



BUILDING THE FUTURE OF EUROPE

The Value and Contribution of
Digital Terrestrial Television

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About this report

In September 2022, Broadcast Networks Europe (BNE) selected South 180 to conduct a study to assess the role and importance of Digital Terrestrial Television (DTT) and broadcasting services.

The study aims to support the decision-making process on the use of the lower UHF band (470–694 MHz) at the upcoming World Radiocommunication Conference (WRC–23) by providing the involved stakeholders with evidence on the value of DTT.

Therefore, the goals of this report is to provide BNE, its members and its stakeholders with a forward-looking perspective of the multiple types of value created by Digital Terrestrial Television, its operators and the broadcasters using it. As such, this reports provides evidence and arguments about how society benefits from DTT.

The conducted research offers an international perspective, including data and cases from relevant national markets –paying special attention to those where DTT has a higher penetration–.

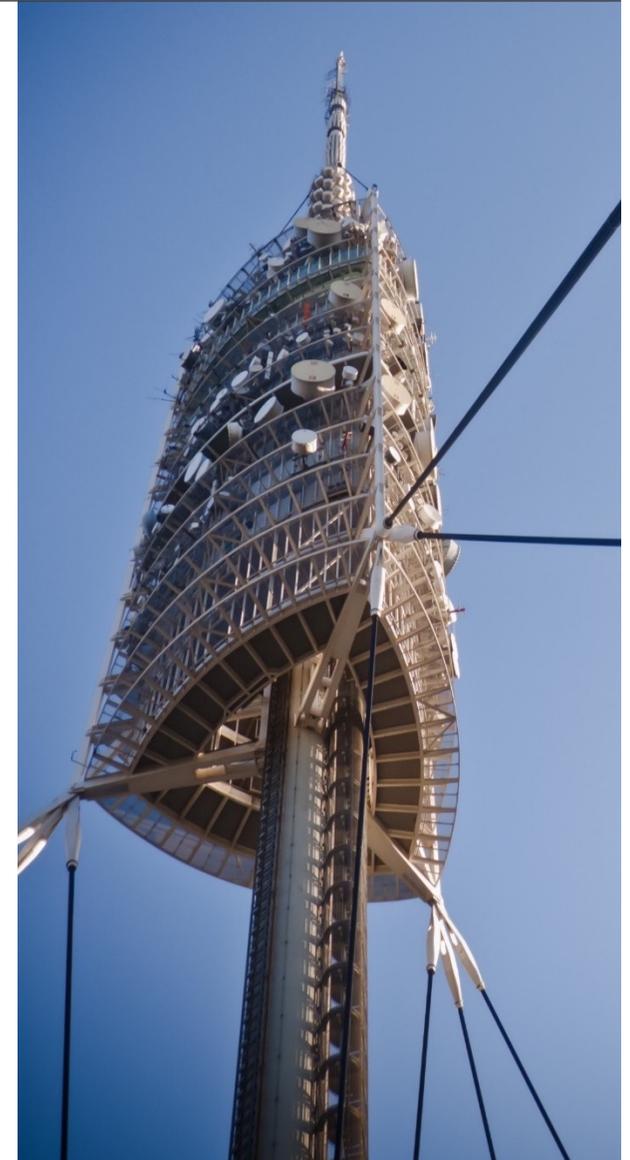
The resulting arguments have a focus on Europe, but in many cases they are also relevant and can be extrapolated to other regions of the world where DTT is a critical network for the distribution of television.

The first section of the report unveils BNE’s vision for the decade of the 2030s, which illustrates the value that its members could deliver if the No Change position prevails in the Region 1 of the ITU at WRC–23.

The second section presents the Digital Terrestrial Television Value Model, i.e. how society and individuals benefit from the existing DTT infrastructure, from the activities carried out by the broadcasters relying on this network for the distribution of their linear television signal, and from the contents that they receive.

This Digital Terrestrial Television Value Model is structured in 6 dimensions, which include 24 key arguments that highlight the value delivered by DTT network operators and broadcasters.

Additionally, 12 cases provide tangible evidence of the positive impact of the DTT network.



Executive Summary



Executive summary

Vision

Europe embodies a collection of values such as democracy, universality, sustainability, diversity, inclusion and accountability, which guide how political and business decisions and choices are made and implemented.

As the trade body of the European broadcast network operators, BNE works to ensure that its members' voice is heard and their activities contribute to develop and strengthen Europe.

This responds to a belief in the equality of each and all European citizens, independently of their age, educational level, socio-economic conditions or place of residence.

For this reason, BNE has developed a vision for Europe beyond 2030, which articulates how its members aim to make a difference: providing universality and accessibility, enabling relevant public service media, highlighting Europe's role model for democracy, fostering European diversity and richness, contributing to a fair and dynamic European single market, boosting competitiveness and fair competition thanks to a long-term regulatory framework, igniting innovation for all Europe and, overall, supporting a stronger Europe.

Value model

The Digital Terrestrial Television Value Model illustrates the multiplicity and diversity of contributions delivered by digital terrestrial broadcasting, in terms of sovereignty and resilience, innovation, democracy, creativity and culture, social commitment and environmental sustainability.

Sovereignty and resilience

As a critical infrastructure, organized in nationwide networks and operated under national licenses, DTT is an asset that strengthens European sovereignty.

At the same time, DTT infrastructure provides resilience for the broadcasters and the other multiple services using it. This turns DTT into the best platform to keep Europe safe, securing a functioning society in times of crises in the easiest way.

In any emergency, terrestrial broadcasting provides a key resilient network to reach out to citizens and support the work of emergency and rescue services, which often operate their own internal communication systems on the DTT infrastructure.



Executive summary

Not only DTT sites are highly protected from any threat but also highly resilient to cyber attacks, guaranteeing service continuity at a level that cannot be matched by online distribution.

Overall, DTT delivers TV services to everybody with no bottlenecks and no buffer even in peak time, securing a high-quality access to all viewers regardless of their location.

Innovation

Based on its vision for Europe beyond 2030, broadcast network operators have recently unveiled their own innovation roadmap.

This includes the launch and development of several new technologies that would not only create the linear TV experience of the future but also blend linear and on demand services for a seamless and easier viewing experience.

Within this roadmap, 5G Broadcast combines broadcast and unicast technologies, not only promoting a better user experience on mobile devices but also a more efficient use of the spectrum.

The DTT network will offer a seamless access to linear and on demand contents, making viewers' lives easier via technologies such as HbbTV and DVB-I.

This commitment to innovation is complemented by the increasing spectral efficiency enabled by two factors: the transition from DVB-T to DVB-T2 and the use of more efficient video compression codecs such as HEVC and VVC. As a result, DTT will enable the delivery of higher quality services and pave the way for the introduction of 5G Broadcast.

This technical evolution of the DTT network will not be at the expense of other services, rather the opposite: this innovation roadmap plans to maintain the track record of terrestrial broadcast services in spectrum sharing with other key services such as PMSE for media and cultural production, radio astronomy and the military.

Democracy

While democracy is often taken for granted in Europe, it needs to be nurtured, strengthened and promoted.

Terrestrial broadcasting services already do that by enabling a direct connection, without gatekeepers, between broadcasters and citizens.

Among all media, broadcasters are a primary source of trusted information, thus greatly contributing to the required public debate to keep democracy healthy.

The license system built upon DTT infrastructure guarantees quality news, pluralism and freedom of speech. It is also an effective tool in the urgent fight against misinformation that threatens democracy.

Consequently, a weakened DTT or its switch-off would diminish the ability of national decision-makers and regulators to use public policies to shape the development of media and communication services. As a result, a broad array of public goals aiming to create a more fair and diverse society would not be achieved.

Overall, DTT broadcasters are key contributors to the health and dynamism of the national public sphere. Thanks to their nationwide footprint and the content they carry, these broadcasters enable each and all citizens to form their own opinions.

Creativity and culture

Terrestrial broadcasting plays a key role in enabling a sovereign, independent and thriving European audiovisual and cultural sector thanks to its close relationship with producers and its very significant investment.

Five out of 6 € invested in European original content come from broadcasters, for which DTT is their distribution backbone.

Executive summary

Overall, European broadcasters annually spend nearly 38 billion € in content.

This investment results in the creation of highly-qualified jobs that, by their nature, are difficult to relocate to other countries.

Not only are broadcasters the prime investors in European original content but also the main agents showcasing this content. As such, they spread culture and stories with European values at their core.

For broadcasters, DTT is more than just a robust and reliable distribution network delivering an extensive footprint, high quality of service and high reach: it is also an strategic asset. Thanks to DTT, European broadcasters secure their direct access to their viewers via a free and easy-to-use platform. Furthermore, DTT ensures their prominence and findability in an increasingly crowded offer.

Social commitment

DTT's high population and territorial coverage allows broadcasters to play a key social role in European societies, preventing leaving anybody behind.

DTT brings a free-to-air and easy-to-use linear TV experience to all citizens, regardless of their age, their location or their economic, social and educational conditions.

Given its coverage rates close to 100% of the population, DTT provides an offer with a guaranteed quality of service to nearly all citizens across Europe. It secures universal access to quality information, entertainment and knowledge together with connection and companionship.

Therefore, DTT acts as a tool for inclusiveness that can be leveraged to build a more cohesive society.

The platform also champions accessibility: users with disabilities, and their families, benefit from adapted communication services thanks to the sustained efforts and investments in accessibility made by DTT broadcasters.

Sustainability

Terrestrial broadcasting is an asset for the environmental sustainability journey in which modern societies are embarked.

Broadcast network operators already illustrated this through their landmark Report on Low Carbon Television, commissioned to Carnstone.

Overall, DTT is the greenest platform for TV distribution, thanks to both its multicast nature and the passive aerial connection to access the network at households.

Additionally, the platform enables an enormous brainprint by DTT broadcasters: their ability to raise awareness, change attitudes and prompt action regarding climate and the environment among audiences should be neither obviated nor underestimated.

Furthermore, dismantling an efficient and effective infrastructure of these dimensions would generate enormous amounts of unnecessary waste with a high environmental impact and a huge economic cost.

Similarly, maintaining DTT is a policy decision against both planned obsolescence of mobile devices and generation of electronic waste. The long replacement cycle of TV sets is a greener option than the shorter one of mobile devices.

1

A vision for Europe beyond 2030



A vision for Europe beyond 2030

Europe is something else beyond treaties, directives, or the single market. It is a concept that stands for unity, solidarity, mutual understanding, cooperation and welfare.

Europe is a choice. A choice to work together and ensure that nobody is left behind. Europe is the aspiration to guarantee that any and every European citizen, regardless of location or condition, can benefit from the social, health, technological, industrial and cultural developments achieved by humankind.

Europe embodies a collection of values such as freedom, democracy, equality, universality, sustainability, diversity, inclusion or accountability. Enshrined in the [Treaty of Lisbon](#), these values guide how political and business decisions and choices are made and implemented.

As the trade body of the European broadcast network operators, BNE works to ensure that its members' voice is heard and their activities contribute to the development and strengthening of Europe.

For these reasons, and given the crucial choices that will be made at the upcoming 2023 World Radiocommunication Conference, BNE and its members want to share their vision for Europe's future beyond 2030.

This vision is built on the mentioned European values and embodies BNE and its members' eagerness to contribute to a plural, tolerant and solidary society where there is no place for discrimination.

This vision is also aligned with the recent

[European Declaration on Digital Rights and Principles for the Digital Decade](#), and particularly with its goals regarding placing people at the centre of digital transformation, fostering solidarity and inclusion, strengthening safety and security and promoting sustainability.

Figure 1. A Vision for Europe beyond 2030



2

The value and contribution
of DTT to build a better
future for Europe



The value and contribution of DTT to build a better future for Europe

The decision to be made at the WRC–23, and the European position to be defined ahead of it, may redefine the future of the European broadcasting industry.

It will also have significant consequences for European citizens, as their taken-for-granted access to free-to-air television services may disappear. In addition, it may have major implications for European culture, from its creation to its dissemination, as its main distribution platform might be closed down.

Last but not least, the financial and business implications resulting from a change in the allocation of the frequencies within the lower UHF band would for sure impact Europe’s ability to not only stand up for the values it represents but also remain competitive and innovative amidst a global scenario of polarization, technology disruption and power concentration.

Consequently, such a debate and the related decision-making process should consider all arguments available. Achieving a 360 degrees perspective of the issue, considering not only technological but also economic, social, cultural and democratic aspects becomes a must.

