PSB distribution costs

31st March 2015

Table of Contents

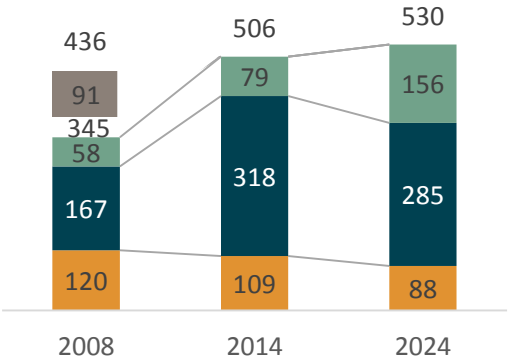
1. **Executive Summary**
2. Introduction
3. PSB distribution costs to date
4. Future outlook for PSB distribution costs – base case
5. Future outlook – alternative scenarios
6. Potential PSB responses to distribution cost increases

Summary conclusions

- PSB distribution costs have risen by approximately 15% since 2008, from c.£440m to c.£510m; in 2008 these costs included over £90m on analogue broadcast delivery
- By 2024, our base case forecast suggests PSB distribution costs are likely to increase by around 5% to c.£530m; this change is driven by:
  - Increases in the cost of IP delivery, despite ongoing reductions in the unit cost of IP provision
  - This increase is offset by a significant decrease in broadcast delivery cost as time-shift channels are eliminated and the number of channels simulcast in SD & HD is significantly reduced
  - Media management costs are also likely to decrease as broadcasters take advantage of advances in technology
- Looking over a shorter 5 year time horizon to 2019/20, there is a likely increase in overall PSB distribution costs of around 10% as the number of SD/HD simulcast channels increases and time-shift channels remain economic before becoming unviable in the 2020's
- There are credible scenarios under which delivery costs could increase to significantly higher levels:
  - A dramatic increase in IP consumption (to 50% of total 2024 PSB viewing) could increase IP delivery costs by over £100m
  - The imposition of charges for multicast delivery of linear TV by ISP-controlled platforms (YouView, Sky) could have an impact on costs of equivalent or potentially greater magnitude
  - The IP cost forecast is also highly sensitive to CDN pricing: if we hold CDN pricing at today's levels, the base case would see an additional £70m of IP delivery costs; in the extreme case where on demand viewing increases to 50% of total viewing, IP delivery costs could be as much as £460m – a £380m increase on the base case

Cost elements

Annual PSB distribution costs – base case, £m



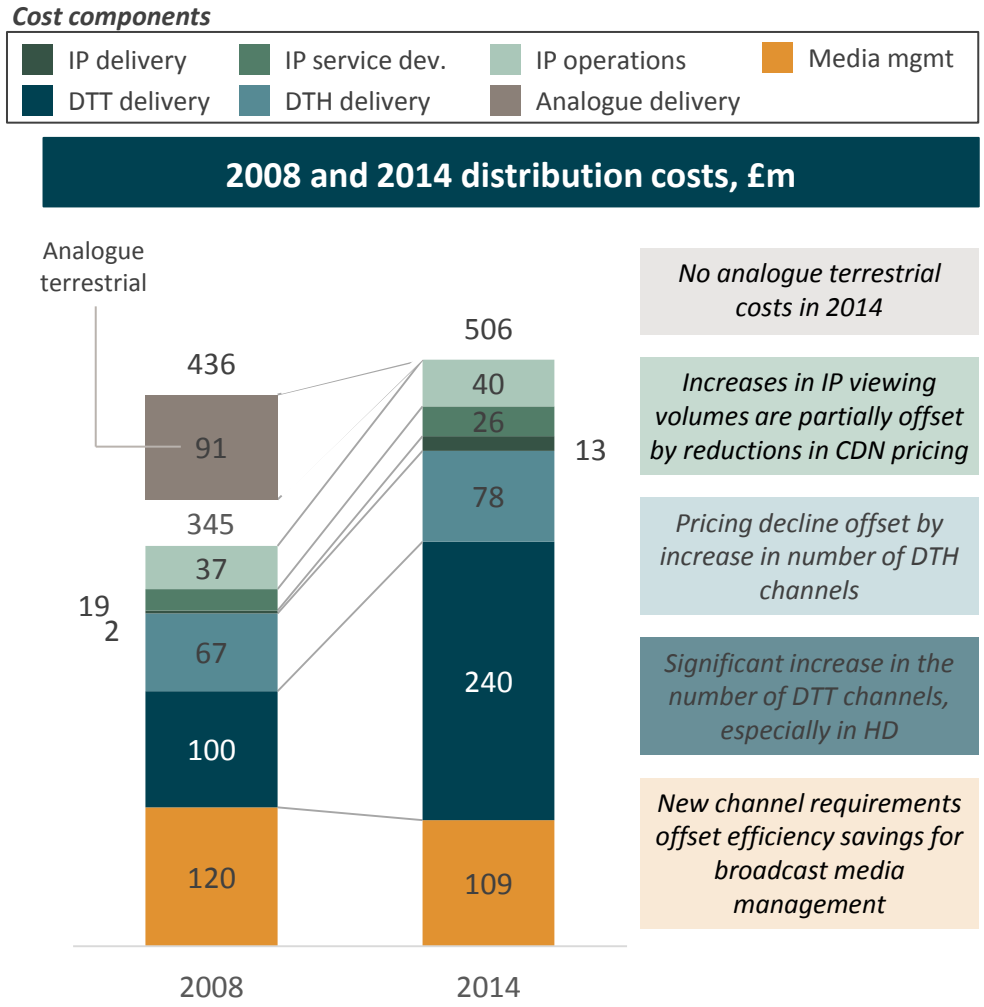
Potential implications for PSB Review

- The base case suggests that, over a ten year span, the major factor driving total distribution costs will remain broadcast delivery, in particular the number of time-shift channels and channels simulcast in SD & HD
- There are scenarios under which distribution costs could increase significantly beyond today's levels and potentially affect content investment if VOD viewing grows much more rapidly and CDN pricing does not fall
- The potential impact of multicast for linear delivery remains highly unpredictable and potentially severe, since under current technology each multicast provider has an effective monopoly and multicast becomes part of a broader carriage deal rather than being solely a technical cost
- The major risk scenarios for the PSBs involving increased VOD viewing are much more likely to be threatening on the revenue rather than the cost side
- There are options for the PSBs to respond to potential cost increases, but they could require the PSBs to accept a position as second tier providers, unable to match competitors like Sky and Netflix in terms of quality of service or innovation in user experience and service functionality

Our analysis suggests that total distribution costs in 2014 were c. £510m, an increase of £70m on 2008, when costs included analogue transmission

