population, particularly younger generations, now gets its information via the Internet, social networks, video-sharing platforms and influencers. Yet these contents largely escape any editorial control: information rubs shoulders with rumour, disguised advertising and disinformation, with no guarantee of method, fact-checking or accountability of the source. The resulting proliferation of false information poses a real risk to public debate and social cohesion.

Television services broadcast over DTT, by contrast, offer information produced by professional journalists and newsrooms, within editors regulated by Arcom and subject to demanding obligations of ethics, honesty and independence of information, pluralism and correction. Free terrestrial broadcasting guarantees that this reference information remains accessible to all, regardless of a subscription, a recommendation algorithm or the control of an interface. Preserving DTT therefore also means preserving the existence of a foundation of reliable, verified and universally accessible information — a major democratic issue at a time of informational distrust.

On the collective strategy, we consider that public authorities and stakeholders should retain the maintenance of a minimum broadcast floor, for reasons of service continuity, national security and technological sovereignty. The prospect of a switch-off should not be set as an objective, but the hypothesis of a decline must be anticipated early enough to allow, if necessary, a controlled — and not a suffered — transition towards hybrid architectures.

**Question 8: What transition scenarios could be envisaged? Is a transitional reduced DTT offering desirable? On what criteria?**

A gradual transition seems preferable to any abrupt switch-off. Several stages could be envisaged, in this order:

- Technological migration to DVB-T2/HEVC to gain in spectral and energy efficiency.
- Increased pooling of broadcasting infrastructures.
- Development of hybrid broadcast/IP services (DVB-I, HbbTV).
- Gradual and documented rationalisation of coverage, preserving the most dependent areas.
- Introduction, if necessary, of a tighter DTT offering that nonetheless guarantees a floor of public-service and information content.

In the case of a reduced offering, the selection criteria should include: information, pluralism, events of major importance, public service, free access and contribution to creation.

**Question 9: Should market rules be left to play out, or should public authorities be entrusted with a mission of organisation and planning? What indicators?**

A transition of this magnitude cannot be left to market rules alone. The regulator and public authorities must play a structuring role in order to guarantee service continuity, industrial coherence, the protection of audiences and the regulatory stability needed for investment.

The indicators to monitor could include: DTT penetration (individual and collective reception), the proportion of DTT-only households, the real availability and quality of fibre and mobile, the comparative costs of broadcasting and IP distribution, territorial coverage and the equipment rate compatible with DVB-T2/HEVC.

**Question 10: In the event of DTT switch-off, how should the indirect benefits it provides (GIS visibility, numbering, interface) be transposed to a non-DTT environment? On what principles and what timetable?**

The visibility and discoverability of services must remain a major issue. In an OTT and connected environment, it appears necessary to preserve the discoverability of services, neutrality of access and the visibility of content of general interest.

Visibility obligations should be applicable to Smart TV interfaces, television operating systems, aggregators and distribution platforms. This is precisely one of the purposes of DVB-I: to enable, on modern terminals, an official, ranked and enforceable service list, independent of manufacturers' commercial choices (the standard and its uses are presented in Annex 2). The visibility criteria should be linked to pluralism, information, support for creation and accessibility, and their implementation timetable should be set before any significant reduction in terrestrial broadcasting, so as not to create a visibility vacuum.

### **Question 11: Do you have any comments on the effects of a possible transfer of the 600 MHz band to other uses?**

A transfer of the 600 MHz band would sharply reduce the future capacity of DTT and would jeopardise the very possibility of modernisation towards DVB-T2/HEVC and UHD. Such a decision must be anticipated with great caution.

We consider that a premature withdrawal would risk weakening the broadcast offering, increasing dependence on IP networks, raising the risks of congestion and reducing national resilience. Any change must be coordinated at European level and made subject to a prior assessment of the real use of the platform.

### **Question 12: Do you have any comments on the proposed milestones? Do you see others that are structuring?**

The proposed roadmap appears coherent. We suggest adding, as structuring milestones:

- a national audiovisual-resilience strategy, articulated with population-alert systems;
- a dedicated strand on the cybersecurity of broadcasting infrastructures;
- larger-scale hybrid broadcast/IP experiments (building on the DVB-I pilots);
- a comparative assessment of the energy footprint of the various distribution modes;
- a clear and dated trajectory for migration to DVB-T2/HEVC, a condition for orderly modernisation;
- a support plan for the reception and distribution industry (collective installations, aerial trades).