To contribute to this debate, as a direct outcome of BNE’s vision for Europe beyond 2030, this report provides a deep and

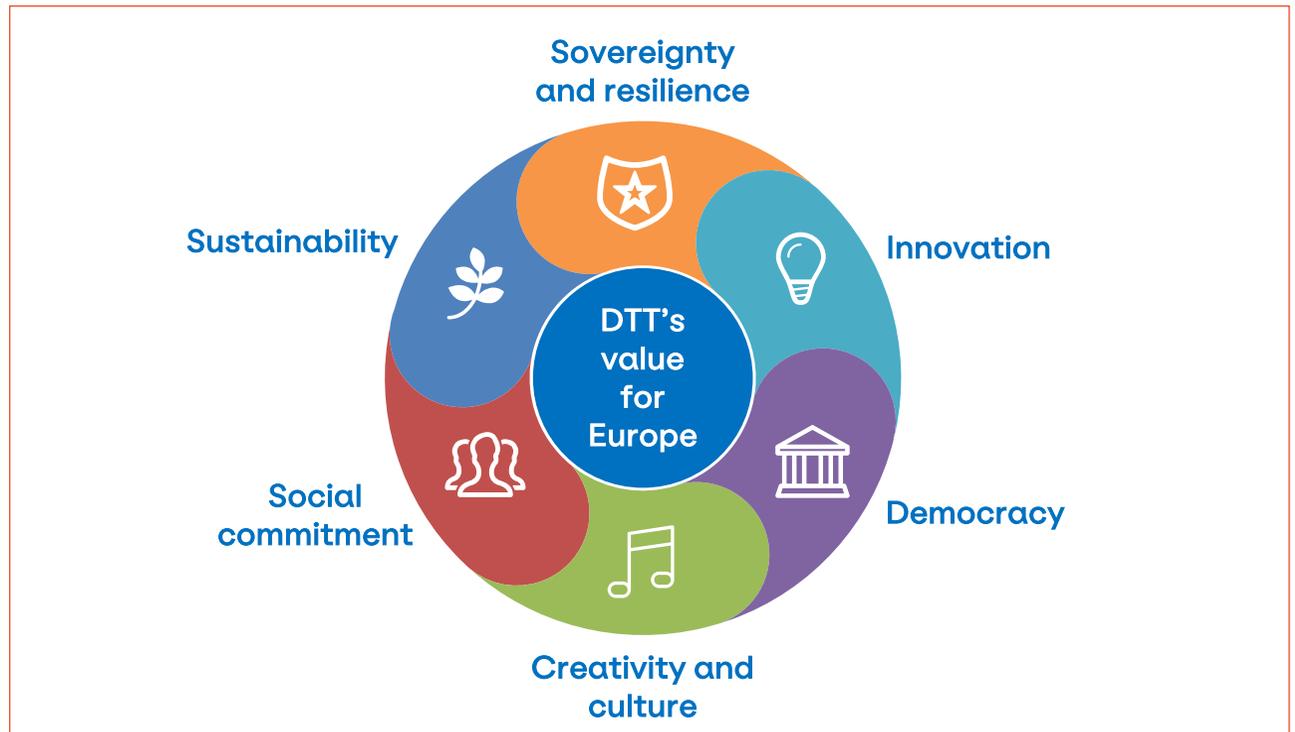
thorough assessment of how broadcasting services, and particularly digital terrestrial television, deliver value to European societies and its citizens and could also contribute to Europe’s Digital Decade targets.

This exploration has resulted in the Digital Terrestrial Television Value Model, which illustrates the multiplicity and diversity of

domains in which the platform delivers value and has a positive impact on society and the industry.

From infrastructure safety and independence to technical innovation and many other types of economic, social, cultural and democratic value, all the benefits delivered by DTT turn it into a great asset to build the future of Europe.

Figure 2. Digital Terrestrial Television Value Model



The value and contribution of DTT to build a better future for Europe

A sovereign and resilient Europe



#1

The best and easiest way to ensure Europe's sovereignty

#2

A lifeline in emergency situations

#3

A safeguard against cybersecurity threats

#4

A secured high-quality access to TV services

CASE

Strengthening citizens' resilience across Europe

CASE

Broadcasters' agile response to COVID-19 for the citizens and for culture

As a critical infrastructure, organized in nationwide networks and operated under national licenses, DTT is an asset that strengthens European sovereignty.

At the same time, DTT infrastructure provides resilience for the broadcasters and the other multiple services using it. This turns DTT into the best platform to keep Europe safe, securing a functioning society in times of crises in the easiest way.

In any emergency, terrestrial broadcasting provides a key resilient network to reach out to citizens and support the work of emergency and rescue services, which often operate their own internal communication systems on the DTT infrastructure.

Not only DTT sites are highly protected from any threat but also highly resilient to cyber attacks, guaranteeing service continuity at a level that cannot be matched by online distribution.

Overall, DTT delivers TV services to everybody with no bottlenecks and no buffer even in peak time, securing a high-quality access to all viewers regardless of their location.

A sovereign and resilient Europe

#1. The best and easiest way to ensure Europe's sovereignty

WHY?

Because of its large nationwide population and territorial coverage and its resilience, DTT is a key national communication infrastructure.

DTT only stops working in extremely rare occasions. National regulations establish severe thresholds regarding its continuous availability. The aim is to minimize the impact of any incidence on service provision.

To meet these requirements, broadcast network operators make huge investments to deploy redundancy strategies. This means that most major technical components have a backup. Some critical systems such as head ends even have double redundancy.

Also energy supply is redundant, as generators that run on fuel for several days kick in when there is a power grid outage.

This makes DTT transmitter sites resilient to equipment failures, natural disasters such as fires, extreme weather conditions, power outages and sabotage.

FOR WHOM?

DTT networks benefit the entire society as they contribute to national sovereignty by ensuring the operation of a nationwide communication network highly resilient to external attacks.

POLICY ALIGNMENT

In a polarized and volatile global scene, European countries and institutions are becoming increasingly concerned about the risks faced by critical infrastructures.

As illustrated by the sabotage of the Nord Stream gas pipelines, European infrastructures are under threat.

At European level, the EU's resilience strategy is drafted in its Directive on the resilience of critical entities ([CER Directive](#)). More recently, the European Commission has proposed a [coordinated approach by the Union to strengthen the resilience of critical infrastructure](#).

In this regard, the capillarity of the DTT network and the universality it provides become a key asset for these resilience strategies, national security and sovereignty.



10 days
of autonomy



In case of outage, DTT transmitters in Greece can continue to operate up to 10 days thanks to power generators.

Source: Digea

The resilience of the DTT network ensures the national control and sovereignty over a critical infrastructure in times of crises

A sovereign and resilient Europe

#2. A lifeline in emergency situations

WHY?

As recognized by the [ITU](#), broadcasting is a key infrastructure to reach the population in emergency situations. Extreme natural events such as floodings and storms –on the rise due to climate change– or military conflicts as the one Ukraine illustrate how broadcasting often remains the most resilient infrastructure and the last available network to inform and support citizens in danger.

Additionally, the nearly universal coverage offered by broadcasting services is indispensable to reach people in isolated areas, where it may take longer for civil protection bodies to arrive.

For civil protection operations, broadcasting remains a critical network. Its combination with Internet-based platform optimizes the response time during a crisis.

FOR WHOM?

Citizens are the ultimate beneficiaries of this resource, which becomes a key tool to protect and reassure them.

It also facilitates the work of civil protection officers as well as emergency and rescue services.

POLICY ALIGNMENT

In Europe, early warning tools complement national public warning systems with the aim is to protect citizens from disasters.

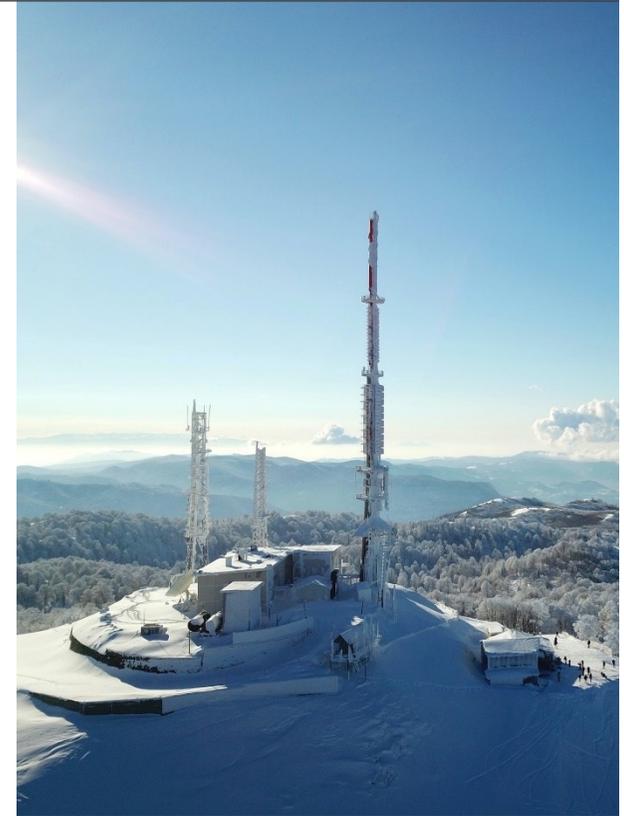
Their goal is to reach and alert people affected by a natural or human-induced hazard.

Given its resilience, the terrestrial broadcast infrastructure and the DTT services can contribute to save lives, protect livelihoods and the environment by complementing other emergency warning systems.



Temperatures in Europe have increased at more than twice the global average over the past 30 years, leading to exceptional heat, wildfires and floods

Source: [World Meteorological Organization](#)



Terrestrial broadcasting offers a key resilient communication network to reach citizens in emergency situations

A sovereign and resilient Europe

#3. A safeguard against cybersecurity threats**WHY?**

Growing use of digital services by citizens comes with increasing cybersecurity threats. Distributed Denial of Service (DDoS) attacks are the most frequent and continue [to grow](#).

A recent [EU report](#) warns that cyberthreats are increasingly part of foreign information manipulation and interference campaigns, posing an additional risk to European and national sovereignty.

In this context, terrestrial broadcasting emerges as a resilient infrastructure against cyberattacks. DTT transmitters can only be accessed remotely via their head-ends, which are highly protected, while at the same time employing signal feed redundancies such as satellite feeds, backup microwave links or even over-the-air reception from another site. Therefore, DTT remains available in case of a general shutdown of the Internet or mobile networks due to power outages or attacks.

FOR WHOM?

Cyberattacks affect mostly organizations. In the case of media, broadcast guarantees service continuity at a level that cannot be matched by services provided online.

POLICY ALIGNMENT

Since 2017, all EU Member States –and a few additional ones beyond the EU– have a national cybersecurity strategy.

At EU level, the Revised Directive on measures for a high common level of cybersecurity across the Union ([NIS 2 Directive](#)) strengthens the [EU-wide cybersecurity strategy](#). These strategies are a critical enabler of Europe's digital transformation.

In this regard, the use of a highly-protected network such as DTT effectively contributes to build cyber resilient critical infrastructures.

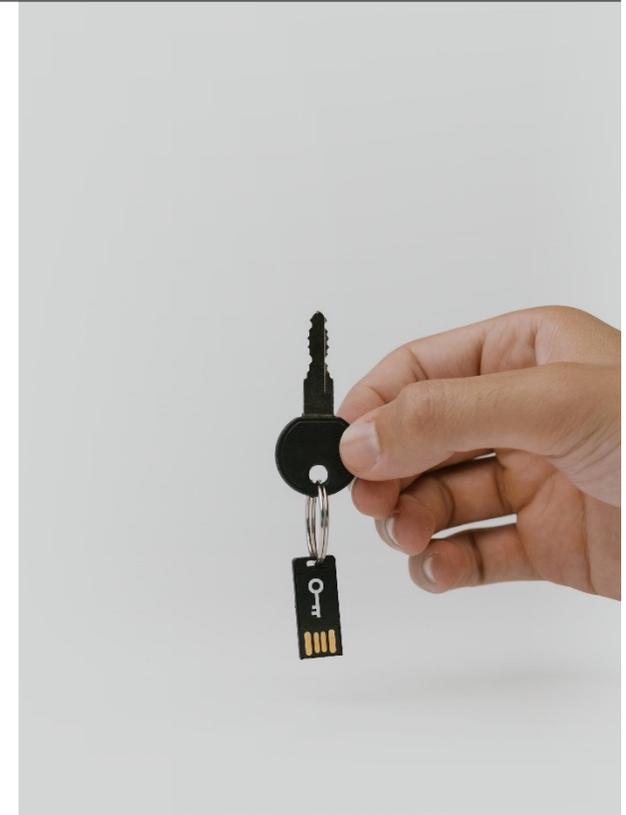
Supporting the continuity of DTT would also contribute to the Specific Goal 5 of the [DG CNECT's Strategic Plan 2020–24](#), *A cyber resilient Europe*, promoting digital identities for all Europeans, while protecting their e-privacy.

FACT

5,106 million hours

Time lost due to cybersecurity issues in EU and EFTA in 2021

Source: [EU Agency for Cybersecurity](#)



Being highly resilient to cyber threats, DTT networks reassure citizens and national administrations, notably in times of crises

#4. A secured high-quality access to TV services

WHY?

DTT ensures quality of service (QoS) while keeping anonymity of the user.

Broadcasting delivery ensures that quality of service is the same for each viewer, making technical high quality a basic feature with independence of the user location.

Quality of service for each user is independent of the size of the audience. There are no bottlenecks and service is as stable in day time as in peak time. For instance, there is no signal drop during a big sports event watched simultaneously by millions of people.

To achieve this, minimum and average data rates are defined together with a maximum bit error rate that is considered quasi error free. As such, DTT offers quality by design: once the broadcaster decides to deliver its signal in standard, high-definition or ultra high-definition, there is certainty for the provider and the user that the signal will be delivered with this agreed level of quality.

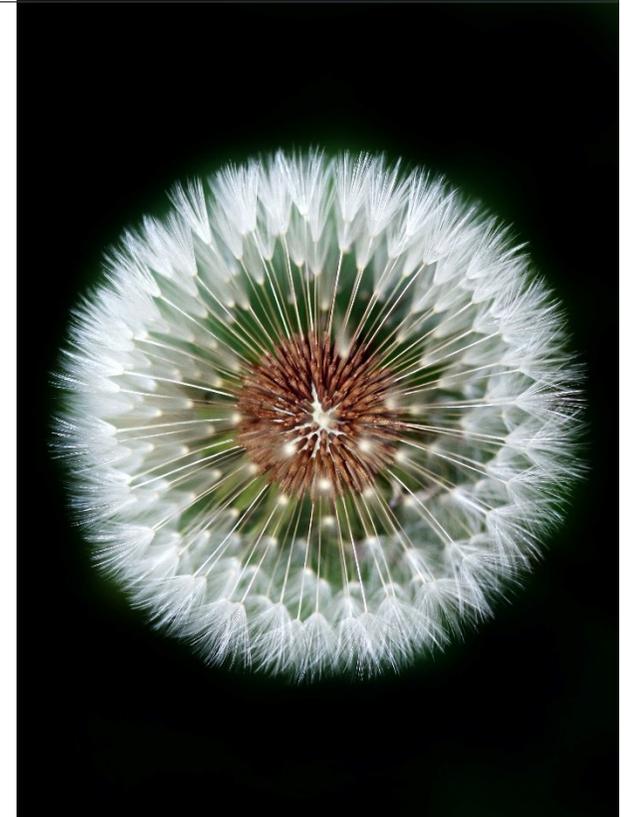
FOR WHOM?