Distribution costs in 2008 & 2014

- We estimate that total PSB distribution costs in 2014 were £506m across all four PSBs, an increase of £70m from 2008
- Changes in distribution costs were driven by the following factors:
  - ***Media management:*** there have been significant increases in all media management requirements: number of channels, number of encodes/transcodes, the number of hours ingested, DRM requirements, amount and complexity of metadata; these have been offset by technical and efficiency realised on the renegotiation of the large contracts which comprise the great majority of media management expenditure
  - ***DTT and DTH delivery:*** there have been significant increases in the number of channels delivered, particularly in the more expensive HD format (see p. 15 below) as well as a significant increase in the number of time-shift channels. These increases have been partially offset by the elimination of the costs of supporting analogue transmission
  - ***IP delivery:*** the cost of IP delivery has increased rapidly as the volume of programming delivered over IP has surged (see p. 16 below); this increase has been partly but far from fully offset by the dramatic reduction in unit delivery costs, particularly CDN costs
  - ***IP service development and operations:*** the cost of developing IP delivery systems and the user experience they support have continued to grow, driven by intense competition from global OTT players like Netflix and YouTube to improve the customer experience and extend it to a wider range of devices and screen sizes, particularly for mobile

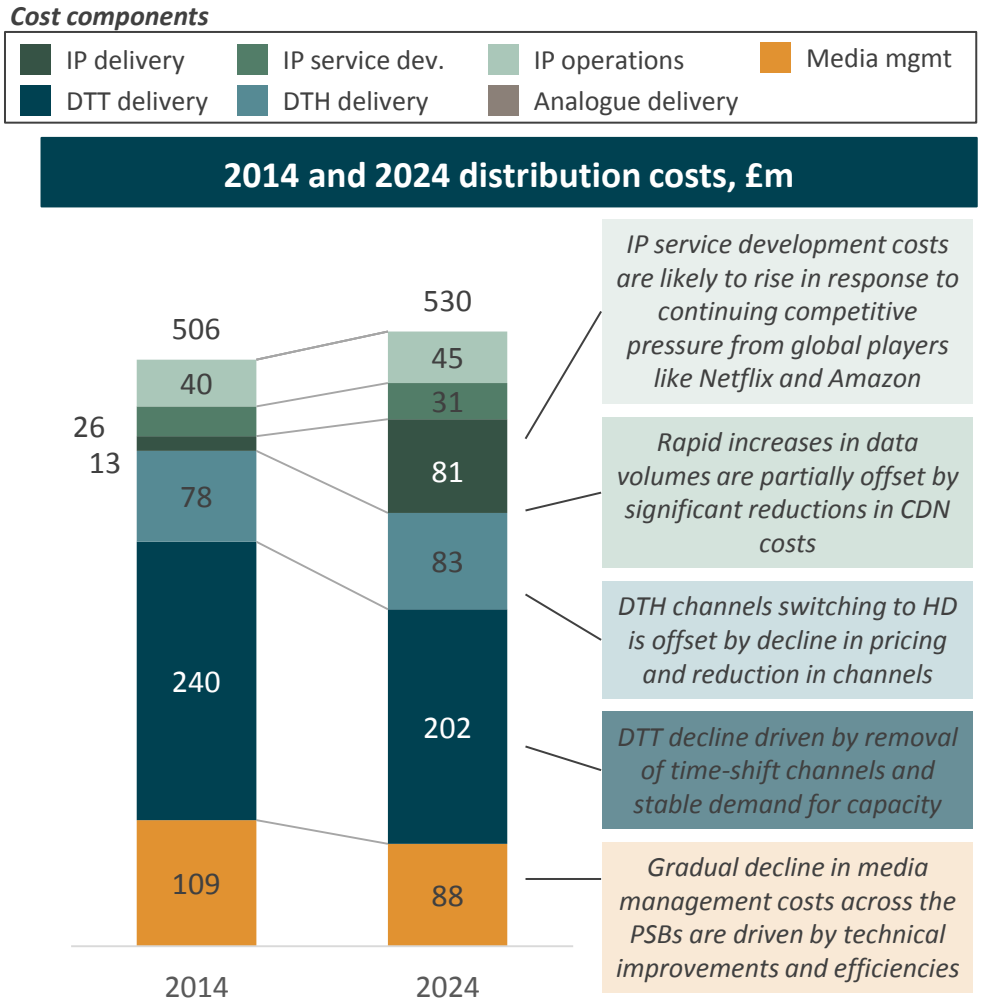


Source: Company reports, press releases, industry interviews, Redshift analysis

Our base case suggests total PSB distribution costs will increase from around £510m to around £530m in 2024, driven by increases in IP delivery

Distribution costs in 2014 & 2024 – base case

- We have considered future PSB distribution costs over a ten year time frame; our base case forecast suggests that total distribution costs will be around £530m in 2024, compared to £506m in 2014
- The changing level of distribution cost in the base case forecast is driven by three main factors:
  - **Changes in viewing behaviour –** we assume that viewing shifts towards IP-delivered content, driven by greater proliferation of non-TV devices, increased access to connected devices and increased prominence and attractiveness of non-linear content
  - **Changes in channel line-up –** the PSBs will be able to reduce the size of their broadcast channel portfolios by eliminating time-shifted (+1, +24) channels on DTH and DTT entirely by 2024, as the overwhelming majority of households have access to on demand delivery over IP. On DTH, we assume a transition to an "HD first" approach by 2022 with a small number of SD channels remaining to serve legacy customers. For DTT, we assume that DVB-T/MPEG-2 remains the primary transmission standard. Switching off time-shifted channels on DTT creates additional capacity for higher definition channels (i.e. HD and UHD) on the PSB MUXs
  - **Changes in technology cost -** There are likely to be significant changes in the unit cost of the underlying technologies which drive overall distribution costs



Source: Company reports, press releases, industry interviews, Redshift analysis

We have considered three major alternative scenarios in which distribution costs might vary significantly from the base case

Alternative scenarios

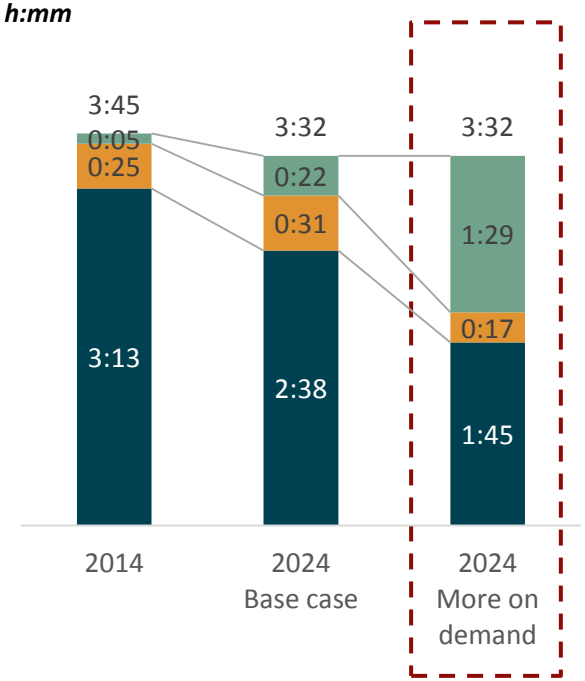
Content type
- Linear
- Broadcaster VoD[1]
- PVR
- Multicast