## **Part 3 – Expiry of the “DTT 3” authorisations and reallocation of resources**

### **Question 13: What is your assessment of the diversity of the current DTT offering with regard to pluralism and the public interest?**

The DTT offering remains relatively diverse and contributes to the pluralism of currents of expression. Some themes, however, appear less differentiating in a highly competitive audiovisual universe. Maintaining a free and diverse offering remains essential, particularly for households that have no other easy access to a plurality of information sources.

### **Question 14: Is the choice of a complementary thematic offering (DTT 3) still relevant? Which themes are of greatest interest?**

Yes, subject to genuine editorial differentiation, failing which thematic channels struggle to distinguish themselves from the plethora of offerings available online. The themes that appear most relevant to us are information, youth, sport, culture, the regions, and science and knowledge. By way of illustration, a channel showcasing France’s strengths and its centres of excellence could help young people find their path, by restoring a fair image of the country’s potential and the value of study as well as of work, including manual work.

### **Question 15: Do you consider it desirable to maintain the current number of free-to-air DTT services, or to change it?**

We consider that maintaining the current number of free-to-air channels is an important factor in the attractiveness of the DTT platform. A significant reduction in the offering would risk accelerating viewers’ disengagement: faced with a less diverse offering, part of the public would turn more towards

OTT platforms, FAST channels and the catalogues of major international platforms, to the detriment of the French audiovisual ecosystem.

The question of the number of channels should not, however, be separated from that of technological modernisation. The generalised move to DVB-T2 combined with the HEVC codec would significantly improve the spectral efficiency of the multiplexes, with better picture quality, preparation for UHD and HDR, optimisation of distribution costs, better energy efficiency and a potential increase in available capacity.

In this context, modernising the platform could make it possible **not only to maintain the current offering, but to envisage new services in due course**, while improving the overall quality of the experience. We therefore consider that priority should be given to modernising the platform rather than to reducing the offering, in order to preserve the attractiveness of free-to-air television and its competitiveness against offerings distributed exclusively over the Internet.

#### **Question 16: Should a 2035 expiry be set for the authorisations, to align them with the channels authorised in 2025?**

Yes. Aligning the expiry dates to 2035 would facilitate industrial visibility, investment decisions, technological choices (notably the DVB-T2/HEVC migration) and any future reorganisations of the offering. A common expiry date offers a coherent planning framework for all stakeholders.

#### **Question 17: Should the general obligations (pluralism, ethics of information, social cohesion, protection of audiences) follow on from those applicable to the services authorised in 2025?**

The principles of pluralism, protection of audiences and ethics must be maintained; they form the bedrock of trust in audiovisual services. These obligations should nonetheless evolve so as to avoid excessive competitive imbalances with digital platforms subject to lighter constraints, in order not to penalise the most heavily regulated players.

## **Part 4 – Evolution of the framework for regulating television services**

#### **Question 18: Do the new ways of making services available (OTT, connected-TV interfaces, video-sharing platforms) call for observations, particularly on the legal framework of distribution?**

These new modes of distribution are profoundly transforming audiovisual architectures. We observe a growing convergence between broadcast infrastructures, IP transport, CDNs, cloud platforms and OTT distribution systems.

This evolution requires significant adaptation of infrastructures to guarantee quality of service, low latency, continuity of distribution, real-time monitoring, cybersecurity and flow resilience. It also sharply increases the needs in encoding/transcoding, monitoring, software orchestration, IP infrastructures and QoS/QoE monitoring tools.

This increased complexity makes decisive the ability to **verify the compliance of signals end to end**, whatever the network used. Mediaproxy, the monitoring solution on which Visionetics International relies, makes it possible to monitor broadcast and broadband flows in parallel, from the output of the final gallery through to the reception of broadcast programmes, and to verify both technical compliance and adherence to regulatory obligations. It notably ensures the verification of the presence and frame-accurate alignment of signalling markers (for example SCTE-104 and SCTE-35) that condition the splicing of segmented and addressable advertising — a growing issue for editors. Its capacity to record over long periods (from a few weeks to several years) further provides broadcasters, operators and the regulator with compelling evidence, from which video sequences and

compliance data can be extracted at any time. Compliance monitoring also makes it possible to ensure that there is no divergence between the various broadcasts of the same programme, including in the event of the time shift required for the overseas territories (DOM).