Individuals benefit from a homogeneous quality of service while keeping control over their data and independently of their purchasing power, location or technical skills.

POLICY ALIGNMENT

The [European Green Deal](#) is clear at pointing that a modern, resource-efficient and competitive economy should ensure that no person and no place are left behind. In audiovisual terms, DTT is the best option to ensure this becomes a reality. With DTT, there is no need to downgrade the quality of the services (lower bit rate) to ensure that they are available to all citizens.

This should be seen as an integral part of the European approach to territorial cohesion, one of the three pillars of the [Treaty of Lisbon](#) in 2008, together with social and economic cohesion.



99.6%



Average availability rate of DTT in mainland Portugal in 2020

Source: [Anacom's Relatório qualidade de serviço TDT - 2020](#)

DTT delivers television to everybody with no bottlenecks and no buffer even in peak time

A sovereign and resilient Europe

CASE: Strengthening citizens' resilience across Europe

From 1980 to 2020, natural disasters affected nearly 50 million Europeans and caused economic losses of roughly 12 billion € per year. The UN believes that these events are likely to increase in frequency and severity in the future.

These events have the potential to disrupt interpersonal and mass communication networks, putting citizens' lives at risk and making the work of civil protection officers more difficult.

This was the case of the mass floodings in Germany – notably in the Ahr Valley–, Belgium and the Netherlands in summer 2021.

In Germany, all the severely affected areas experienced disruptions in mobile network services. In the Ahr Valley region, it took two weeks to recover the previous mobile coverage and up to one month to fully restore the network. Broadband services functioned normally only after five months. In Belgium, it took around 11 months to restore connection completely.

This case exemplifies the vulnerability of digital networks and how a redundant approach can help. Following this disaster, German broadcaster BR has started to test how Cell Broadcast, a technology that send warning messages directly to mobile phones, could be implemented in 5G Broadcast.



 **STAT**



Source: European Commission

RESOURCES

Factsheet – [European Disaster Risk Management](#)

Report – [Provisional State of the Global Climate 2022](#)

Paper – [Critical Infrastructure impacts of the 2021 mid-July western European flood event](#)

Press release – [BR testet erfolgreich Cell Broadcast via 5G Broadcast](#)

A sovereign and resilient Europe

CASE: Broadcasters' agile response to COVID-19 for the citizens and for culture

During the COVID-19 pandemic, broadcasters demonstrated how their resilience benefits the entire society.

Following the sudden confinements approved by public authorities, broadcasters across Europe rapidly adapted, changing their schedules and offering relevant services to the citizens.

Public service broadcasters illustrate this agility well. They focused on providing information about what was a completely new and uncertain situation for most citizens. People relied and trusted public service media, as evidenced by sky-rocketing ratings: the reach of their evening news programmes multiplied by 2.5 in the most affected markets on days when key announcements were made.

After the first weeks, public broadcasters used their programming to provide relief, entertainment, connection and sense of belonging in a difficult moment, when citizens were isolated. They also set up educational content and resources for children who were suddenly home schooling.

Notably, public broadcasters became a lifeline for cultural workers and companies, which suffered the effects of cultural venues being closed. They did so by stepping in for cancelled events, increasing exposure for local artists and supporting creatives in need through new commissions.



STAT



Growth of public service media daily viewing

(March 2020 vs. average Q1 2019)

Source: EBU based on 29 of its members

RESOURCES

Report – [Update COVID-19 Crisis. PSM Audience Performance](#)

Report – [COVID-19 Crisis. PSM Support to the Arts and the Creative Sector](#)

The value and contribution of DTT to build a better future for Europe

An innovative Europe



#5

A native linear experience in mobile devices through 5G Broadcast

#6

Seamless access to linear and on demand contents

#7

A more efficient television experience

#8

An example of spectrum sharing with other key services

CASE

5G Broadcast, the European path to a native mobile experience for linear TV

CASE

Blending the power of broadcast and broadband in Spain via LOVEStv

Based on its vision for Europe beyond 2030, broadcast network operators have recently unveiled their own innovation roadmap. This includes the launch and development of several new technologies that would not only create the linear TV experience of the future but also blend linear and on demand services for a seamless and easier viewing experience.

Within this roadmap, 5G Broadcast combines broadcast and unicast technologies, not only promoting a better

user experience on mobile devices but also a more efficient use of the spectrum.

The DTT network will offer a seamless access to linear and on demand contents, making viewers' lives easier via technologies such as HbbTV and DVB-I.

This commitment to innovation is complemented by the increasing spectral efficiency enabled by two factors: the transition from DVB-T to DVB-T2 and the use of more efficient video compression codecs such as HEVC and VVC.

As a result, DTT will enable the delivery of higher quality services and pave the way for the introduction of 5G Broadcast.

This technical evolution of the DTT network will not be at the expense of other services, rather the opposite: this innovation roadmap plans to maintain the track record of terrestrial broadcast services in spectrum sharing with other key services such as PMSE for media and cultural production, radio astronomy and the military.

An innovative Europe

#5. A native linear experience in mobile devices through 5G Broadcast

WHY?

5G Broadcast combines the building blocks of 5G mobile technology with broadcast towers to bring the free-to-air linear video experience to all types of mobile devices, including in-car systems.

5G Broadcast works on mobile devices without the need of a SIM card. Hence, it does not require a subscription and its consumption is excluded from data caps.

As such, 5G Broadcast avoids gatekeepers and preserves the free-to-air essence of the European TV system. It even enhances the users' experience, enabling access via mobile devices and matching changing consumption patterns.

FOR WHOM?

For users, the value of 5G Broadcast lies in bringing a native linear broadcasting experience to their mobile devices without extra cost.

From the broadcasters' perspective, 5G Broadcast has the potential to increase their reach while improving the user experience.

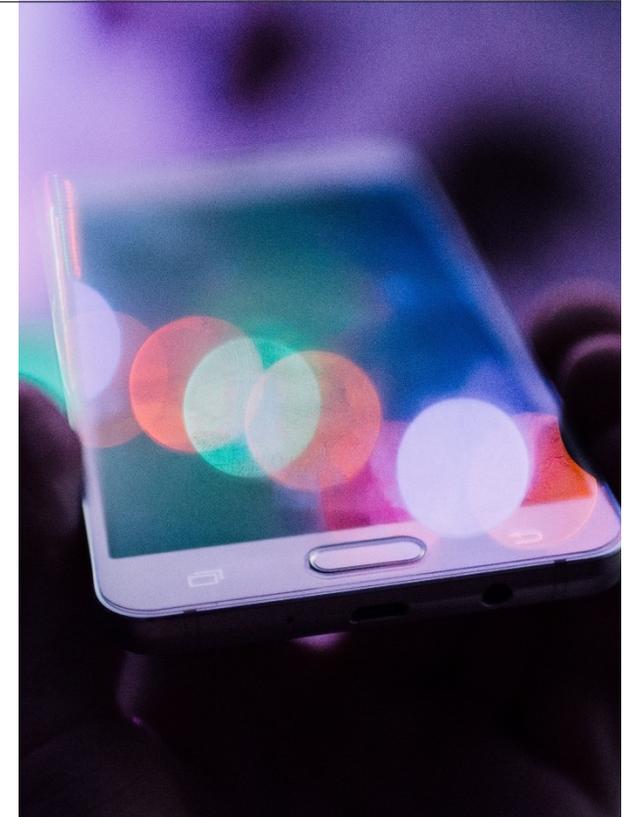
As such, the public policy objectives linked to the licensed TV system can continue in place, thus supporting national administrations and media authorities.

POLICY ALIGNMENT

Keeping broadcast infrastructure relevant in combination with the next generation of mobile technologies is aligned with the twin green and digital transitions of the EU and many European countries.

At EU level, the European Commission set [A New Industrial Strategy for Europe](#) in March 2020, 'fit for the ambitions of today and the realities of tomorrow'.

This document clearly states that 'Europe's industrial strategy must reflect our values and social market traditions'. Thanks to its innovation roadmap, broadcast networks are the digital networks best suited to deliver this policy goal.



In 2020 

5G Broadcast specifications were published as part of the 3GPP Release 16 for 5G technology

Source: [3GPP](#)

Blending broadcast and unicast technologies not only promotes a better user experience but a more efficient spectrum use too

An innovative Europe

#6. Seamless access to linear and on demand contents

WHY?

While on-demand video consumption is clearly increasing, linear TV continues to represent most of the overall consumption: in 2022, [82% of adults watched television on a weekly basis across Europe](#). On average, every citizen watched [3 hours and 36 minutes of TV every day](#).

As such, blending the benefits of broadcast and on-demand is a sensitive proposition for the audience. While HbbTV brings both services together to the same device –notably connected TVs– and enables interactive services, there are other new technologies in the pipeline to improve the TV watching experience. This is the case of DVB-I, which allows seamless switching between broadcast and broadband signals while bringing new features to DTT such as playlists and temporary streams.

FOR WHOM?

Citizens will enjoy a better TV experience by being able to use services and their features interchangeably across devices.

Broadcasters can provide a better service and thus satisfaction to their customers.

POLICY ALIGNMENT

Enriching citizens’ life while keeping it simple perfectly matches with the innovation goals set by European bodies such as the European Commission and its ‘human-centered innovation’. If citizens can get the best benefits from linear and on-demand video, then there is no need to renounce to any of them.

Additionally, this innovation vector is mostly powered by the DVB family of standards, led by European engineers considering the needs of European citizens. Consequently, given the technical and commercial track record of DVB technologies as well as their leading role in this innovation field, there is a potential to generate a European success story by globally exporting this technology.



3 hours
36 mins



Average daily linear and time-shifted TV consumption per person in Europe in 2021

Source: [EBU](#)

DTT promotes the hybridization of linear TV and on demand video to better serve citizens

#7. A more efficient television experience

WHY?

Increasing demand for radio spectrum bands has brought the focus to spectral efficiency. Broadcast players tackle this challenge by optimizing the technical layer that supports DTT services.

A proof of this is the ongoing transition from DVB-T to more efficient DVB-T2, already [used in 28 European countries](#), 16 of them in the EU. Four out of five DTT households use DVB-T2.

With regards to video compression, DTT is also migrating from the MPEG-4 standard to HEVC (High Efficiency Video Coding), offering around 50% additional data compression for the same perceptual quality. The already standardized VVC (Versatile Video Coding) is expected to encode as many UHD streams in a DTT multiplex as HEVC can encode HD streams.

FOR WHOM?

Spectral efficiency improves the user experience by increasing the quality of video, in terms of both more definition (UHD, UHD2) and better definition (HDR, HFR, WCG), as well as better audio (NGA).

Additionally, it may allow to introduce 5G Broadcast services in the medium term.

POLICY ALIGNMENT

Efficient use of the radio spectrum is a core principle of European spectrum policies, notable at EU level. This principle has been enshrined in the [European Electronic Communications Code](#) (2018), the key directive in this area.

In this regard, a recent [study](#) commissioned by the European Commission confirms the potential of broadcasting to continue to improve efficiency through technical innovation.



 FACT

80.9%



of DTT households use DVB-T2

Source: [Dataxis](#)

DTT continues working on delivering spectral efficiency through innovation

#8. An example of spectrum sharing with other key services

WHY?

Services based on radio frequencies have to consider interferences from other services. This is why some of them cannot co-exist in the same band, as occurs with broadcast and mobile services.

In the lower UHF band, terrestrial TV share the spectrum with other services. The most important one is Programme-Making and Special Events (PMSE), used for media production and cultural, sports, religious, political and social events at permanent and temporary venues. This is PMSE's only harmonized spectrum at European level.

For decades, the band has been used on a secondary allocation by radio location and radio astronomy, the scientific field that observes the radio waves from stars, planets and other areas of the universe with telescopes. More recently, white spaces have started to be used.

The lower UHF band is also temporarily used on remote locations by the military.

FOR WHOM?

Spectrum sharing benefits a great variety of professional communities while delivering essential services to citizens in an efficient manner.

POLICY ALIGNMENT

EU institutions value shared use of the radio spectrum.

The EU's [Radio Spectrum Policy Programme](#) (2012) sets out a framework based on efficient use and efficient management. To enhance efficiency and flexibility, this framework requires Member States to foster the collective use and shared use of spectrum where appropriate.

The [European Electronic Communications Code](#) (2018) promotes the shared use of the radio spectrum as a major driver for achieving its main goals, namely promoting competition, the internal market, citizens' and businesses' interests and connectivity. Keeping the current allocation of the lower UHF band to DTT is the way to make these goals a reality.



FACT

224 MHz

of the lower UHF band accommodate a broad variety of services.

- BROADCAST TV
- PMSE
- RADIO ASTRONOMY
- RADIO LOCATION
- MILITARY
- WHITE SPACES

Efficiency best practice



By sharing spectrum harmoniously with other key services, DTT enables a prosperous cultural and media ecosystem

CASE: 5G Broadcast, the European path to a native mobile experience for linear TV

5G Broadcast enables the blending of the terrestrial broadcast infrastructure with mobile broadband networks to deliver a native linear TV experience to users in all type of mobile devices.

This will not only deliver higher convenience – as users will be able to watch linear broadcasting on their mobile devices– but also enable better portable outdoor reception at high speeds. 5G Broadcast could also become a complementary way of viewing in secondary homes.

5G Broadcast allows broadcasters to remain competitive even if viewing behaviour changes. This is a critical step to ensure their future relevance among the audiences. As such, the EBU has counted at least 18 different trials since 2015, showing high level of interest by market players.