Channel type
- DTT SD
- DTT UHD
- DTT HD

1 Faster switch to on demand

In this scenario, we consider the impact on distribution costs of a significant increase in IP-delivered on demand viewing

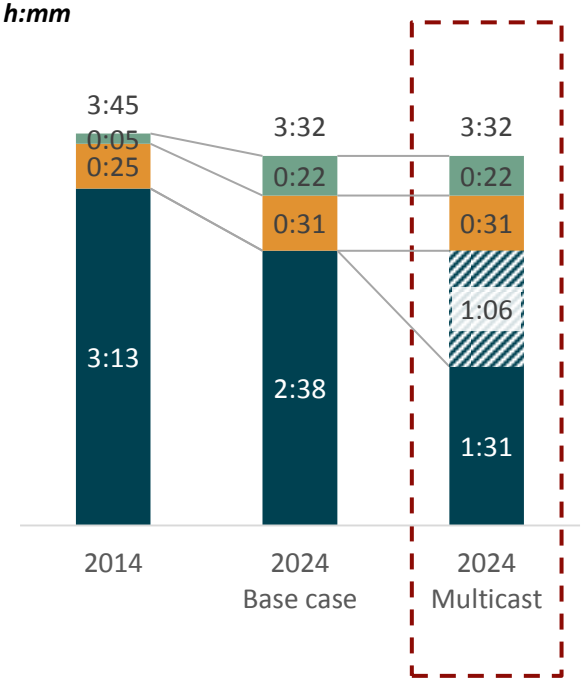
Average daily broadcaster viewing per person, h:mm



2 Linear TV over IP via multicast

In a 'linear TV over IP' scenario, we consider how PSB distribution costs might change in a landscape in which TV platforms have opted to deliver linear television over multicast

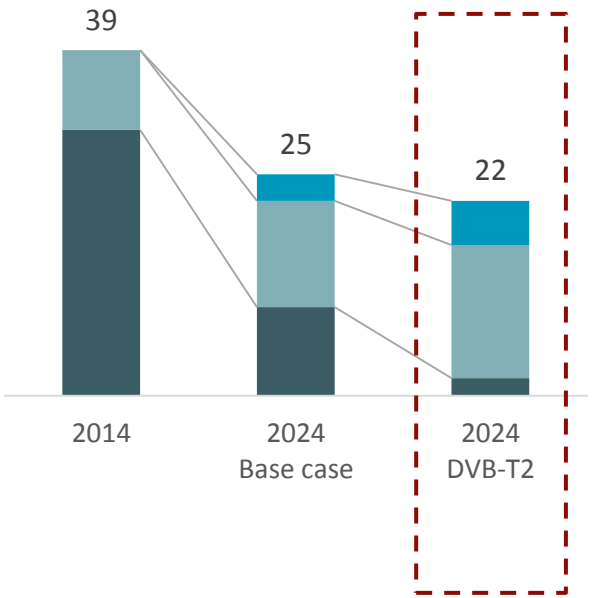
Average daily broadcaster viewing per person, h:mm



3 DTT transition to DVB-T2/MPEG-4

In this scenario, we consider the likely impact on PSB distribution costs of a transition to DVB-T2/MPEG-4 on DTT

Number of PSB DTT channels



Source: Company reports, press releases, industry interviews, Redshift analysis

In a scenario where on demand viewing reaches 50%, our analysis suggests that distribution costs could increase by over £120m

1 Faster switch to on demand

Content type

Linear | BVOD | PVR

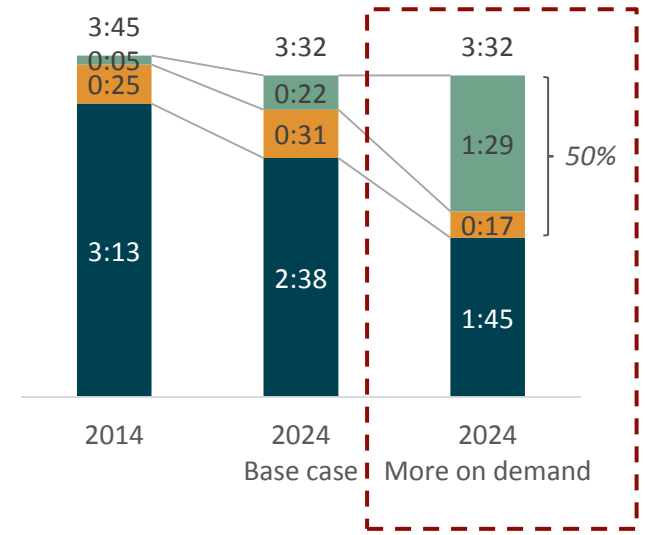
Cost components

IP delivery | IP service dev. | IP operations | Media mgmt | DTT delivery | DTH delivery | Analogue delivery

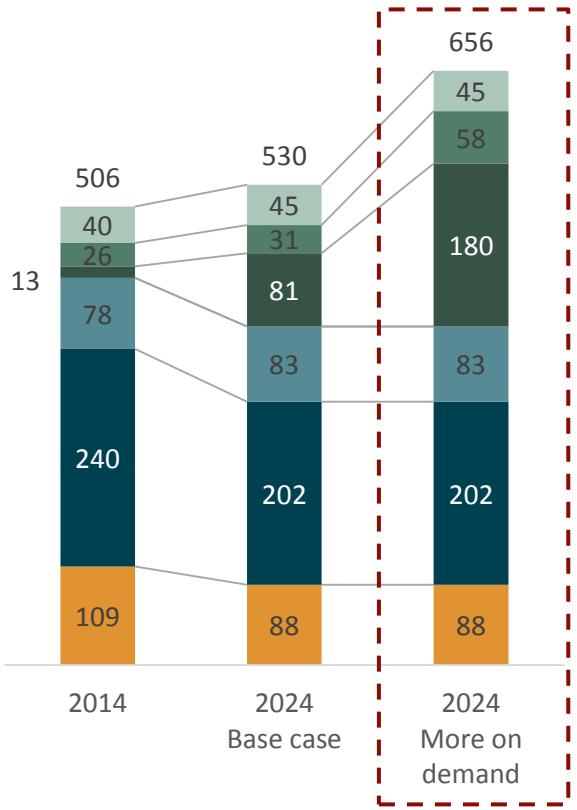
Assumptions

- On demand viewing increases dramatically
- Due to volume discounts, average CDN unit price decreases more rapidly compared to the base case
- IP service development increases as a result of wholesale reconfiguration of TV interfaces towards a more personalised approach

Average daily broadcaster viewing per person, h:mm



Impact on distribution costs, £m



- This is an extreme case; it assumes a dramatic reshaping of the way in which TV programming is presented onscreen
- The impact on PSB distribution costs compared to the base case is significant, but not catastrophic
- The PSBs might see this as a good problem to have, since it implies a significant increase in viewer engagement and an effective response to the challenges of the on demand era
- The impact on the cost of IP service development is difficult to quantify; it is logical to assume that there would be a significant increase, since this scenario implies much greater use of on demand functionality
- This outcome is highly sensitive to the assumption made about the rate of change in CDN unit pricing