On the legal front, we draw attention to the decisive role of the **interfaces and operating systems of connected televisions**, which have become genuine mandatory gateways. Future regulatory frameworks should encourage open, interoperable and resilient architectures (DVB, HbbTV, DVB-I standards) so as to avoid excessive dependence on proprietary ecosystems, often non-European, and to preserve the ability of editors and public authorities to guarantee the visibility of services of general interest.

**Question 19: What do you think of the framework relating to the appropriate visibility of GIS? What issues for editors and what coordinated actions?**

The visibility of services of general interest is a major democratic issue. Promotion mechanisms must be guaranteed in connected environments, failing which the hierarchy of services would be determined solely by the commercial choices of interface manufacturers.

Reinforced coordination between French editors appears necessary, in particular to put forward common technical solutions. DVB-I offers a concrete framework in this respect: a list of national services, complemented by a list dedicated to local channels. Maintained collectively, these lists are capable of ensuring homogeneous and enforceable visibility across all compatible terminals.

**Question 20: What is your position on a possible extension of the GIS perimeter to all or some free-to-air local terrestrial television? Should the geolocation of interfaces be taken into account?**

This extension seems relevant to us. Local television channels contribute to local information, cultural diversity and territorial pluralism — dimensions that major platforms cover poorly. The geolocation of interfaces could allow contextualised promotion, presenting each user with the local services of their territory without cluttering the home screen. DVB-I already integrates this functionality.

**Question 21: How can this extension be reconciled with the objective of effective visibility, given the number of services concerned? Should it be limited to local services present on DTT? Should grouping within a single application be taken into account?**

A regional or aggregated approach seems preferable to us. Limiting the extension, at first, to local services present on DTT constitutes a reasonable basis of proportionality. Grouping local television channels within a common application, open to any local service wishing to join it, would improve their visibility, their accessibility and the pooling of their technical resources, while limiting the clutter of interfaces. The FAVN's DVB-I pilot will be able to illustrate an approach based on a service list combined with geolocation, without having to go through a dedicated application.

**Question 22: In the longer term, what should be the criteria for designating GIS if DTT were to decline or even be switched off?**

The criteria should relate to the contribution to pluralism, the information mission, free access, national or territorial coverage, support for creation, accessibility and resilience. These criteria are intended to remain relevant irrespective of the distribution network, so that GIS status protects a function of general interest and not a particular mode of transport.

**Question 23: DTT editors bear more demanding obligations than players present on other networks. Which constraints pose the greatest difficulty? What priority rebalancing should be undertaken?**

Editors present on DTT bear, owing to their use of the radio-frequency resource, significant constraints that many digital platforms do not bear. Without speaking on behalf of editors regarding their own burden, we identify several priority rebalancings:

- visibility: enforceability of promotion rules against the interfaces and operating systems of connected televisions;
- contribution to creation: seeking greater equity between regulated players and platforms;
- advertising obligations: examining the asymmetries between television and digital advertising;
- value-sharing: conditions of access and listing on terminals and application stores;
- access to usage data: better symmetry of information between editors and platforms.

We also note a strategic asset of editors present on DTT: the numbering of their channels, established for the terrestrial platform, is preserved on the other networks (operators, satellite, broadband), which contributes to their visibility.

**Question 24: Which regulatory asymmetries between television services and on-demand audiovisual media services should be reduced as a priority? Which differences remain relevant?**

A gradual convergence of the rules appears desirable, notably regarding visibility, contribution to creation and access to interfaces. Some differences nonetheless remain justified in view of the specificities of live, linear broadcasting and events of major importance. Rather than uniform alignment, we advocate a graduated approach taking into account audience, the nature of the content and the role of general interest. Targeted relaxations may be envisaged for all services, provided the essential obligations of pluralism and protection of audiences are preserved.

**Question 25: New forms of linear content are developing (video-sharing platforms, social networks). Would an alignment of obligations be relevant? Under what arrangements?**

An alignment seems justified to us when these contents reach levels of audience and professionalism comparable to those of traditional audiovisual services. Regulation must nonetheless remain proportionate and take into account the very high volume of content, its volatile nature and the resources of Arcom. Technical solutions would make it possible to record these new programmes over a defined period, coupled with a portal for the public to file complaints, or even with automated analysis to assist reporting — in strict respect of freedom of expression.