In Austria, 5G Broadcast tests show that:

- Mobile devices can be used for portable outdoor reception and extend the number of users for terrestrial broadcasting.
- 5G Broadcast HPHT networks are a supplement to existing DVB–T2 HPHT networks for fixed and portable indoor reception. Both can coexist with DVB–T2 in the sub–700 MHz UHF band.
- 5G Broadcast can achieve a comparable performance to DVB–T2 in the future given its potential for development.



STAT

18 trials 

of 4G/5G Broadcast have been conducted by public broadcasters across Europe since 2015

Source: EBU

RESOURCES

Technical specification – [5G Broadcast System for linear TV and radio services: LTE-based 5G terrestrial broadcast system](#)

Report – [Trials and tests relating to 4G/5G by European public broadcasters](#)

Report – [Technical implementation status of 5G Broadcast: Vienna Field Trial](#)

An innovative Europe

CASE: Blending the power of broadcast and broadband in Spain via LOVEStv

The Spanish HbbTV platform LOVEStv epitomizes the starting point of a blended experience including linear and on demand TV services. It brings traditional television and the Internet closer in a non-disruptive manner via smart TVs, present in more than half of the Spanish households.

For the users, the platform creates the opportunity to continue to enjoy free-to-air TV and add on-demand content and features, such as catch-up, start-over, electronic program guide, and curated recommendations. This is especially valuable for the less digitally literate users or those who cannot afford a pay subscription.

LOVEStv is also an example of a joint effort between public and commercial broadcasters to offer a better service and experience to citizens, strengthening their value proposition. For the public operator, being present at LOVEStv implies a better fulfilment of its public service remit. For commercial operators, LOVEStv and its underlying technology create the opportunity to build new commercial propositions and stay relevant in the changing advertising landscape.

By using HbbTV, LOVEStv acts as a catalyst, adding value to the linear TV consumption and spreading the use of on-demand services for a better user experience.


 **STAT**

2.1 million
households use
LOVEStv in Spain



Source: Cellnex

RESOURCES

Website – [LOVEStv](#)

Academic paper – [The Spanish HbbTV service LOVEStv: When technology facilitates new strategies for survival](#)

The value and contribution of DTT to build a better future for Europe

A democratic Europe



- #9 Primary source of trusted information and public debate
- #10 A firewall against disinformation
- #11 A communication service for the benefit of the whole society
- #12 A key contributor to the national public sphere
- CASE Media that citizens can trust
- CASE Free-to-air television that brings people together across Europe

While democracy is often taken for granted in Europe, it needs to be nurtured, strengthened and promoted.

Terrestrial broadcasting services already do that by enabling a direct connection, without gatekeepers, between broadcasters and citizens.

Among all media, broadcasters are a primary source of trusted information, thus greatly contributing to the required public debate to keep democracy healthy.

The license system built upon DTT infrastructure guarantees quality news, pluralism and freedom of speech. It is also an effective tool in the urgent fight against misinformation that threatens democracy.

Consequently, a weakened DTT or its switch-off would diminish the ability of national decision-makers and regulators to use public policies to shape the development of media and communication services. As a result, a broad array of public

goals aiming to create a more fair and diverse society would not be achieved.

Overall, DTT broadcasters are key contributors to the health and dynamism of the national public sphere. Thanks to their nationwide footprint and the content they carry, these broadcasters enable each and all citizens to form their own opinions.

A democratic Europe

#9. Primary source of trusted information and public debate

WHY?

Vibrant democracies require a healthy public sphere, which is enabled by the provision of quality news and trustworthy information.

Thus, trust in news is a key element to support citizens in their democratic duties. Countries with [higher trust](#) also tend to have higher interest in news and lower levels of active news avoidance.

Public broadcasters' news are the most trusted in 28 out of the 31 European countries (25 out of 27 in the EU) analysed by the [Reuters Institute](#). Commercial broadcasters lead in the three remaining countries.

Therefore, legacy broadcasters such as those distributed via DTT networks crucially contribute to sustain the quality of democracy at national and European level.

While often taken for granted in Europe, democracy needs to be nurtured. Only one fifth of the world population lives in what [Freedom House](#) considers free countries.

FOR WHOM?

The democracy upholding role played by broadcasters benefits the entire society, from democratic institutions and processes to individual citizens.

POLICY ALIGNMENT

While Europe is still one of the areas in the world with the highest democracy levels, this is not without challenges. Across the continent, some countries experience authoritarian drifts that question the rule of law. In fact, 88% of European citizens feel that [“there is still work to be done to protect democracy in the EU”](#).

In this context, the [European Democracy Action Plan](#) emphasizes that nurturing democratic values and practices is a key political priority in the EU. The [European Media Freedom Act](#) is one of its flagship components.

As DTT provides a direct connection between broadcasters and citizens, without gatekeepers, it becomes an asset for the public debate. Consequently, it must be safeguarded as a way to maintain and develop a healthy democracy.

 FACT

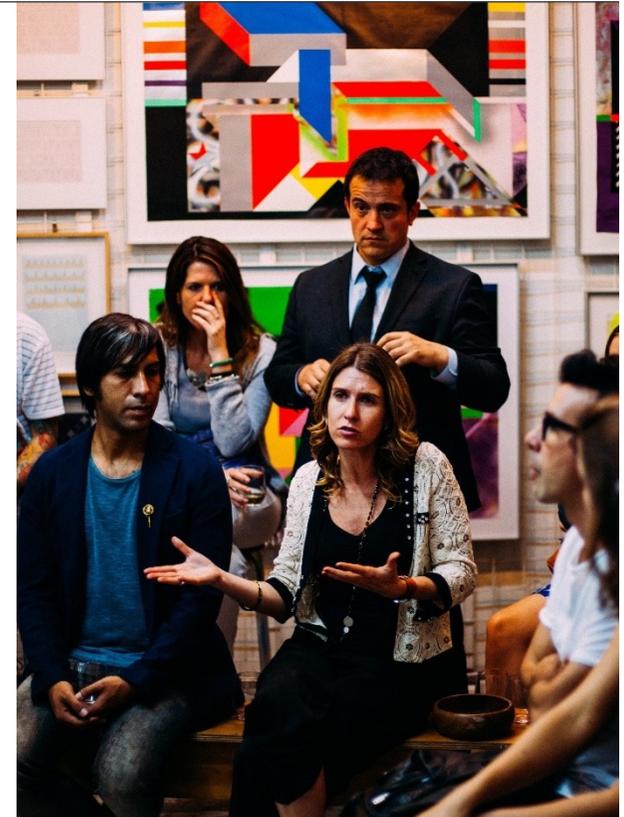
75%



of citizens use TV as their primary source of news

Online news platforms, 43%; Radio, 39%; Social media platforms and blogs, 26%; Printed press, 21%; YouTube or other video platforms, 13%; Messaging apps, 10%; Podcasts, 5%

Source: [Flash Eurobarometer News & media survey](#)



Supporting DTT contributes to secure a more vibrant public debate and healthier democracies

#10. A firewall against disinformation

WHY?

Social media and other Internet-only outlets have publicly demonstrated that they are unable to deal with disinformation.

Opposite, licensed media have confirmed that even in times of digital abundance, they play a key role in guaranteeing quality news, pluralism and freedom of speech.

While Europe remains at the top of world's press freedom, [Reporters without Borders](#) warns about 'the effects of a globalised and unregulated online information space that encourages fake news and propaganda'.

Consequently, the quality and benefits delivered by the European regulated media model may be at stake if TV services are deprived of their direct and independent access to citizens via broadcast networks.

For the citizens, especially for those with low digital literacy, the mix of outlets distributed by unregulated digital platforms makes it more difficult to access quality information.

FOR WHOM?

Society benefits from healthy media that citizens can trust. In fact, trustworthy media are a bedrock of democracy. National and European institutions must therefore do their best to protect them.

POLICY ALIGNMENT

Disinformation features high among the priorities of EU policy-makers. It is one of the three pillars of the [European Democracy Action Plan](#), designed to empower citizens and build more resilient democracies across the European Union.

The European Commission already adopted a [EU Code of Practice on Disinformation](#) in 2018. This was [reinforced in 2022](#) 'to counter efforts by actors who spread disinformation to destabilise our societies and democracies, try to exploit a crisis, and put citizens' lives at risk'.

Supporting the continuity of DTT would also contribute to the Specific Goal 6 of the [DG CNECT's Strategic Plan 2020-24](#), *A modern, open and pluralistic society in the digital age*, where online disinformation is countered and diverse cultural content is available to all Europeans.



FACT

83% 

of Europeans think that disinformation threatens democracy

Source: [Flash Eurobarometer 464 – Fake news and disinformation online 2018](#)

Protecting the distribution of licensed and regulated media via broadcast services is a cornerstone of a well-informed society and a thriving democracy

A democratic Europe

#11. A communication service for the benefit of the whole society

WHY?

Operating a DTT service requires a broadcast or multiplex license, which usually includes certain duties, conditions or limitations based on public policy goals such as media pluralism, cultural diversity, etc. This is notable in the case of public service broadcasters, as enshrined in their public service remits.

Additionally, accountability methods are put in place by independent regulators to assess the fulfilment of these requirements.

A weakened DTT or its switch-off would diminish the ability of national regulators to use public policies to shape the development of media and communication services. Consequently, a broad array of public goals that ensure a more fair and diverse society would not be achieved.

FOR WHOM?

DTT has been and can continue to be a tool for national administrations to create a better society for their citizens by delivering public policy objectives.

As a result, the entire society and each of its citizens receive value from television services that are regulated with positive societal impact in mind.

POLICY ALIGNMENT

Public policies aim to respond to societal issues on behalf of the public through the use of legal and regulatory tools. They are an essential tool for democracy to work for all citizens.

In the case of terrestrial broadcasting services, the platform has been historically used as a way to intervene in the media market in exchange of the use of a common good, the radio spectrum. All this while creating safeguards to guarantee the editorial independence of broadcasters.

As the weight of transnational players and distribution networks only lightly regulated grows, the effectiveness of public policies to tackle certain societal issues decreases, and as such their impact on society.



576 indicators

are used by independent regulator CNMC in Spain to assess that RTVE fulfils its public service functions.



Source: [CNMC](#)

DTT is a tool to achieve public policy objectives thanks to the conditions set in its licenses

A democratic Europe

#12. A key contributor to the national public sphere

WHY?

As DTT's footprint and most of its content are national, the platform is a core tool to shape national public spheres.

By distributing their content, notably news and current affairs programmes, DTT broadcasters enable citizens to form their own opinions, which collectively build the public opinion. In this way, they crucially contribute to existence and quality of the public debate.

Through the licensing process, regulators can shape how DTT invigorates the public sphere. This is often done by requiring certain type and amount of content, e.g., minimum number of hours of news, delivery of regional or local news, coverage of key parliamentary events, etc. In the case of public service media the requirements within their public service remit define their role. As a result DTT is powerful public policy asset.

FOR WHOM?

Through DTT, citizens receive TV content that relates to them, helps them form their opinions, enriches their lives and enables them to connect to what happens around them. DTT is an effective and powerful tool for countries to create a shared communication space and common understanding.

POLICY ALIGNMENT

In 2022, the European Commission proposed the [European Media Freedom Act](#) (EMFA), which signals the relevance of broadcasters in shaping the national public sphere.

Among other goals, the EMFA aims to protect the editorial independence of media service providers and improve the protection of journalistic sources.

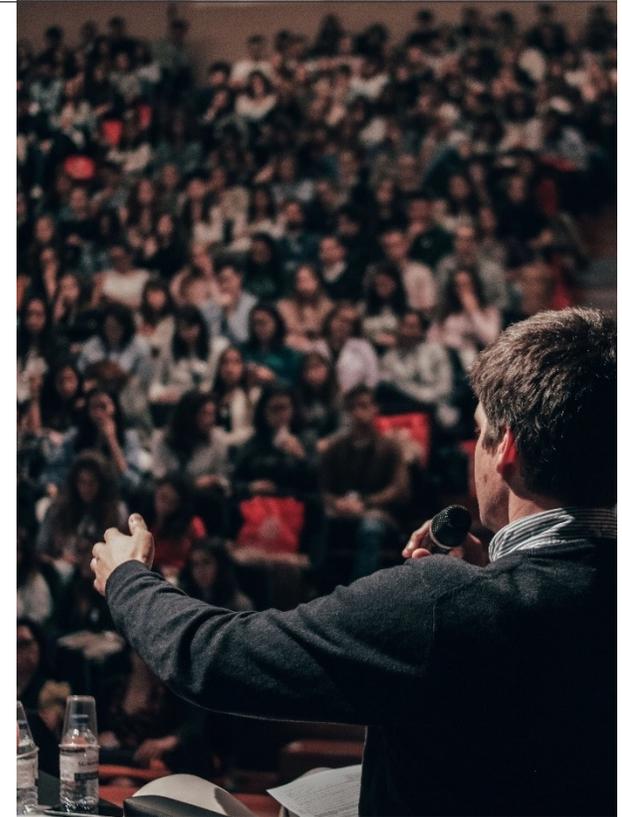
Similarly, it also seeks to strengthen the independence of public service media, which 'shall provide a plurality of information and opinions, in an impartial manner, in accordance with their public service mission'.

FACT

6 billion € investment
45,000 journalists
27% of their offer

European public service
 broadcasters are undoubtedly
 committed to news and information

Source: [EBU](#)



DTT broadcasters are key contributors to the health and dynamism of the national public sphere, enabling citizens to form their own opinions

A democratic Europe

CASE: Media that citizens can trust

While European citizens are progressively embracing the Internet in their everyday life, they do not trust it when it comes to media. Even less if we refer to social media.