Source: Company reports, press releases, industry interviews, Redshift analysis

In a 'multicast' scenario, PSBs might be faced with incremental distribution costs of over £170m, although this outcome appears highly unlikely

2 Linear TV over IP via multicast

Cost components

IP delivery | IP service dev. | IP operations | Media mgmt
DTT delivery | DTH delivery | Analogue delivery | Multicast

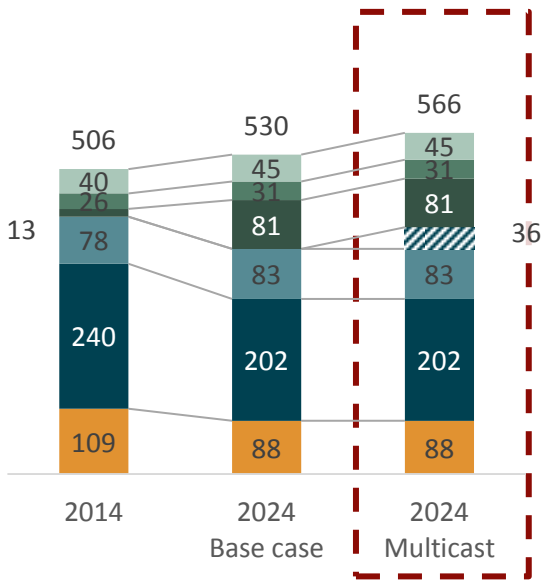
Assumptions and impact on distribution costs

Assumptions

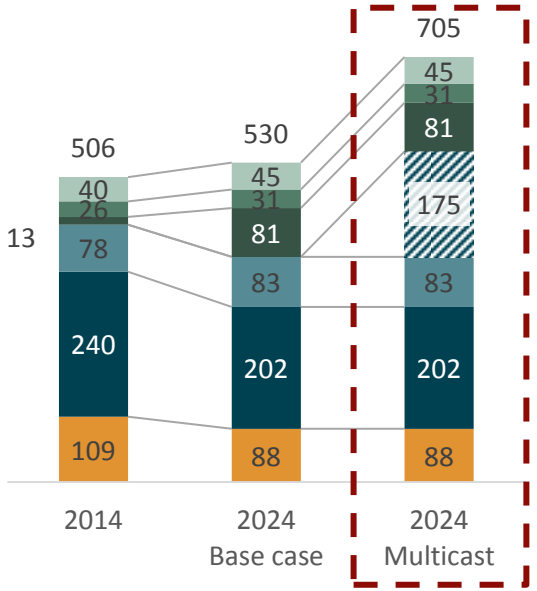
- Sky, BT and TalkTalk opt to deliver all linear channels via IP multicast; viewing on these TV platforms remains the same
- We assume that PSBs have to negotiate carriage on an ISP-by-ISP basis
- We assume BT's TV Connect rate card as a benchmark for Multicast pricing

Impact on distribution costs, £m

Low case (no regionality)



High case (full regionality)



- The PSBs would not be able to switch off DTT and DTH delivery because there would still be substantial audiences on Freesat and Freeview, so the cost of multicast would be entirely incremental
- In theory, this is a significant threat to PSB distribution costs. However, there are real practical questions about the likelihood of this outcome, especially considering:
  - The PSBs are likely to continue to have significant influence over YouView's policy
  - Sky's enthusiasm for IP over linear is far from guaranteed since they do not control the underlying network
  - The pricing of multicast is extremely uncertain, and will depend on the relative strength of the negotiating parties at the time
  - The technology for IP delivery is changing rapidly, and the current business model for multicast may be obsolete by 2024

Source: Company reports, press releases, industry interviews, Redshift analysis

DVB-T2/MPEG-4 is an important goal for the DTT ecosystem; it is likely to require medium-term investment in more HD channel capacity to encourage migration

3 DTT transition to DVB-T2/MPEG-4

Channel type

DTT SD
DTT UHD
DTT HD

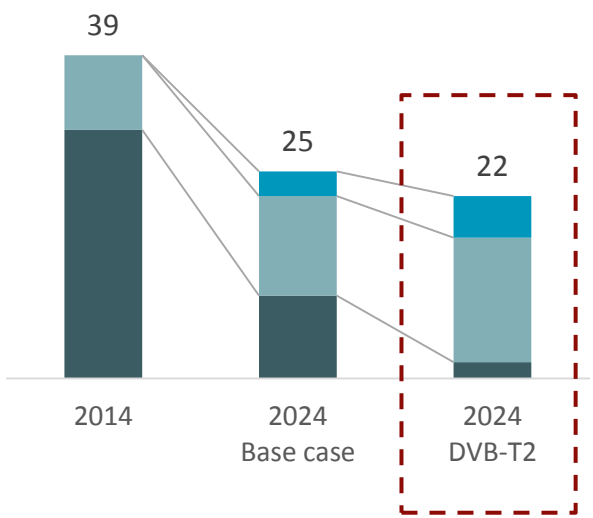
Scenarios

Base case
Transition to T2

Assumptions

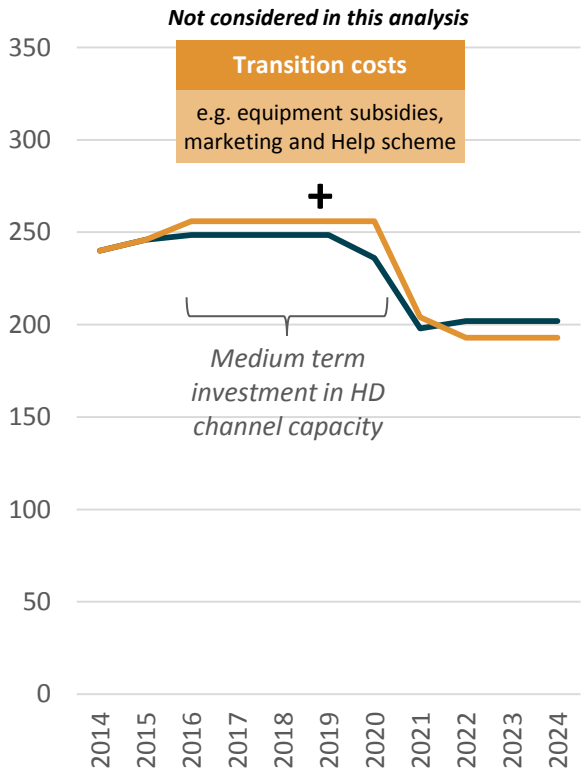
- DTT transitions to DVB-T2/MPEG-4
- 700MHz change of use and switch to DVB-T2/MPEG-4 occurs simultaneously in 2022
- HD channel variants run simultaneously and then replace SD variants. Five main PSB channels in UHD
- MUX pricing remains broadly stable