A targeted approach seems preferable to us to a full transposition of the historical television model. It could combine targeted obligations on the most structuring players, cooperation with platforms, algorithmic transparency, reporting mechanisms and partly automated monitoring.

## **Conclusion**

The transformation of the television medium is as much an industrial and technical issue as an editorial and democratic one. As a player in distribution and redistribution infrastructure, Visionetics International wishes to stress that a hasty shift to exclusively IP-based distribution would eliminate neither costs nor dependencies: it would displace them, weakening national resilience and causing an entire industrial sector and many trades to disappear.

In this context, it seems essential to us to preserve a resilient audiovisual infrastructure, national broadcasting capabilities, control of critical architectures and European technological sovereignty.

We consider that the future of the sector will rest mainly on hybrid architectures combining broadcast distribution (DTT), broadband distribution (OTT), virtualised infrastructures and real-time monitoring. The gradual modernisation of infrastructures should notably rely on:

- DVB-T2/HEVC, for spectral and energy efficiency;
- DVB-I and HbbTV, for content promotion and service-list management;
- IP workflows and virtualisation;
- monitoring platforms and redundant architectures;
- highly energy-efficient solutions.

Finally, the transition of the audiovisual landscape will have to preserve a balance between technological innovation, cost control, quality of service, continuity of distribution, national resilience, strategic independence and environmental sobriety. It is on this condition that television can remain a universal, free and sovereign service, for the benefit of all audiences.

## Annex 1

# Comparative environmental footprint of television reception modes

*DTT, IPTV, OTT and mobile networks*

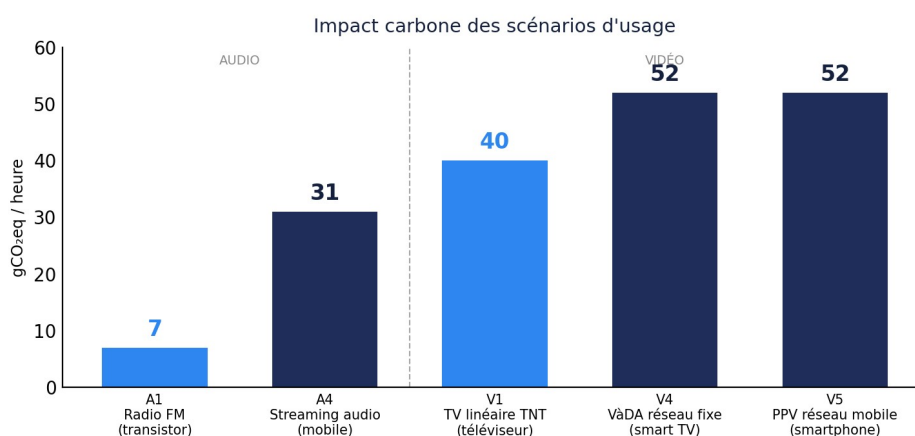
Energy sobriety is a central issue in the debate on the future of DTT. The available public data converge towards a clear finding: **terrestrial broadcasting (DTT) is, together with terrestrial radio, the most sober audiovisual reception mode, far ahead of distribution over IP networks (IPTV and OTT) and mobile networks.** This annex brings together the main results from the reference study published by Arcom, Arcep and ADEME, supplemented by the European LoCaT study.

## 1. The Arcom / Arcep / ADEME study on the environmental impact of audiovisual usages

In 2024, Arcom and Arcep, in collaboration with ADEME (the French Agency for Ecological Transition), published a study assessing the environmental impact of audiovisual usages in France across several usage scenarios and several indicators. This study has the advantage of emanating directly from the regulator itself.

### 1.1 The carbon footprint varies sharply with the reception mode

For video, the carbon footprint of one hour of viewing differs significantly across scenarios. Linear television received via DTT on a television set is the least-emitting video mode, ahead of video on demand over fixed networks and video over mobile networks:

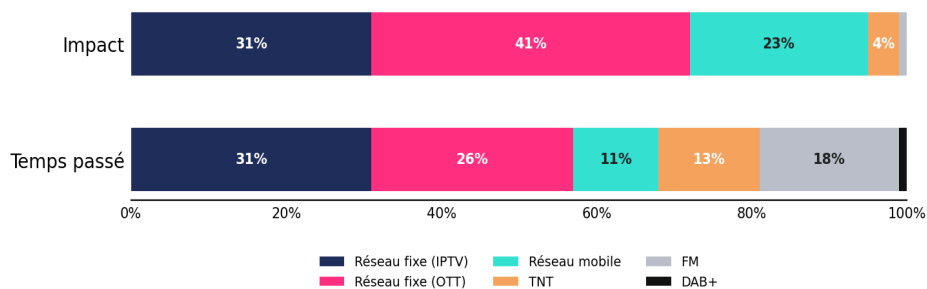


*Carbon impact by usage scenario, in gCO<sub>2</sub>eq/hour. Source: Arcom – Arcep – ADEME, 2024.*

DTT (V1: 40 gCO<sub>2</sub>eq/hour) sits well below video usages distributed over fixed (V4: 52) and mobile (V5: 52) networks. Terrestrial FM radio (A1: 7) further confirms the great sobriety of terrestrial broadcasting compared with audio streaming over mobile networks (A4: 31).

### 1.2 DTT: 13% of usage, but only 4% of the impact

The most striking result appears when the carbon impact is related to time spent. At the French scale (2022), audiovisual usages travelling over fixed and mobile networks represent 68% of usage but 95% of the carbon impact, whereas DTT represents 13% of usage for only 4% of the impact:



Breakdown of carbon impact and time spent by distribution mode (France, 2022). Source: Arcom – Arcep – ADEME, 2024; usage data Médiamétrie 2022.

In other words, DTT delivers a substantial share of television consumption for a very small fraction of the sector’s carbon footprint. Conversely, OTT (fixed network) and IPTV concentrate most of the impact. The same finding applies to final energy consumption: linear and catch-up television represent 48% of time spent but 72% of energy consumption.

## 2. The European LoCaT study: convergent figures

These orders of magnitude are confirmed by the LoCaT study (Low Carbon TV), conducted at European level for Broadcast Networks Europe and the French Technical Association of DTT Editors (ATET). Its 2025 extension (LoCaT Sat) added satellite distribution. As a European average (2020), the energy consumption associated with one hour of viewing per device was as follows:

Reception mode	Energy (Wh/hour)	Emissions (gCO2e/hour)
DTT (terrestrial)	14	3.3
Satellite	19.5	4.7
OTT (fixed network)	109	26.2
IPTV (managed network)	153	37

Source: The LoCaT Project (LoCaT Sat extension, September 2025); figures excluding the television set’s own consumption.

LoCaT thus concludes that DTT is the most sober distribution mode, followed by satellite, itself 6 to 8 times more efficient than IP. OTT and IPTV present a footprint several times higher.

## 3. Lessons for the future of DTT

These two sources – one from the French regulator, the other from the European broadcasting industry – reach a consistent conclusion: **a shift from DTT to exclusively IP-based distribution would result in a significant increase in the energy and carbon footprint of television consumption.** Terrestrial broadcasting, which serves a very large number of households simultaneously from a limited number of transmission points, retains a structural sobriety advantage that individual distribution over IP networks cannot match.

**Sources:** Arcom, Arcep, ADEME – “Environmental impact of audiovisual usages”, 2024. The LoCaT Project (Low Carbon TV) – pan-European study and LoCaT Sat extension, 2025 (www.thelocatproject.org). Usage data: Médiamétrie, 2022.

Note: Annex 2 (the DVB Project’s DVB-I white paper) follows, in its original English version.

## Annex 2

# A DVB-I explainer for business and policy leaders

*White paper – DVB Project Office, March 2026, Version 1.1*

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## Introduction

Developed by the DVB Project, DVB-I is a specification that provides a common way to describe television services so that any compatible device can present them to the user.

This white paper provides a non-technical explanation of what DVB-I is and the roles it can play in the fast-changing video distribution ecosystem. Relevant trends include the growing consumption of on-demand content; the increased use of broadband networks for the delivery of television (linear and on-demand), alongside widespread discussion around a future shutdown of digital terrestrial television (DTT) networks even as new broadcast technologies emerge; and the growth in popularity of application-centric platforms for the discovery and viewing of content.

These trends, along with the growing dominance of global video platforms, bring challenges for broadcasters and content providers, network operators, end-user-device manufacturers, and media regulators. DVB-I offers solutions to many of these challenges. This document is intended for advisors and decision-makers who influence policy, regulation and commercial strategies, whether at broadcasters, platform operators, consumer electronics companies, regulatory bodies, or as media industry analysts.