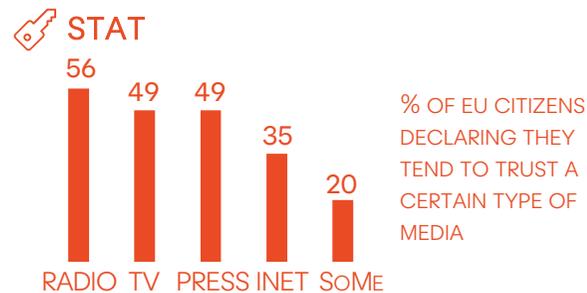
Over the last decade, the results of the Eurobarometer survey consistently show that citizens trust in legacy media, notably radio and TV. Their trust in online media has progressively decreased.

Legacy media, including traditional broadcasting, reach similar levels of trust by citizens than the public administration, the judiciary and the European Union. They are only behind health staff and security forces, and rank above national parliaments and governments, as well as political parties.

Regardless of the increase in online media consumption, broadcasting services maintain the trust of their audiences.

Consequently, they still play a central role in the provision of a safe space for public communication that satisfies individual and societal needs.

This trust in broadcasters is highlighted in the national rankings of most trusted news brands unveiled by the Reuters Institute in its annual report.



European citizens trust broadcast media

Source: EBU based on Eurobarometer 96

RESOURCES

Survey results – [Standard Eurobarometer 96 \(winter 2021–22\)](#)

Survey results – [Flash Eurobarometer News & Media Survey](#)

Report – [Trust in Media 2022](#)

Report – [Reuters Institute Digital News Report 2022](#)

A democratic Europe

CASE: Free-to-air television that brings people together across Europe

The European Commission acknowledges the essential role of sport in European society by highlighting that it ‘promotes the active contribution of EU citizens to society and thereby helps to foster active citizenship’.

To secure this contribution to citizenship, both the Audiovisual Media Services Directive and the European Convention on Transfrontier Television include safeguards to allow European countries to determine which events of major importance for society must be broadcasted free-to-air. The goal is to ensure that these events are available to the entire population so that their right to information is not undermined.

As of June 2022, at least 29 European countries had a national list of events of major importance for society. In total, 448 sports events are protected, meaning an average of 15.4 events per country.

Additionally, across 14 countries the lists also include 39 cultural events for their mandatory free-to-air distribution. The principle applied is the same: they are considered to be part of the national identity, bringing people together around shared aspirations.

In most cases, DTT is the only platform capable to deliver these events free-to-air to a significant proportion of the population.


 **STAT**

487



Events of major importance for society are protected for free-to-air distribution across 29 European countries

Source: EBU

RESOURCES

Policy document – [White Paper on Sport](#)

Legal document – [Audiovisual Media Services Directive](#)

Legal document – [European Convention on Transfrontier Television](#)

Dataset – [Lists of events of major importance for society](#)

The value and contribution of DTT to build a better future for Europe

A creative and culturally rich Europe



- #13 A vital support for the European audiovisual sector
- #14 A generator of highly-qualified creative jobs in Europe
- #15 A platform to showcase European culture and society
- #16 The core building block for broadcasters' sustainability
- CASE The solid health of the European audiovisual sector
- CASE Broadcasters sustaining the independent production sector in the UK

Terrestrial broadcasting plays a key role in enabling a sovereign, independent and thriving European audiovisual and cultural sector thanks to its close relationship with producers and its very significant investment.

Five out of 6 € invested in European original content come from broadcasters, for which DTT is their distribution backbone. Overall, European broadcasters annually spend nearly 38 billion € in content.

This investment results in the creation of highly-qualified jobs that, by their nature, are difficult to relocate to other countries.

Not only are broadcasters the prime investors in European original content but also the main agents showcasing this content. As such, they spread culture and stories with European values at their core.

For broadcasters, DTT is more than just a robust and reliable distribution network delivering an extensive footprint, high

quality of service and high reach: it is also an strategic asset.

Thanks to this platform, European broadcasters secure their direct access to their viewers via a free and easy-to-use platform. Furthermore, DTT ensures their prominence and findability in an increasingly crowded offer.

A creative and culturally rich Europe

#13. A vital support for the European audiovisual sector

WHY?

Broadcasters are the main supporters of the European audiovisual industry, spending 37.7 billion € through their investments in original content (in-house, commissions and co-productions) and acquisitions (source: [EBU](#) and [ACT](#)).

The [European Audiovisual Observatory](#) estimates that 17.4 billion € were invested in European original content –excluding news and sports– in 2021 across the EU27, UK and Norway. Broadcasters accounted for 84% of this investment (14.6 billion €) while SVOD players reached 16% (2.8 billion €). As SVOD content investment [may have peaked](#), broadcasters will remain the main investors in European original content in the foreseeable future.

FOR WHOM?

The European audiovisual sector is the main beneficiary of the existence of thriving broadcasting services. As the mentioned investment in content is mostly done by Europe-based groups and SMEs that are locally supplied, maintaining the competitiveness of broadcasting services has a positive impact on the overall economy of the continent.

POLICY ALIGNMENT

Across Europe, cultural and creative industries have been identified as growth engines for the economy. In 2019, they [generated 643 billion €](#) turnover at EU28 level. Within this group, audiovisual activities generated 119 billion €.

Being aware of their crucial role, the EU supports the European audiovisual industry since 1991 through the [Creative Europe Media strand](#). This includes training, product development, distribution of works and support to festivals, markets, cinemas and audience development projects.

As broadcasters are the main investors of a sector considered by the European Commission as [‘vital to safeguarding Europe’s cultural diversity and sovereignty’](#), Europe cannot afford compromising the future of DTT, their distribution backbone.



FACT



Distribution of investment in European original content (2021)

Source: [EAO based on Ampere Analysis](#)

DTT is the distribution backbone for broadcasters, which are by far the main investors in the European audiovisual sector

A creative and culturally rich Europe

#14. A generator of highly-qualified creative jobs in Europe

WHY?

Cultural and creative industries have been identified by national governments and EU bodies as growth engines for the economy.

Consequently, public policies across the continent have focused on the creation of highly-qualified jobs in these industries.

In 2019, there were [7.6 million jobs](#) in the cultural and creative industries in EU28. Of those, 1.1 million jobs were in the audiovisual sector, including TV and film. [This figure doubles](#) when indirect and induced employment is considered.

This figure was above the 0.9 million jobs in the telecoms sector.

Jobs in the cultural and creative industries are [highly-qualified](#): 59% of workers have a tertiary level of educational attainment, compared to the 35% average of the whole economy.

FOR WHOM?

The generation of employment is a direct benefit for the citizens. As these industries are difficult to relocate, the society ensures the outcomes of these activities have a long-term beneficial effect on the territory.

POLICY ALIGNMENT

Aware of the crucial role of cultural and creative industries, the EU supports the growth and development of the European audiovisual industry since 1991 through the [Creative Europe Media strand](#). This includes training, product development, distribution of works and support to festivals, markets, cinemas and audience development projects.

The European commitment to the sector was highlighted in 2020 with the launch of the Action Plan to support recovery and transformation of the media and audiovisual sectors.

DTT is a core distribution mean for the broadcasters that form the core of the audiovisual sector. Keeping the necessary spectrum for them would ensure that they continue delivering on their duties as well as value.



FACT

1.1 million jobs   

were supported by the audiovisual sector in EU28 in 2019

(vs. 0.9 million by telecoms sector)

Source: [EY based on DESI and Eurostat](#)

Broadcasters contribute to the creation of highly-qualified jobs that are difficult to relocate to other countries

A creative and culturally rich Europe

#15. A platform to showcase European culture and society

WHY?

In addition to their investor role, broadcasters are crucial to showcase European content.

In 2021, public service broadcasters [devoted 90.5%](#) (89.6% in EU 27) of their programming to European content, about 1.2 million hours.

These figures made them absolute champions of European content compared to other players such as stand-alone VOD services. The latter [reached 30%](#) of European titles in their catalogues only after the Audiovisual Media Service Directive introduced this obligation in 2018.

FOR WHOM?

By showcasing European content on the screen, broadcasters disseminate and amplify national cultures and heritage and disseminate the ones of other countries.

This is also crucial to spread European values and identities and to create shared cultural and societal references.

In doing this, broadcasters play an essential role to build a diverse Europe with strong ties among nations and their citizens.

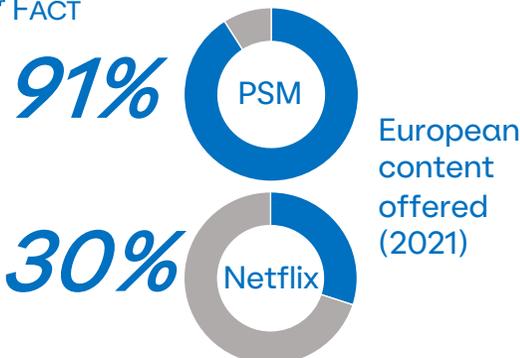
POLICY ALIGNMENT

For decades, the [Audiovisual Media Services Directive](#) has mandated European broadcasters to fulfil a 50% quota of European content in their programming. Broadcasters across the continent have gone well above this mark, notably in the case of public service media organizations. This demonstrates their commitment to the European project as well as the relevance of national and European content for the citizens. At the same time, this has turned broadcasters into the real engine of the European content production industry.

Supporting the allocation of the lower UHF band to broadcasting services is equivalent to protect this European formula that has proven to be extremely successful.



FACT



Source: For PSM, [EBU](#) (22 PSM in 21 markets)
For Netflix, [Ampere Analysis](#) (27 markets)



By showcasing European content, broadcasters spread European values and cultures and create ties among nations and their citizens

A creative and culturally rich Europe

#16. The core building block for broadcasters' sustainability

WHY?

DTT is the distribution backbone of European broadcasters, with 124.2 million households receiving their TV services via this network (source: EBU, BNE, DVB).

According to the [European Audiovisual Observatory](#), 10 out of the 13 top European audiovisual groups are active on the DTT platform, including some of the most heavily reliant on it, such as the BBC and ITV in the UK, RAI in Italy and France Télévisions.

For broadcasters, DTT is more than just a distribution network delivering an extensive footprint and high reach: it is also a strategic asset. Thanks to DTT, these players ensure a direct access to their viewers via a free and easy-to-use platform, ensure their prominence and, as such, their findability.

In fact, DTT provides broadcasters with bargaining power when negotiating carriage fees as well as operational conditions with other networks.

FOR WHOM?

Beyond the distribution of their TV signal, broadcasters receive unique value from DTT at strategic level: direct access, prominence, findability and negotiation power.

POLICY ALIGNMENT

For decades, the [Audiovisual Media Services Directive](#) (AVMSD) has been the cornerstone of the EU harmonized approach to the broadcasting sector, shaping an industry that has added an economic dimension to its social relevance.

The [Council of Europe](#) has also shown interest on public service media, notably via its support to develop them in Central and Eastern Europe and the development of journalistic standards.

The continuation of the long-standing successful association between the terrestrial network infrastructure and broadcasters would set a solid base for further development of broadcasters and broadcasting policy in the future.



FACT

124.2 million households

receive television services via DTT in the CEPT48 countries, and 80.1 million in EU27.

Source: EBU, BNE, DVB



Without DTT, many European broadcasters would lose their primary distribution platform, compromising their viability

A creative and culturally rich Europe

CASE: The solid health of the European audiovisual sector

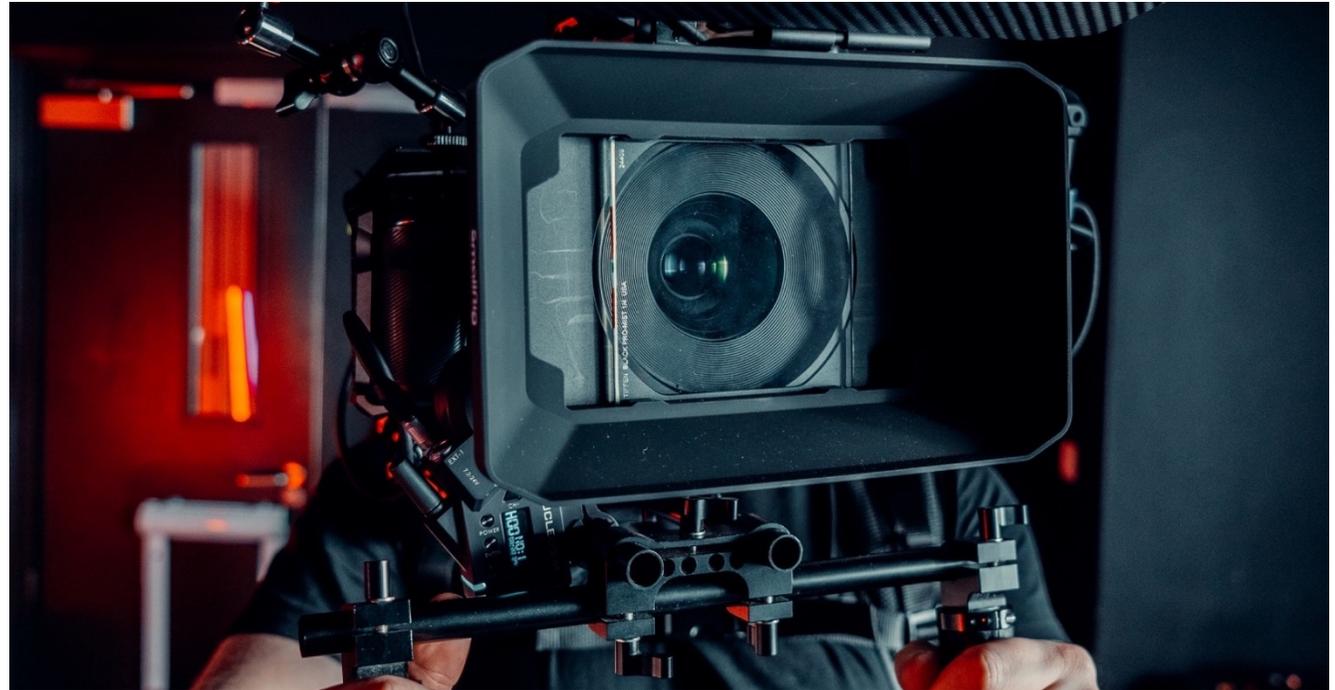
Across Europe, cultural and creative industries have been identified as growth engines for the economy. In 2019, their turnover reached 643 billion € at EU28 level.