Number of DTT channels



Impact on distribution costs

Annual DTT costs, £m



- Transition to DVB-T2/MPEG-4 is an important goal for the members of the DTT ecosystem as they seek to plan for the future of the DTT platform. It is under active consideration, although the economics for multiplex operators and broadcasters are challenging
- Following a transition to T2, DTT spend by the PSBs declines by £9m in 2024 compared to the base case
- This decline is driven by the reduction in the number of channels, resulting from the removal of simulcast channels (i.e. switching off SD variants)
- Our analysis considers the impact of DVB-T2 on transmission costs; we have excluded additional costs that may be incurred through the management of the transition process, particularly the costs of mitigating disruption for consumers

Source: Company reports, press releases, industry interviews, Redshift analysis

There are potential avenues for the PSBs to respond to rising distribution costs: reduce channel variations and reduce spend on IP service development

Potential PSB responses to distribution cost increases

Reduce channel variants

- The PSBs may be able to mitigate against future distribution cost increases by reducing the number of channel variants that are transmitted. In particular, the PSBs could reconsider regional variants on DTH
- These approaches have significant potential barriers/limitations: there will be increasing consumer demand for HD channels, and regionalised programming is a key part of the PSBs' remit

2024	***Regional (DTH)***
# channels, DTH	3 (SD) + 45 (HD)
Potential cost savings in 2024, £m	41.3

Reduce ambition for online services

- The base case assumes that the PSBs continue to increase their investment in IP service development in order to provide high-quality online services to UK viewers
- The PSBs may consider scaling back this investment and using more third-party components to provide their services to consumers. Some of the PSBs have already adopted this approach in significant service development areas; for others, this approach could require a shift in their attitude towards on demand services
- The PSBs could take a more positive approach to syndicating online video to external services who would bear the cost of delivery, as with current arrangements with the Sky and Virgin TV platforms
- Reducing PSB ambition for on demand services or adopting higher levels of syndication has potential barriers/limitations, including:
  - ***Undermining viewer relationships –*** the PSBs risk diminishing the value of their channels/online brand with consumers
  - ***Attitudinal shift –*** the PSBs are striving for 'best-in-class' online services (especially the BBC and Channel 4); a reduction of ambition implies a reduction in innovation
  - ***Increased competition for viewing share*** **-** the PSBs will face increased competition for viewing share on syndicated platforms
  - **Impact on advertising revenue –** for the commercial PSBs, online syndication is likely to have a negative impact on advertising revenue

Source: Company reports, press releases, industry interviews, Redshift analysis

Table of Contents

1. Executive Summary
2. **Introduction**
3. PSB distribution costs to date
4. Future outlook for PSB distribution costs – base case
5. Future outlook – alternative scenarios
6. Potential PSB responses to distribution cost increases

Ofcom wishes to investigate how PSB distribution costs have changed during the period covered by the PSB Review, and how these costs might change in future

Introduction

- This study is designed to contribute to Ofcom's third PSB Review, *Public Service Content in a Connected Society*
- Ofcom is concerned about potential threats to the future strength and sustainability of the PSB system posed by the increasing cost of distribution in an always-on, online and mobile environment, which is driving *"a rapid increase in the number of technical distribution platforms used by the PSBs to reach viewers. While increased efficiency may result in an element of cost reduction, there is a danger that the net effect could negatively impact on the budgets available for investment in content"*(1)
- The goal of the project is to investigate how the PSBs' distribution costs have changed over the period covered by the current PSB Review, and how they are likely to change over the next ten years. The ten year forecast is based on trends observable today; in an arena where technology is advancing with great speed, there will inevitably be highly significant developments between now and 2024 we cannot currently foresee. It is impossible to factor these unknown developments into the forecast today, so the forecast has a high level of uncertainty attached
- The scope of the project includes the costs of traditional broadcast distribution, as well as the costs of content distribution over the internet and on mobile devices via internet protocol (IP)
- The project scope focuses on distribution costs; it does not include the potential impact of changes in the distribution landscape on PSB revenues. These changes could have very significant effects on the financial stability of the PSBs: for example, the convergence of internet and TV distribution may undermine the advertising premium typically commanded by the major commercial TV broadcasters. At the same time, it may also give them a platform to improve the targeting and therefore the yield of their advertising inventory. The changes might also offer the opportunity for new revenue streams for pay services. These effects are extremely complex to analyse and there is little consensus on their impact. They are beyond the scope of this study
- In carrying out its analysis, Redshift has drawn on published reports and information made publicly available by the PSBs, interviews with key industry participants, and its own proprietary forecasts and knowledge base
- Redshift has discussed the issues raised by the study with each of the PSBs, but the figures given in the study are Redshift estimates rather than figures supplied by the PSBs; in many cases the PSBs remain bound by confidentiality agreements with major suppliers which prevent them from providing detailed cost breakdowns beyond the figures made publicly available in annual reports, industry statements, etc.

(1) Ofcom Invitation to Tender MC/347: Specification of Service

Table of Contents

1. Executive Summary
2. Introduction
3. **PSB distribution costs to date**
4. Future outlook for PSB distribution costs – base case
5. Future outlook – alternative scenarios
6. Potential PSB responses to distribution cost increases

We have divided distribution costs into four main components for the purposes of the analysis