## DVB-I in plain terms

DVB-I is a specification that allows compatible devices – whether DVB-I is built in by the manufacturer or available as a separate app – to know what television services are available. Each service is described by its name, language, delivery methods, channel number, content protection needs and other details. This enables services to be presented consistently and reliably.

The DVB-I service list is what tells a device or app which services are available. Service lists can be obtained in different ways – from national or regional directories (or registries), via an operator or broadcaster, or from locations specified by the device manufacturer or app developer. Service lists are usually delivered over a broadband connection but can also be carried in a broadcast signal.

Crucially, DVB-I is independent of media delivery technology and does not define how a service is received. A DVB-I service list can reference services delivered by terrestrial, satellite or cable broadcast, over the internet, by hybrid combinations of broadcast and broadband networks, or by emerging delivery technologies such as 5G Broadcast.

DVB-I is sometimes misunderstood as being an application, a regulatory tool or a platform. It is none of these. There is nothing in the DVB-I specification that dictates how services appear on screen, are navigated or presented. Manufacturers and operators retain full control of their user interface and home-screen design.

## DVB-I is...

- an open standard;
- designed for the internet era;
- for broadcast- and broadband-delivered content;
- able to replicate and enhance the current television offering;

- industry-developed;
- compatible with existing business models.

### **DVB-I is not...**

- a user interface;
- a proprietary platform or application;
- limited to IP-only services;
- a content delivery technology;
- a replacement for broadcast standards;
- a regulator-mandated architecture;
- a platform that determines business models.

## **Core capabilities of DVB-I**

### **Support for multiple service lists**

A device can access more than one DVB-I service list. Examples include a national or regulator-maintained list; a list published by a broadcaster or consortium; a commercial or FAST-channel (free ad-supported streaming) list; an operator-specific list; and a manufacturer-curated list. DVB-I does not impose priorities or restrict how these lists are used, but it has provisions to help maintain prominence should this be a requirement. Different service lists can coexist and be integrated according to local requirements or device design.

### **Delivery-agnostic integration**

Because DVB-I does not define how services are delivered, it allows devices to integrate content received by any method. A broadcaster may, for example, provide its main service via satellite and a set of supplementary pop-up channels via the internet. DVB-I enables the device to make these visible to the user in a unified way.

A single service can also have multiple delivery options, for example with both a broadcast signal and a broadband stream. A device chooses whichever option is available or most suitable according to defined priorities. This built-in flexibility supports resilience – if one delivery method fails or is unavailable, the device can switch to another without interruption. Furthermore, regional variations can be achieved by using internet delivery for local content while broadcast delivers the national feed, switching between them at defined times.

### **Rich content guides and metadata**

DVB-I supports rich content metadata for both channels and programmes. This includes channel logos; programme artwork and still images; extended programme descriptions; genre classifications and parental guidance information; links to related content, including apps; information about on-demand availability; language and accessibility attributes; and schedule metadata for electronic programme guides. This enables devices to present modern, visually engaging guides that align with viewer expectations and support advanced navigation and discovery.

### **Integration with applications**

DVB-I service lists can include links to applications that extend or complement the linear experience, enabling smooth transitions from broadcast or internet-delivered channels to interactive or on-demand features. Web-based applications – built on HbbTV or standard HTML – can include catch-up and replay players, companion experiences such as games, accessibility tools, interactive information

services, and data-rich sports or entertainment overlays. Beyond web-based apps, linked applications may also include operator applications built using HbbTV OpApp; broadcaster-owned platforms providing access to full catalogues, programme series, live streams or enhanced programme information; operator or platform portals offering subscription services and curated recommendations; and other streaming or on-demand applications linked to the service.

### **Support for on-demand content**

DVB-I service lists can list on-demand assets and catalogues such as replay or start-over options, catch-up episodes, extra material associated with linear broadcasts, online-exclusive content, and programme series and other content playlists.

### **Accessibility signalling**

DVB-I can signal a wide range of accessibility features, supporting diverse viewer needs. By ensuring accessibility metadata is consistently signalled across platforms and devices, DVB-I supports regulatory requirements and keeps accessibility features available across broadcast, hybrid and IP environments. These include subtitles and captioning (hard-of-hearing, translation, and text-to-speech-suitable subtitles); audio description, spoken subtitles, alternative audio mixes and multiple language tracks; sign-language services, including open or closed sign-interpreted video (for example a picture-in-picture window of a signer, even if there is only one video decoder in the device); alternative versions, such as localized editions or plain-language adaptations; and content-safety information, including programme-level warnings and markers for potentially harmful visual content.