In the case of audiovisual activities, they generated 119 billion €. This figure represents an 11% growth compared to 2013, when the turnover was 107 billion €.

Across the continent, several countries have therefore identified audiovisual activities as an untapped opportunity to boost quality employment and economic growth. For example, Spain plans to invest 1.6 billion € in the sector via its Spain Audiovisual Hub programme between 2021 and 2025.

As argument #14 suggests, the return of this investment will mostly depend on the health of national players and, among them, licensed broadcasters –as seen in the UK case illustrated on the next page.

Moreover, broadcasters work in close relationship with other cultural players. They rely on PMSE services and invest and promote culture and arts. Additionally, they are key investors in the film industry, generating added value and creating many jobs (see the resource from France Télévisions).


 **STAT**

119 billion 
revenue generated by the
audiovisual sector in EU28
in 2019 (+11% vs. 2013)

Source: EY based on DESI and Eurostat

RESOURCES

Report – [Rebuilding Europe. The cultural and creative economy before and after the COVID-19 crisis](#)

Policy document – [España Hub Audiovisual de Europa. Plan de impulso al sector audiovisual](#)

Report – [France Télévisions, créateur de valeur ajoutée](#)

A creative and culturally rich Europe

CASE: Broadcasters sustaining the independent production sector in the UK

The internationally acclaimed UK’s TV production sector generated 3,148 million GBP in revenues in 2021.

Up to 82% of this investment corresponded to primary commissions, i.e. new programmes commissioned by a company. This meant 2,568 million GBP.

Four media groups with public service obligations were the main investors in the sector: the BBC, the commercially-funded public broadcaster Channel 4 and the commercial groups ITV and Channel 5. Together, they accounted for 57% of all primary commissions (1,454 million GBP).

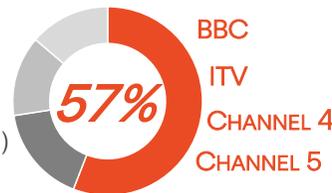
These broadcasters mostly rely on DTT to deliver their signal, which is used by 18.3 million households. That is 2 out of 3.

The remaining investment in primary commissions came from other UK channels, mostly relying on cable and satellite (17%), by international TV channels (14%) and, finally, by stand-alone VOD platforms such as Netflix and Amazon Prime (12% or 299 million GBP).

These results mean that, every year, those broadcasters relying mostly on DTT invest nearly 5 times more than VOD platforms in original content. Therefore, they are critical players of the TV production sector in the UK.



STAT
DISTRIBUTION OF INVESTMENT IN UK – ORIGINATED PRIMARY COMMISSIONS (2021)



Public service broadcasters are the top investors in national content in the UK

Other UK channels, 17%; Foreign linear channels, 14%; Stand-alone VOD platforms, 12%

Source: UK Television Production Survey 2022

RESOURCES

Survey results – [UK Television Production Survey 2022](#)

Report – [Media Nations: UK 2022](#)

The value and contribution of DTT to build a better future for Europe

A socially committed Europe



- #17 A free and easy communication to avoid leaving anybody behind
- #18 A social unifier
- #19 The same TV service regardless of location
- #20 A guaranteed TV service to everybody by championing accessibility
- CASE BBC Three: how to fail by leaving broadcast
- CASE The importance of DTT for portable TV consumption in Germany

DTT's high population and territorial coverage allows broadcasters to play a key social role in European societies, preventing leaving anybody behind.

DTT brings a free-to-air and easy-to-use linear TV experience to all citizens, regardless of their age, their location or their economic, social and educational conditions.

Given its coverage rates close to 100% of the population, DTT provides an offer with a guaranteed quality of service to nearly all citizens across Europe. It secures universal access to quality information, entertainment and knowledge together with connection and companionship.

Therefore, DTT acts as a tool for inclusiveness that can be leveraged to build a more cohesive society.

The platform also champions accessibility: users with disabilities, and their families, benefit from adapted communication services thanks to the sustained efforts and investments in accessibility made by DTT broadcasters.

A socially committed Europe

#17. A free and easy-to-access platform to avoid leaving anybody behind

WHY?

DTT brings the free-to-air linear television experience to all citizens regardless of their age or their economic, social and educational conditions. DTT is therefore perceived as an essential service, which provides quality information, entertainment and companionship.

DTT is not only free but also easy and intuitive to use. Very little literacy or skills are required.

The availability and free access that characterizes broadcast television is perceived as essential by the most vulnerable groups in society. This includes the elderly and people from lower socioeconomic grades, as shown by [Ipsos](#) in the UK.

FOR WHOM?

Citizens value not only the personal benefit that free-to-air access to DTT services implies but also how it enables feeling connected to the entire society.

In times of growing polarization and inequalities, DTT is a tool already in place for governments to reinforce social cohesion and inclusion, avoiding further fragmentation of the social fabric.

POLICY ALIGNMENT

The [European Pillar of Social Rights](#) and its [action plan](#) provide guidance on how to build 'a strong social Europe that is fair, inclusive and full of opportunity'.

Guaranteeing that 'everyone has the right to access essential services of good quality' and that 'support for access to such services shall be available for those in need' is one of the 20 principles within this EU policy.

Accordingly, the allocation of the lower UHF band to broadcasting services is a tool to ensure the availability of free and easy-to-access communication services to all audiences. As such, the lower UHF Band can continue fulfilling this social function. Subsidizing an alternative way to deliver it may be costly and unnecessarily bureaucratic.



286 million 

people in CEPT48 countries use DTT to access free-to-air television

Source: EBU-DVB-BNE

DTT is a tool for inclusiveness that can be leveraged to build a more cohesive society

A socially committed Europe

#18. A social unifier

WHY?

Cohesion policy is the European Union's main investment policy, which is understandable when more than [1 in 5 people in the EU were at risk of poverty or social exclusion in 2021](#).

This was just before the rising inflation in 2022, which probably has pushed many more below exclusion thresholds: those at risk of poverty, those severely materially deprived and those living in a household with low work intensity.

As such, a free-to-air and easy-to-access communication service such as DTT provides a common platform in equal conditions, securing universal access to quality information, entertainment and knowledge together with connection and companionship. This is regardless of any socio-economic or personal condition.

FOR WHOM?

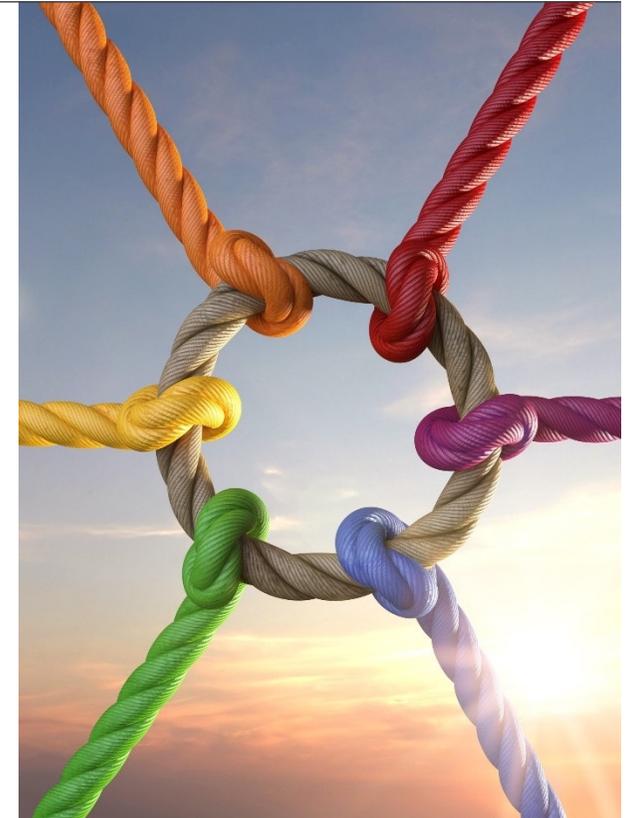
While DTT provides an obvious personal value for those users in risk of exclusion, it also contributes to a shared public value by becoming a de facto common denominator in terms of communications and audiovisual public services to every member of society, thus contributing to a shared public sphere.

POLICY ALIGNMENT

Social cohesion concerns are becoming policy priorities across European and national administrations amidst growing inequalities, adversary inflationary situation across Europe in 2022 and ideological polarisation.

The [European Green Deal](#) is clear at pointing that a modern, resource-efficient and competitive economy should ensure that no person and no place are left behind. In audiovisual terms, DTT is the best policy option to ensure this becomes a reality.

Social cohesion was also one of the three pillars of the [Treaty of Lisbon](#) in 2008 and continues to feature high in the EU Agenda.



95.4 million

21.7% of the EU population were at risk of poverty or social exclusion in 2021



Source: [Eurostat](#)

DTT broadcasting secures universal access to quality content and information, regardless of age, socio-economic conditions or background

A socially committed Europe

#19. The same TV service regardless of location

WHY?

Given coverage rates close to 100% of the population, DTT provides the same TV channels with a guaranteed quality of service to nearly all citizens across every European country. This makes DTT a champion of territorial cohesion among communication networks.

While communities in sparsely populated areas legitimately demand good connectivity, this should not be at the expense of a current widespread infrastructure delivering them value at the same level than in urban areas.

Actually, the infrastructure goals of the [Europe's Digital Decade](#) program are likely to be achieved without the need to deprive people living in rural areas of DTT services.

FOR WHOM?

Fostering territorial cohesion does not only benefit individually those people living in these areas but also supports these areas in retaining and attracting population, and thus generating public value.

This includes rural areas and those that suffer severe and permanent natural or demographic handicaps such as those with very low population density, islands and mountain regions.

POLICY ALIGNMENT

The [European Green Deal](#) is clear at pointing that a modern, resource-efficient and competitive economy should ensure that no person and no place are left behind. The EU develops this idea in its [long-term vision for the EU's rural areas up to 2040](#), which includes a [Rural Pact](#) and an EU Rural Action Plan. In audiovisual terms, DTT is the best option to ensure this becomes a reality.

This is part of a longer tradition of territorial cohesion, an original European concept born with the will to counteract the tendency of market forces to favour the most competitive and populated regions. As such, territorial cohesion became one of the three pillars of the [Treaty of Lisbon](#) in 2008, together with social and economic cohesion.



FACT

137 million

people live in rural areas
(30% of the population
and 80% of the territory)



Source: [Eurostat](#)

DTT is a key element in building more cohesive and inclusive societies regardless of people's location

A socially committed Europe

#20. A guaranteed TV service to everybody by championing accessibility

WHY?

As a heavily regulated market, DTT broadcasters tend to have significant obligations to make their services accessible to all kind of users. This is framed by the [Audiovisual Media Services Directive](#), which points out three types of services: subtitling, audio description and signed programmes.

As recognized by the [Council of the European Union](#), ‘the number of people with a disability in the EU is only set to increase’ given the aging population and a raising risk of developing chronic conditions. This means that the accessibility value provided by DTT is likely to increase even further in the future. With this in mind, [new accessibility tools](#) are considered in the innovation roadmap proposed by broadcast network operators, including HbbTV and the VVC video codec.

FOR WHOM?

Users with disabilities, and their families, benefit from adapted communication services thanks to the efforts and investments in accessibility made by DTT broadcasters.

For decision-makers, DTT’s accessibility regulation is a powerful tool to enhance the lives of a significant number of citizens.

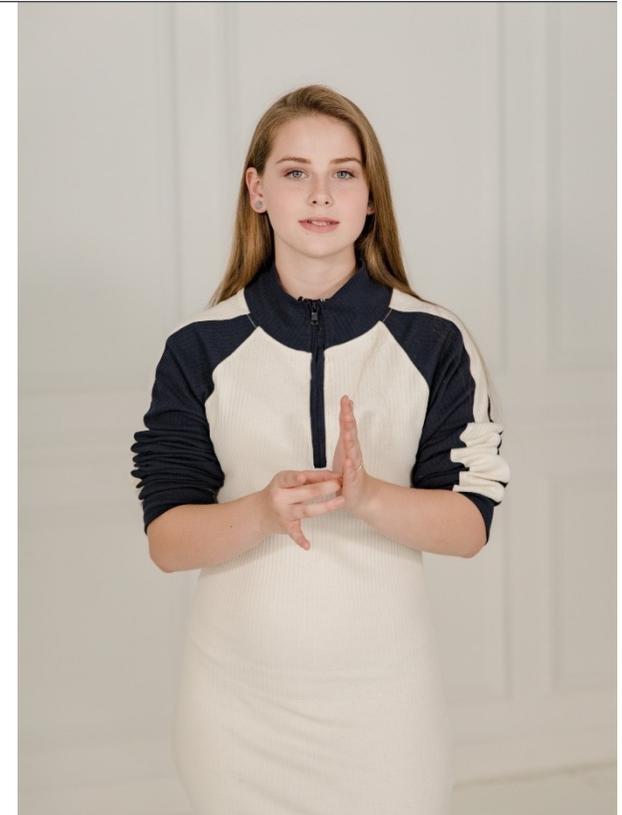
POLICY ALIGNMENT

The [European Pillar of Social Rights](#) and its [action plan](#) are the guide to build ‘a strong social Europe that is fair, inclusive and full of opportunity’.

The ‘inclusion of people with disabilities’ is one of the 20 principles in this EU policy. The EU aims to ensure the existence of services that enable to fully participate in society.

To develop this principle, enhancing equal participation and avoiding any discrimination, the EU has issued its [Strategy for the Rights of Persons with Disabilities 2021–2030](#).

In this regard, the current accessibility regulation in DTT and the actions put in place by broadcasters contribute to the advancement of this EU policy.