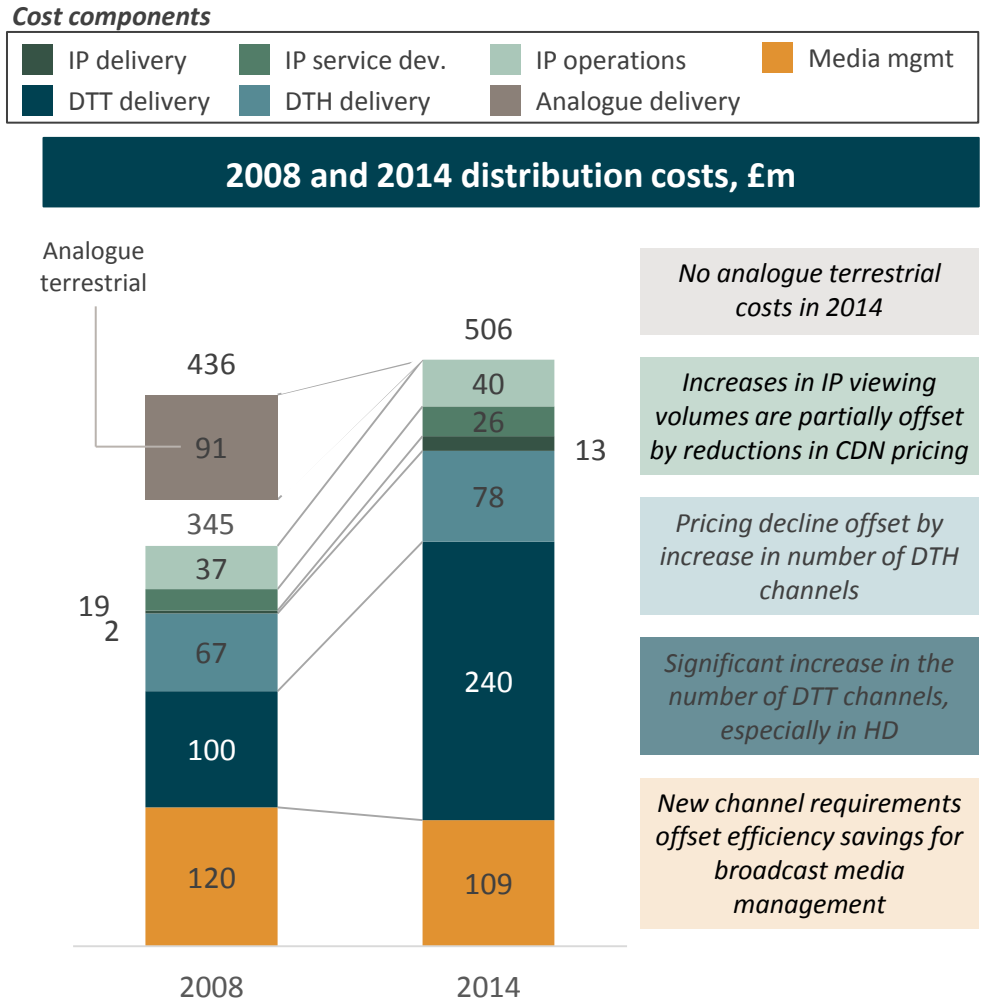
Components of PSB distribution costs

	Functions
Media management	We combine media management for broadcast and internet protocol (IP); while historically they have been treated separately, there is an established trend towards the merger of these two media management functions into a single supplier contract. Broadcast media management functions are those responsible for delivering programmes from the service provider to the broadcast delivery network, including: • Access services – adding subtitles, signing and audio description to linear programming • Lines and contribution – transferring files between the point of generation and the playout location • Playout and monitoring – assembling and maintaining the linear channel feed for distribution For IP delivery, there is an additional set of media management functions: • Encoding and transcoding – converting programme files into digital formats to support multiple device variants • Metadata layering – maintaining metadata schemas to support different device interfaces • Content management – managing content properties such as rights
Broadcast delivery (DTT and DTH)	Broadcast delivery costs are those incurred in delivering programmes from playout centre to the end user through digital terrestrial and satellite transmission, including: • Multiplexing – converting multiple linear channels for broadcast delivery over terrestrial, satellite and cable • Head-end distribution – delivering content streams to various major head-ends over fixed fibre links • Broadcast transmission – delivering the signal over a terrestrial transmission network or to a satellite transponder via satellite uplink
IP delivery	IP delivery costs are those incurred in delivering programmes from a central point of origin to the end user over fixed and mobile networks using IP. Typically, the PSBs employ specialised content delivery networks (CDNs) to secure an efficient, high quality service
IP service development and operations	IP service development costs are those incurred in developing the software based systems which determine the functionality of IP programme delivery systems and make programmes accessible across different device types and operating systems. Operational costs are those incurred in technical support, ongoing service maintenance, special event management, etc.

Our analysis suggests that total distribution costs in 2014 were c. £510m, an increase of £70m on 2008, when costs included analogue transmission

Distribution costs in 2008 & 2014

- We estimate that total PSB distribution costs in 2014 were £506m across all four PSBs, an increase of £70m from 2008
- Changes in distribution costs were driven by the following factors:
  - ***Media management:*** there have been significant increases in all media management requirements: number of channels, number of encodes/transcodes, the number of hours ingested, DRM requirements, amount and complexity of metadata; these have offset by technical and efficiency realised on the renegotiation of the large contracts which comprise the great majority of media management expenditure
  - ***DTT and DTH delivery:*** there have been significant increases in the number of channels delivered, particularly in the more expensive HD format (see p. 15 below) as well as a significant increase in the number of time-shift channels. These increases have been partially offset by the elimination of the costs of supporting analogue transmission
  - ***IP delivery:*** the cost of IP delivery has increased rapidly as the volume of programming delivered over IP has surged (see p. 16 below); this increase has been partly but far from fully offset by the dramatic reduction in unit delivery costs, particularly CDN costs
  - ***IP service development and operations:*** the cost of developing IP delivery systems and the user experience they support have continued to grow, driven by intense competition from global OTT players like Netflix and YouTube to improve the customer experience and extend it to a wider range of devices and screen sizes, particularly for mobile

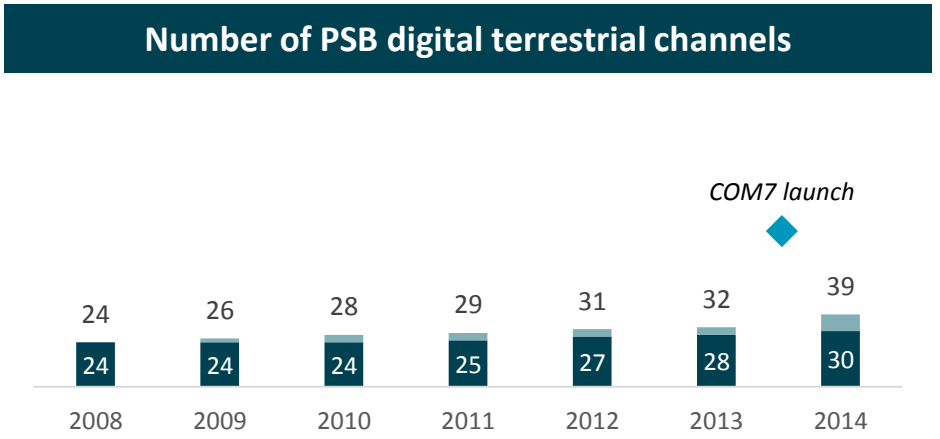


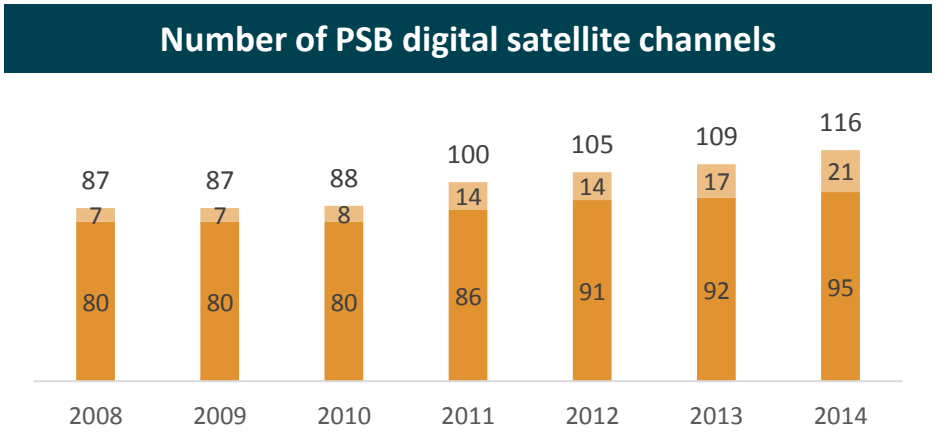
Source: Company reports, press releases, industry interviews, Redshift analysis