## **Why DVB-I matters**

With television markets moving, at different speeds, from broadcast-led systems towards hybrid and even IP-only environments, DVB-I provides a stable, delivery-neutral discovery layer that works at every stage of that transition. This allows stakeholders to innovate without undermining continuity for viewers. DVB-I helps platforms evolve while giving viewers a consistent and dependable way to find television services.

### **Broadcasters and content owners**

For broadcasters, the challenge of maintaining prominence has intensified as audiences navigate an increasingly fragmented media landscape. Inclusion in DVB-I service lists allows broadcasters to ensure their services are consistently labelled and represented across devices, meeting both commercial expectations and regulatory obligations: consistent service identity and branding; reliable delivery of programme metadata, ratings, accessibility features and classifications; coherent presentation of linear, hybrid and on-demand services as a unified offering; and accurate metadata across devices from different manufacturers. These capabilities are especially valuable for public service broadcasters, which often face stricter prominence and accessibility requirements.

### **Television and device manufacturers**

DVB-I offers manufacturers a single, well-defined metadata source for service identification, classification and accessibility; consistent handling of service lists in regulated markets; and the ability to meet local requirements while retaining full control of user-interface design and the home-screen experience. It does not limit their ambitions to develop their own platform and operating-system environments; rather, it provides a common metadata foundation that can simplify integration work, reduce duplication and ease compliance.

## Operators and platforms

DVB-I enables curated service lists that remain consistent and accurate across devices; reliable identification of authorised services; clear signalling of accessibility and classification metadata; smooth integration of partner channels, pop-up services and third-party offerings; and a stable foundation for hybrid operations, ensuring resilience across multiple delivery paths.

## Regulators and media authorities

For policymakers, DVB-I offers a neutral, structured framework that supports objectives around accessibility, prominence, media pluralism and viewer protection: transparency over service provenance and clear identification of authorised or licensed services; optional regulator-maintained service lists to anchor national frameworks without mandating user-interface design; consistent signalling of content classifications, accessibility features and safety warnings; a technology-neutral foundation that accommodates future delivery platforms; and a clearer, more consistent basis for monitoring and enforcement across varied devices and delivery modes.

## Deployment and potential

Although DVB-I is still at an early stage of deployment, it is designed to support increasingly complex television ecosystems, where a single device could draw on multiple service lists simultaneously. Combined with emerging technologies, such as those from 3GPP, DVB-I could also enable uniform service signalling across fixed and mobile devices as markets evolve.

### ***Sat.tv Connect: commercial satellite deployment***

Eutelsat's Sat.tv Connect service is the first commercial deployment of DVB-I. It uses DVB-I service lists to organise a large free-to-air satellite offering, with multiple lists per orbital position supporting regional and language variants, demonstrating how DVB-I can modernise existing broadcast environments without changing the underlying delivery infrastructure.

### ***Italy: broadcaster-led hybrid trial***

The Italian DVB-I market trial demonstrates how DVB-I can bring together broadcast and IP-delivered channels within a unified, familiar user experience, preserving established and regulated channel numbers and familiar remote-control navigation while adding hybrid delivery, online-only services and richer metadata. DTT remains the dominant platform in Italy.

### ***Germany: industry cooperation on market requirements***

In Germany, public and private broadcasters, industry associations, regulators and device manufacturers have worked together on a framework for the commercial launch of DVB-I. The DVB-I Round Table, initiated in 2024, brings together key stakeholders to address the conditions for a national DVB-I offering, including media-law and competition-law considerations.

## Conclusion

DVB-I offers a consistent, standards-based approach to the discovery of television services at a time when video distribution is increasingly fragmented across networks, platforms and devices. It enables organisations to modernise their offerings while continuing to serve established viewer habits and respecting regulatory frameworks and commercial relationships. Whether used to maintain the prominence of public service broadcasters, to simplify device integration, to support operator workflows or to anchor regulatory objectives, it represents a flexible, future-facing framework that can help ensure television services remain discoverable, reliable and accessible. For more information, visit <https://dvb-i.tv>.