87 million 

people in the EU have some type of disability (1 in 4 adults)

Source: [Eurostat](#)

DTT is essential to secure the availability of access services for the growing group of persons with disabilities

A socially committed Europe

CASE: BBC Three: how to adapt to the needs and wishes of the audience

In February 2016, UK's BBC Three ceased linear broadcasting, moving to on-demand distribution. As a youth-oriented service, their audiences were expected to follow and immediately adopt online consumption.

However, the results show that BBC Three's audience shrank by 60–70% after it closed its linear TV channel, with annual viewing minutes plummeting 89% below their previous linear TV level.

Given these results, BBC Three broadcast channel was reinstated in February 2022. The reason behind this move was 'a drive to provide more value to audiences'. BBC's management team reached this conclusion after realizing that a significant group of young viewers maintained a strong linear TV consumption but were light users of the BBC. This was considered to be a risk to build a sustainable future for the organization.

The clear lesson from this case is that it is not about linear or on-demand but about giving choice to users. Linear broadcasting cannot be excluded from the range of services offered to the public if broadcasters aim to maximise their audiences. This is notably the case of public broadcasters if they want to reach their universality goal, and for commercial broadcasters to maximize their commercial results.



STAT

-89%

Loss in viewing time for BBC3 after moving the channel from linear broadcast to on-demand-only

(UK residents 4+. Periods 17/02/2015–16/02/2016 vs. 01/11/2018–31/10/2019)

Source: Neil Thurman (2020) based on BARB

RESOURCES

Website – [BBC Three](#)

Press release – [BBC Three to return as a broadcast channel in January 2022](#)

Academic paper – [When a TV channel reinvents itself online: Post-broadcast consumption and content change at BBC Three](#)

A socially committed Europe

CASE: The importance of DTT for portable TV consumption in Germany

The number of households receiving DTT in Germany has increased by 31% to 5.7 million since 2019.

Mobile reception is the unique selling proposition of DTT in Germany. Since 2020, this has become the main use case for DTT in this country. Then, 2.8 million households were receiving DTT in mobile devices. Two years later, the figure reached 4 million. Mobile comprises any mobile and portable devices, such as smartphones, tablets, laptops, portable DVD players, small TV sets and any other device with a DTT tuner. The number of vehicles with built-in DTT reception is also rising.

The increasing usage of DTT in mobility can be explained by a rising trend to use portable devices to watch television. In 2022, 26.2% of Germans declared a portable device as their main entry point to TV.

Against the lack of mobility offered by cable offers, the complex installation requirements and cost of satellite reception, and the limited data coverage and cost of mobile networks, the DTT platform has emerged as a valuable option for those seeking a cheap and easy to access option to watch television. A small indoor antenna or a dongle with no data cost are enough.

This case also illustrates how Germany is paving the way for 5G Broadcast with a clear use case.



 STAT

4 million 
 German households use DTT in portable devices (x2 in 3 years)

Source: Kantar Video Trends 2022

RESOURCES

News article – [DTT on the rise in Germany due to mobile usage](#)

Report – [Video Trends 2022](#)

The value and contribution of DTT to build a better future for Europe

A sustainable Europe



#21

Delivering a greener and cheaper TV experience

#22

An engine for a more sustainable future

#23

An infrastructure for all

#24

A way to avoid an enormous amount of electronic waste

CASE

Greener TV watching across Europe

CASE

A contribution to reduce electronic waste via fair consumer practices

Terrestrial broadcasting is an asset for the environmental sustainability journey in which modern societies are embarked.

Broadcast network operators already illustrated this through their landmark Report on Low Carbon Television, commissioned to Carnstone.

Overall, DTT is the greenest platform for TV distribution, thanks to both its multicast nature and the passive aerial connection to access the network at households.

Additionally, the platform enables an enormous brainprint by DTT broadcasters: their ability to raise awareness, change attitudes and prompt action regarding climate and the environment among audiences should be neither obviated nor underestimated.

Furthermore, dismantling an efficient and effective infrastructure of these dimensions would generate enormous amounts of unnecessary waste with a high

environmental impact and a huge economic cost.

Similarly, maintaining DTT is a policy decision against both planned obsolescence of mobile devices and generation of electronic waste. The long replacement cycle of TV sets is a greener option than the shorter one of mobile devices.

#21. Delivering a greener TV experience

WHY?

The delivery of TV services via DTT is the [greenest possible option](#).

The reasons for the optimal energy consumption of DTT compared to other networks such as OTT and IPTV are twofold:

- The multicast nature of broadcast is more efficient than dedicated unicasts when the signal is distributed to a wider group of users.
- Most DTT households use a passive aerial connection to access the network, which is directly linked to the TV set. There is no need for energy-hungry peripherals such as set-top boxes and modem routers, which are permanently switched on.

Looking into the future, this means that a decrease in the use of the DTT platform results in an increase in energy consumption and its related greenhouse gas (GHG) emissions.

FOR WHOM?

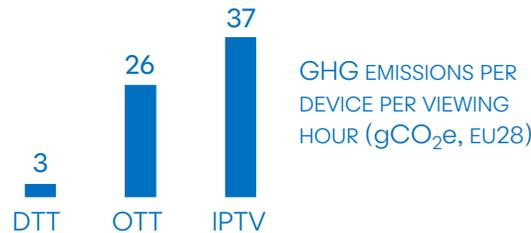
Beyond the obvious benefit for the environment and, as such, for society, lower energy consumption also implies a cheaper energy bill for consumers. In the inflationary times we live in, this is an important individual benefit.

POLICY ALIGNMENT

With [Europe striving to become the first climate-neutral continent](#), maintaining and promoting a system that delivers TV content in a more sustainable way than alternative platforms seems to be a sensitive and congruent political option.

As most European countries have set policy goals to reduce their carbon footprint, profiting from broadcasting efficiency is certainly a smart and already available option to meet those goals without the need for huge investments in alternative energy-hungry platforms.

FACT



DTT is the greenest platform for TV distribution

Source: [Carnstone Report on Low Carbon Television](#) (LoCaT)



DTT contributes to European and national strategies to reduce the carbon footprint of human activities

#22. An engine for a more sustainable future

WHY?

In response to the climate crisis, broadcasters are committed to reduce their environmental impact and are acting accordingly.

Broadcasters have launched strategies to reduce their environmental impact, with flagship cases such as [ITV](#) in the UK and [RTE](#) in Ireland. As many others, they mostly rely on DTT distribution.

They also work collaboratively to accelerate their sustainability journey, for example through the [albert initiative](#) and the [Responsible Media Forum](#).

While reducing their carbon footprint is now a well-established goal within the industry, broadcasters' biggest contribution is in their [brainprint](#): their ability to raise awareness, change attitudes and prompt action among audiences. BBC's *Blue Planet II* is a well-documented example of this kind of [impact](#).

FOR WHOM?

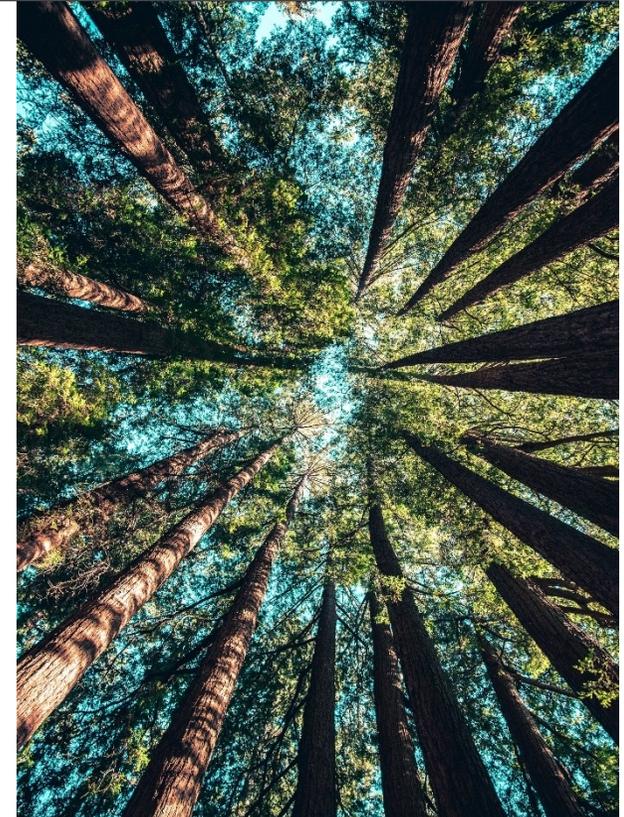
By helping audiences understand all the nuances of climate change, broadcasters contribute to a more sustainable society.

At industry level, many broadcasters have extended their initiatives to their suppliers and partners, supporting them in their sustainable transformation.

POLICY ALIGNMENT

Broadcasters' efforts to reduce their energy consumption and greenhouse gases (GH) emissions will contribute to the [national](#) and [European Commission's goals](#) in this regard.

More broadly, their ability to enable audiences to understand climate change and mobilize them to face the challenges ahead will also contribute to the [EU Adaptation Strategy](#) in this area and, ultimately, to deliver the [European Green Deal](#).



441



productions showcased by UK
broadcasters featured positive
environmental behaviors (2021)

Source: [albert initiative](#)

Broadcasters are a powerful
tool to spread the green
agenda and promote a more
sustainable lifestyle

#23. An infrastructure for all

WHY?

DTT infrastructure is updated continuously, involving significant capital expenses.

In Europe, several markets have recently moved from DVB-T to DVB-T2 to become more efficient. Some of the European countries most heavily reliant on DTT such as Croatia, Italy and Poland have already completed this transition, including the introduction of HEVC coding to achieve a more efficient video compression.

In most African countries, DTT deployment is quite recent and has required a substantial investment that has not been recouped yet.

Additionally, DTT infrastructure is often used by other services such as linear radio services and Public Protection and Disaster Relief. These will certainly struggle to cover the share of investment or operational costs currently funded by TV broadcasters if the latter would not be able to operate in the lower UHF band due to a re-allocation of its frequencies.

FOR WHOM?

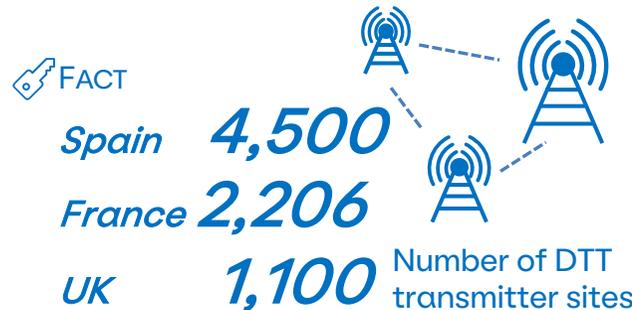
A Co-primary decision at WRC-23 would not only discourage any future investment in DTT but also prevent the amortization of the executed ones. This would compromise the sustainability of key infrastructures for other sectors.

POLICY ALIGNMENT

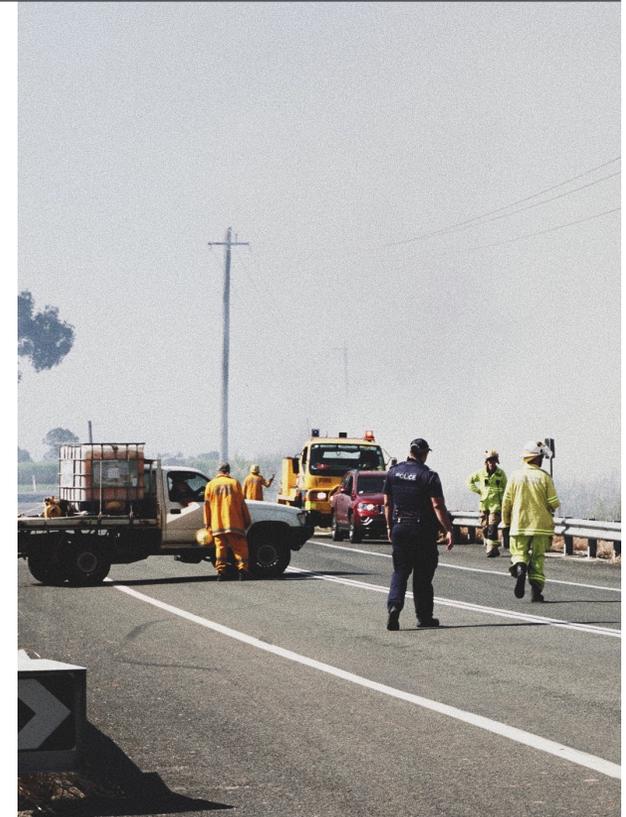
Broadcast network operators have committed to important capital expenses.

Compromising the future of DTT services by re-allocating the frequencies they currently use will make the maintenance of the infrastructure untenable for other users. This will be the case of radio and PPDR services, for which broadcasting currently cross-subsidizes the cost of the network. This will require either public investment or dismantling the infrastructure.

Dismantling an infrastructure of this magnitude would generate enormous amounts of unnecessary waste with a high environmental impact and a huge economic cost. In some cases, before the required period to amortize the capital expenses already invested.



Source: Cellnex, TDF, Arqiva



Dismantling DTT infrastructures would not only affect their millions of daily viewers but also radio listeners and civil protection services

#24. A way to avoid an enormous amount of electronic waste

WHY?

DTT is viewed in devices that do not only consume less energy than alternative equipment for video consumption but also have a longer life cycle.

On average, television sets last around 10 years. During this timespan, an average user would have replaced its smartphone 3 times. Furthermore, while TV sets must be repairable according to EU law, that is not always the case for mobile devices. Additionally, in the case of DTT, receivers do not require peripherals such as set-top boxes.

As a result, shifting linear TV consumption from TV sets to other devices would generate an additional amount of electronic waste, directly torpedoing the [European objectives](#) and dozens of national environmental policies across the continent.

FOR WHOM?

Reducing waste generates a tangible environmental benefit for the whole society.