Broadcast transmission cost increases have been driven by the increase in the number of channels and, in particular, the increase in HD channels

2008-2014 changes: Increase in the number of broadcast channels

- On digital terrestrial (DTT), the BBC, ITV and Channel 4 all launched channels on the PSB HD MUX between 2008 and 2010. In 2014, Arqiva launched COM7, a DVB-T2 multiplex, which allowed for new HD variants for the BBC and Channel 4
- On digital satellite (DTH), the PSBs introduced HD variants for their portfolio channels between 2008 and 2014, as well as some regionalisation for their main HD channels
- The PSBs have many more digital satellite channels than digital terrestrial channels as a result of regionalisation requirements, which are met on DTH by the duplication of the regional signal across an entire channel slot:
  - ***Digital terrestrial transmission:*** regionalised transmission is achieved through a system of 1,194 radio towers across the UK. The radio towers are co-ordinated to deliver different video streams in different TV regions. Each regional variant is only transmitted to the appropriate area
  - ***Digital satellite transmission:*** regionalised transmission is achieved by securing capacity across the full satellite footprint for each of the TV regions. Each regional variant is replicated in full; the BBC has 18 regional variants of BBC One and therefore requires satellite capacity for 18 standard definition channels
- DTH channels are significantly less expensive than DTT; the cost difference varies by channel format (and DTT mux), but is at least a factor of four less than DTT





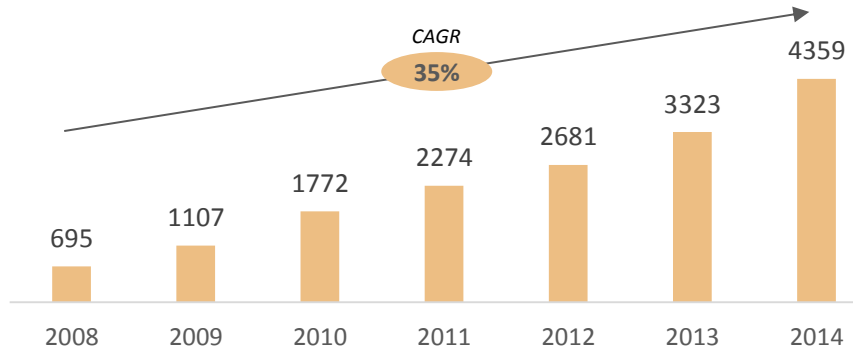
Source: Company reports, Press releases, a516digital.com, Redshift analysis

IP delivery costs have increased due to increased IP consumption and demand for improved picture quality, partially offset by declining CDN costs

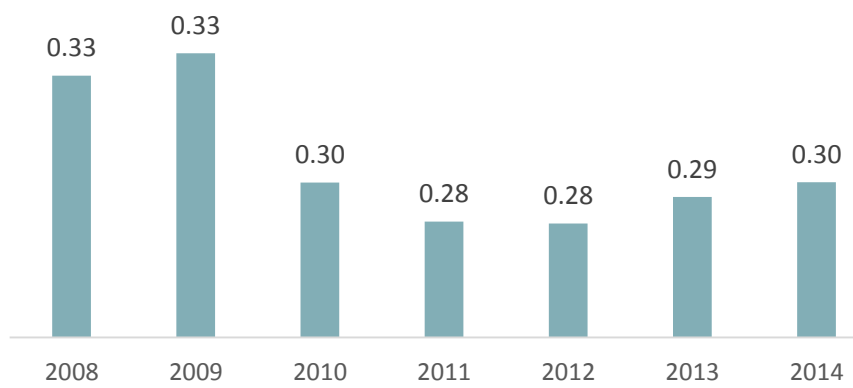
2008-2014 changes: IP delivery costs

- We estimate that IP delivery costs have increased by 400% from £2 to £13m between 2008 and 2014
- IP delivery costs have increased primarily as a result of the rapid increase in the consumption of IP-delivered content delivered to new devices as well as TV sets: the volume of PSB IP video requests has increased at a CAGR of 35% between 2008 and 2014 from 695m to 4.4bn
- Average cost/video request has decreased from 0.33 pence to 0.30 pence
- The decline in cost/request is the result of continuing declines in CDN pricing, driven by technical innovation and persistent competitive pressure in CDN provision
- This decrease has recently been offset by growth in the amount of data delivered per request, as improvements in broadband network speeds and improvements in screen resolution at all screen sizes are driving demand for higher image quality
- CDN services are increasingly becoming commoditised, leading to significant reductions in unit pricing. We expect these reductions to continue throughout the period of the study
- The costs of IP service development have increased, driven by constant competitive pressure on service functionality from major competitors like Netflix and Sky

Annual PSB IP video requests, m



Delivery cost per request, pence



Source: iStats, company reports, press releases, industry interviews, Redshift analysis

Table of Contents

1. Executive Summary
2. Introduction
3. PSB distribution costs to date
4. **Future outlook for PSB distribution costs – base case**
5. Future outlook – alternative scenarios
6. Potential PSB responses to distribution cost increases

Our base case forecast suggests total PSB distribution costs will increase from £510m to c. £530m in 2024, driven by increases in IP

Distribution costs in 2014 & 2024 – base case

Base case forecast – key drivers

1 Shift towards IP-delivered on demand viewing

- Viewing shifts towards IP-delivered on demand content; for example, BBC iPlayer catch-up and Netflix
- The main factors driving this change are:
  - Greater proliferation of non-TV devices (tablets and smartphones)
  - Increased access to connected devices
  - Increased prominence and attractiveness of non-linear content

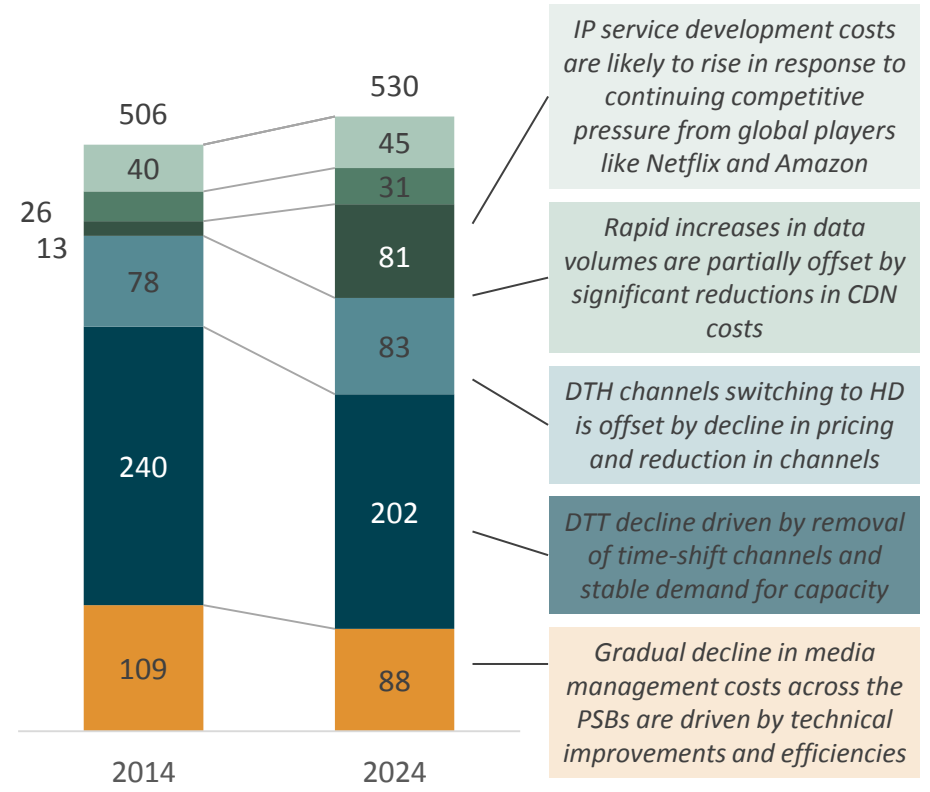
2 Changes in channel line-up and resolution