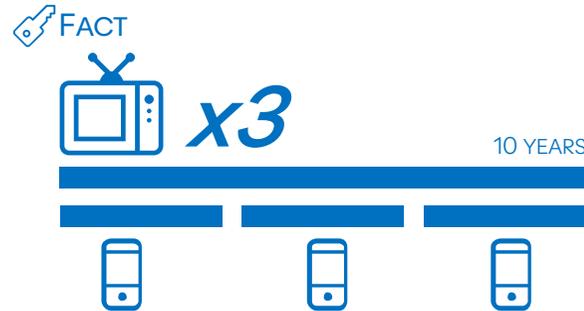
Additionally, European consumers benefit from saving money and avoiding devices that become obsolete shortly after they have been purchased.

POLICY ALIGNMENT

The EU fights planned obsolescence and unnecessary waste through its [Directive concerning unfair business-to-consumer commercial practices in the internal market](#).

The 2021 guidelines on its interpretation and application make the points on planned obsolescence and electronic waste clearer.

Similarly, in 2020 the European Parliament adopted the resolution [Towards a more sustainable single market for business and consumers](#), clamping down on planned obsolescence and favouring repairs.



Source: [IHS Markit](#) + [Strategy Analytics](#)

Maintaining DTT is a policy tool against planned obsolescence and electronic waste

A sustainable Europe

CASE: Greener TV watching across Europe

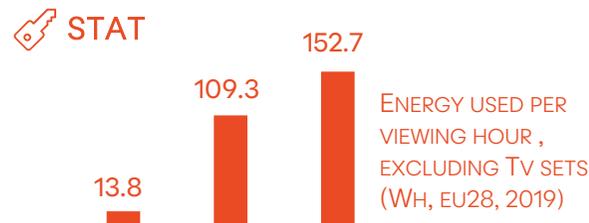
Energy consumption resulting from TV watching greatly varies depending on whether this is done via broadcasting or streaming services.

According to the LoCaT study, overall energy consumption and emission of greenhouse gases (GHG) of DTT networks are lower than those of OTT and IPTV. This is the case not only across EU28 but also in each individual country: one hour of linear TV delivery via DTT consumes 8 times less energy than distributing the same amount of content via streaming. Compared to IPTV, DTT consumes 11 times less energy.

This is caused by the energy consumption of both the distribution network and the customer equipment. This excludes TV sets, which consume approximately the same amount of energy in every instance.

As total energy consumption and emissions are allocated according to the number of viewers, the more DTT is used, the greener it becomes. For example, the difference in energy consumption via DTT and OTT was 20.4 times in Greece.

In terms of GHG, emissions mostly depend on the level of (de)carbonization of the national electricity grid. Assuming that DTT and OTT use the same sources of electricity in each country, DTT becomes the cleanest TV consumption option across Europe.



DTT consumes 8 times less energy than OTT and 11 times less than IPTV

Source: Carnstone Report on Low Carbon Television (LoCaT)

RESOURCES

Report – [Quantitative study of the GHG emissions of delivering TV content](#)

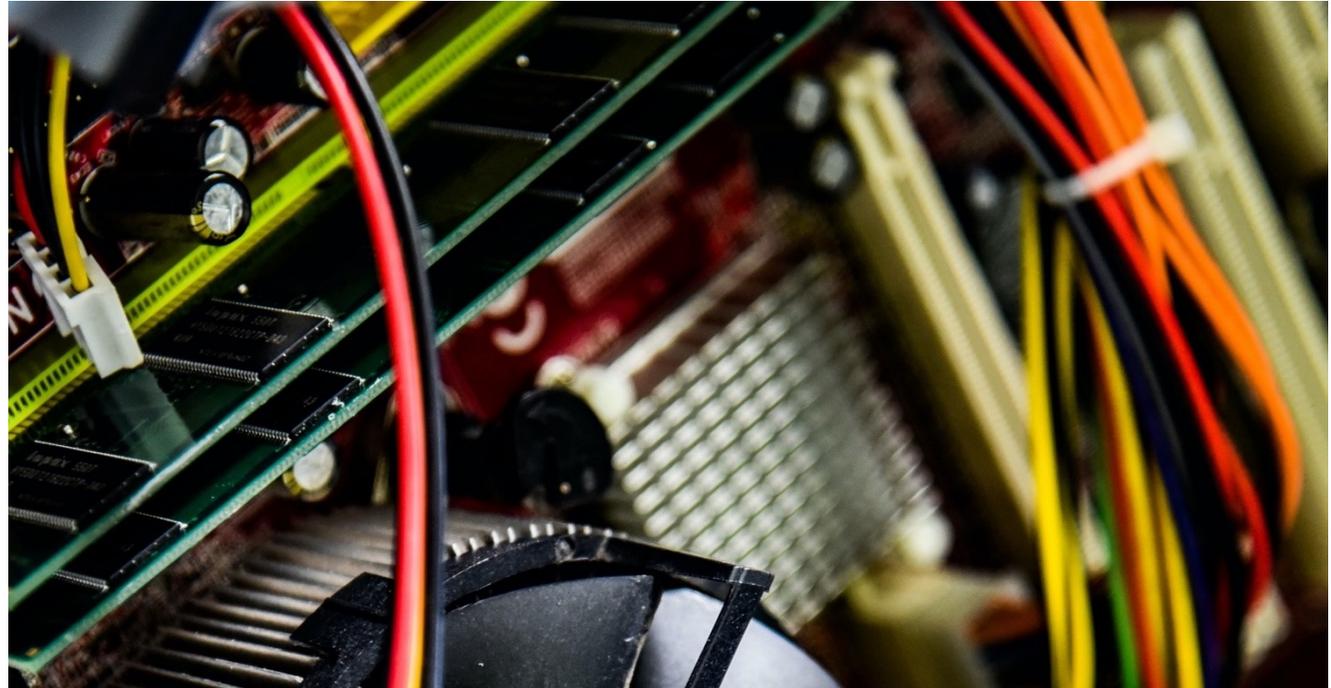
A sustainable Europe

CASE: A contribution to reduce electronic waste via fair consumer practices

Across Europe, there is a growing concern around business practices that promote the obsolescence of electronic devices before their actual lifespan has been reached. These practices have notably been linked to smartphone manufacturers.

Some recent examples illustrate this trend. In 2020, the French Directorate general for competition, consumption and the repression of frauds [Direction générale de la concurrence, de la consommation et de la répression des fraudes] fined Apple with 25 million € for not informing iPhone holders that the updates to the iOS operating system were likely to lead to a slowdown in the functioning of their devices.

This case arose two years after the Italian Competition Authority [Autorità Garante della Concorrenza e del Mercato, AGCM] fined smartphone manufacturers Samsung and Apple for planned obsolescence practices with 5 and 10 million € respectively. Specifically, AGCM found that these firms insistently suggested consumers of their devices to update their systems without informing them of potential serious malfunctions (Samsung and Apple), and greater energy demand (Apple), and high repair cost for out-of-warranty repairs connected to such malfunctions (Samsung).


 **STAT**

<40%  

E-waste is the fastest growing waste stream in the EU.

Less than 40% is recycled

Source: Eurostat

RESOURCES

Infographic – [E-waste in the EU: facts and figures](#)

Press release – [Ralentissement du fonctionnement de certains iPhone : une enquête de la DGCCRF conduit au ...](#)

Press release – [Apple and Samsung fined for software updates that have caused serious troubles and/or have reduced functionality of some mobile phones](#)

Annexes



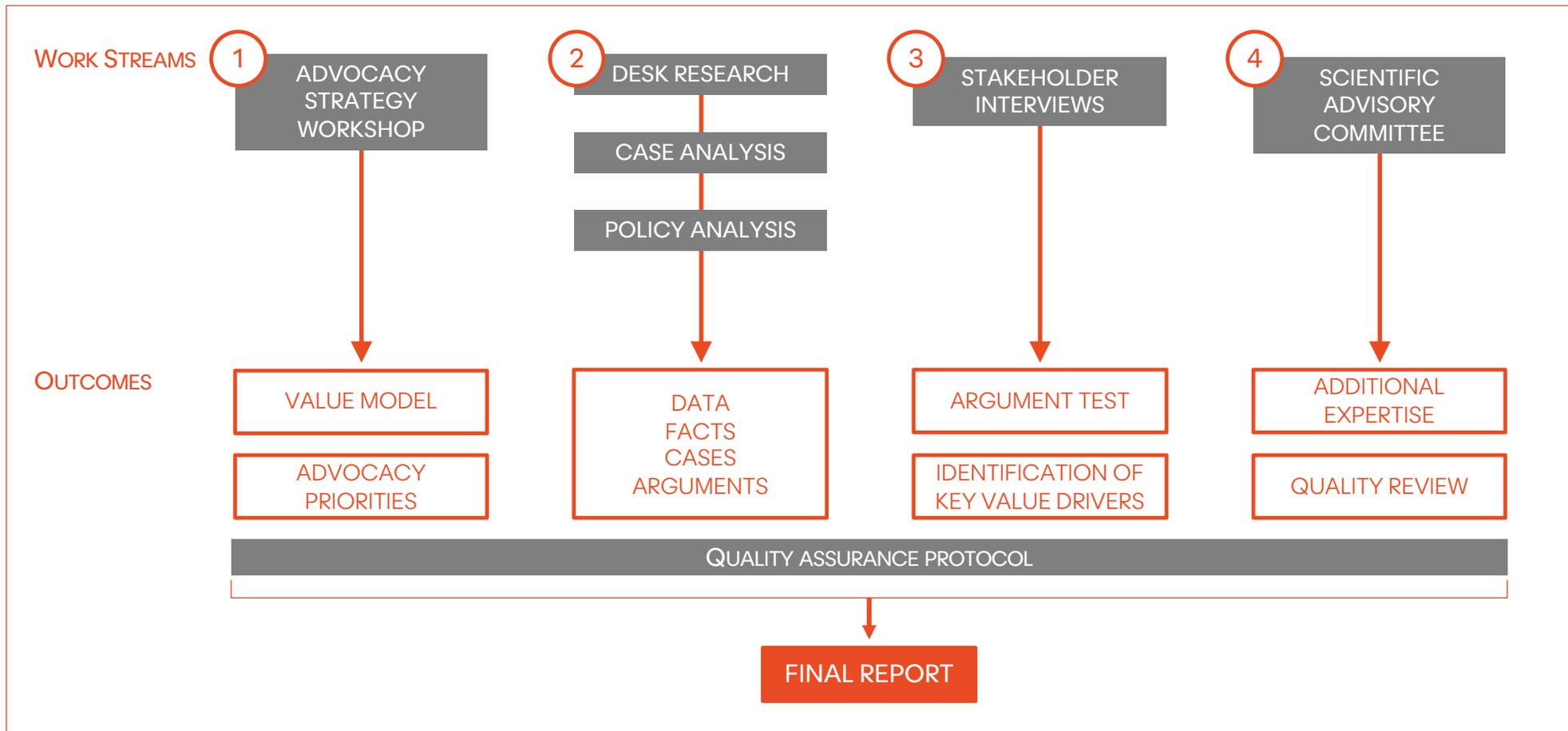
Annex – Methodology

This report was developed between September and December 2022 following a project plan that included four parallel work streams.

As explained in the next pages, specific and detailed processes as well as outcomes were defined for each of them.

To ensure that the final report would perfectly meet BNE’s needs and fulfil its expectations, a quality assurance protocol was applied along the project.

Figure 3. Project plan



Annex – Methodology

1. ADVOCACY STRATEGY WORKSHOP

Hosted by BNE, an on-site Advocacy Strategy Workshop was conducted with BNE members on 29 September 2022 in Brussels.

Through several exercises, this workshop focused on:

- Mapping, analysis and prioritising of key stakeholders, including decision-makers.
- Assessment of previous spectrum negotiations processes.
- Analysis of counter-arguments by competitors.
- Discussion of DTT value model and potential argument lines for the report.

The outcomes of the workshop were twofold:

- Advocacy priorities in terms of stakeholders, value domains and key messages.
- An advanced draft of the Digital Terrestrial Television Value Model.

2. RESEARCH

South 180 combined different research methods to cover all the relevant angles of the themes addressed in the report.

- **Desk research / literature review**

First, a broad desk research and a literature review were conducted. Industry sources were supplemented by academic research.

Secondly, South 180 carried out an analysis of the narrative and arguments developed by stakeholders involved in the lower UHF band debate, both supportive and hostile to BNE's position.

- **Case analysis**

Relevant cases related to the arguments developed to support BNE's position were gathered, analysed and systematized. This included a variety of industry and academic sources.

- **Policy analysis**

South 180 analysed documentation related to different policy processes, including previous WRCs, relevant European legislation and contributions to national and European public consultations, notably the EC's consultation on its position for WRC-23.



Annex – Methodology



3. STAKEHOLDER INTERVIEWS

Between 9 November and 5 December 2022, South 180 interviewed 13 experts through semi-structured interviews of 45 to 60 minutes.

The interviews relied on a set of key questions, which were not formulated in predetermined order and allowed for the possibility to add questions during the conversation.

Interviewees were selected according to their expertise and included seasoned professionals from broadcast network operators, public and commercial broadcasters, and technology providers.

In addition to sharing their knowledge to complement the research conducted by South 180, the interviewees served the purpose of stress testing some of the arguments developed for this report.

4. SCIENTIFIC ADVISORY COMMITTEE

South 180 appointed a scientific advisory committee composed by recognized scholars in the area of media and spectrum research coming from leading universities in the field.

They contributed to this project by:

- Providing information, arguments and analysis on key topics.
- Participating in regular meetings to discuss the research approach and the content of the report.
- Suggesting and facilitating access to relevant interviewees.
- Peer-reviewing sections of the report according to their expertise.

The members of the scientific advisory committee for this project were:

- Dr. Montse Bonet
Autonomous University of Barcelona (Spain)
- Dr. Maria Michalis
Westminster University (The United Kingdom)
- Dr. Marko Ala-Fossi
Tampere University (Finland)

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