- The PSBs will be able to reduce their broadcast channel portfolios as time-shift channels become uneconomic. This saving will be partly offset by the need to add HD/UHD versions on both DTT and DTH platforms
- The PSBs will also need to increase bitrates for IP transmission to serve larger screens, particularly for TV sets, and greater screen resolution capability

3 Changes in technology costs

- There are likely to be significant changes in the unit costs of the underlying technologies which drive overall distribution costs:
  - CDN unit costs are likely to continue to decline
  - Satellite and DTT capacity costs are likely to decline
  - Media management costs are likely to decline
  - IP service development costs are likely to increase

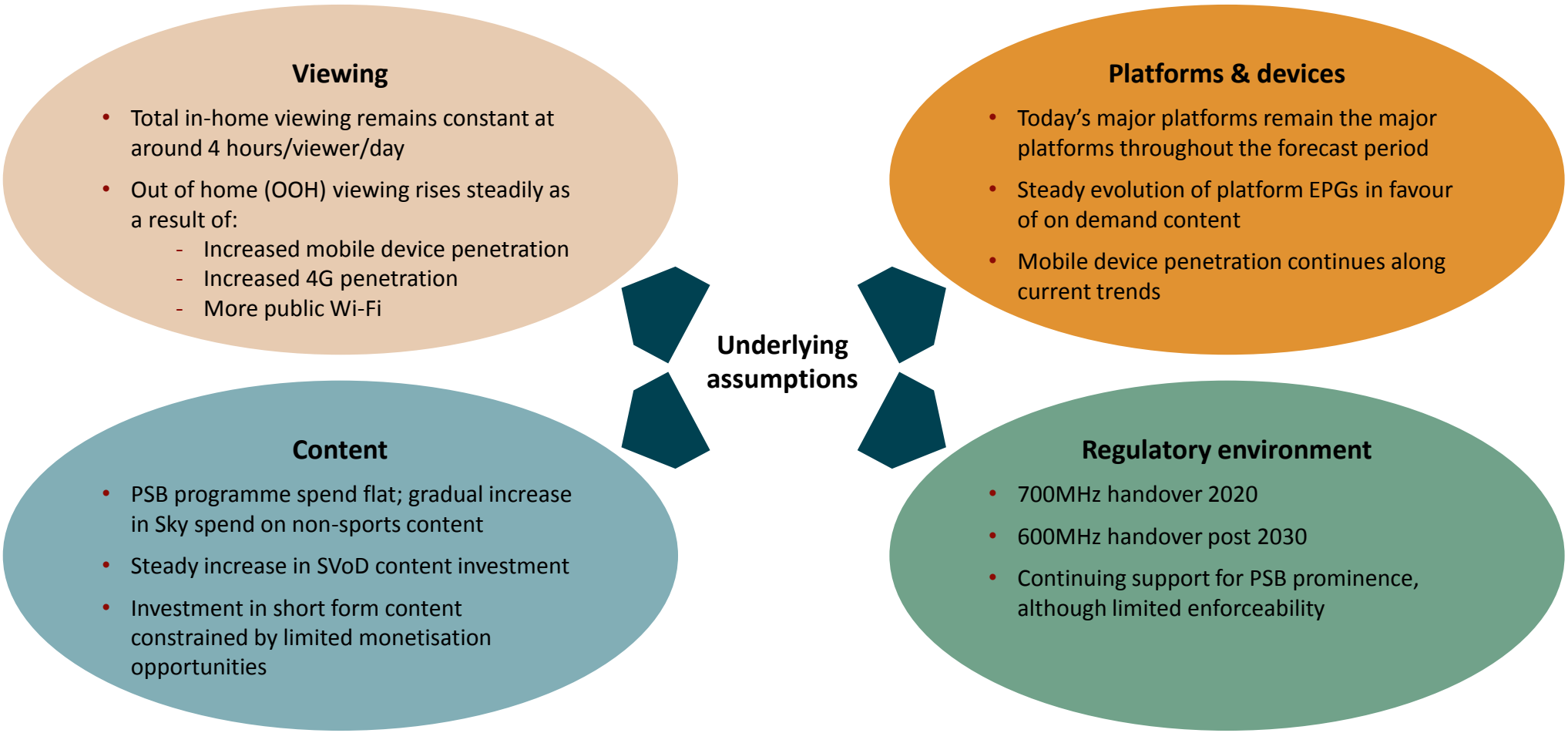
2014 and 2024 distribution costs, £m



Source: Company reports, press releases, industry interviews, Redshift analysis

The underlying assumptions behind the viewing forecast extrapolate the trends we already observe towards greater on demand and mobile viewing

1 Shift towards IP-delivered on demand viewing: base case viewing forecast assumptions



The forecast methodology divides viewing according to established device-based patterns, and layers over further trends towards on demand viewing

1 Shift towards IP-delivered on demand viewing: base case viewing forecast methodology

- We assume that total in-home viewing per person remains constant; in-home viewing of non-TV devices substitutes for traditional TV viewing
- Out-of-home viewing growth is projected taking into account the following factors: increased mobile device penetration, increased 4G penetration and greater access to public Wi-Fi
- Total viewing is held at these levels throughout the remainder of the modelling process

Total viewing assumptions

Changes in total viewing time

X

- We forecast the ownership of non-TV devices (PC/laptop, tablets and smartphones) and the number of primary UK households for each major platform (Sky, Virgin, YouView, Freeview and Freesat)
- The forecast uses established device-based behaviour to forecast device usage, so when a user gains access to a new device, they adopt behaviour that corresponds to the new device. For example, if 20 minutes is the current average for tablet users, each incremental tablet user will generate an additional 20 minutes of tablet viewing per day

Changes in access to devices

Changes in how we split our total viewing time across devices and content types

X

- In addition to modelling on the basis of established device-based viewing behaviour, the model anticipates further shifts in viewing preferences, including:
  - an increase in the amount of tablet viewing per tablet user
  - An increase in SVoD viewing per household as a result of increased content spend by Netflix et. al
- The model also forecasts a slow decline in PSB share to reflect increasing competition from domestic and international players

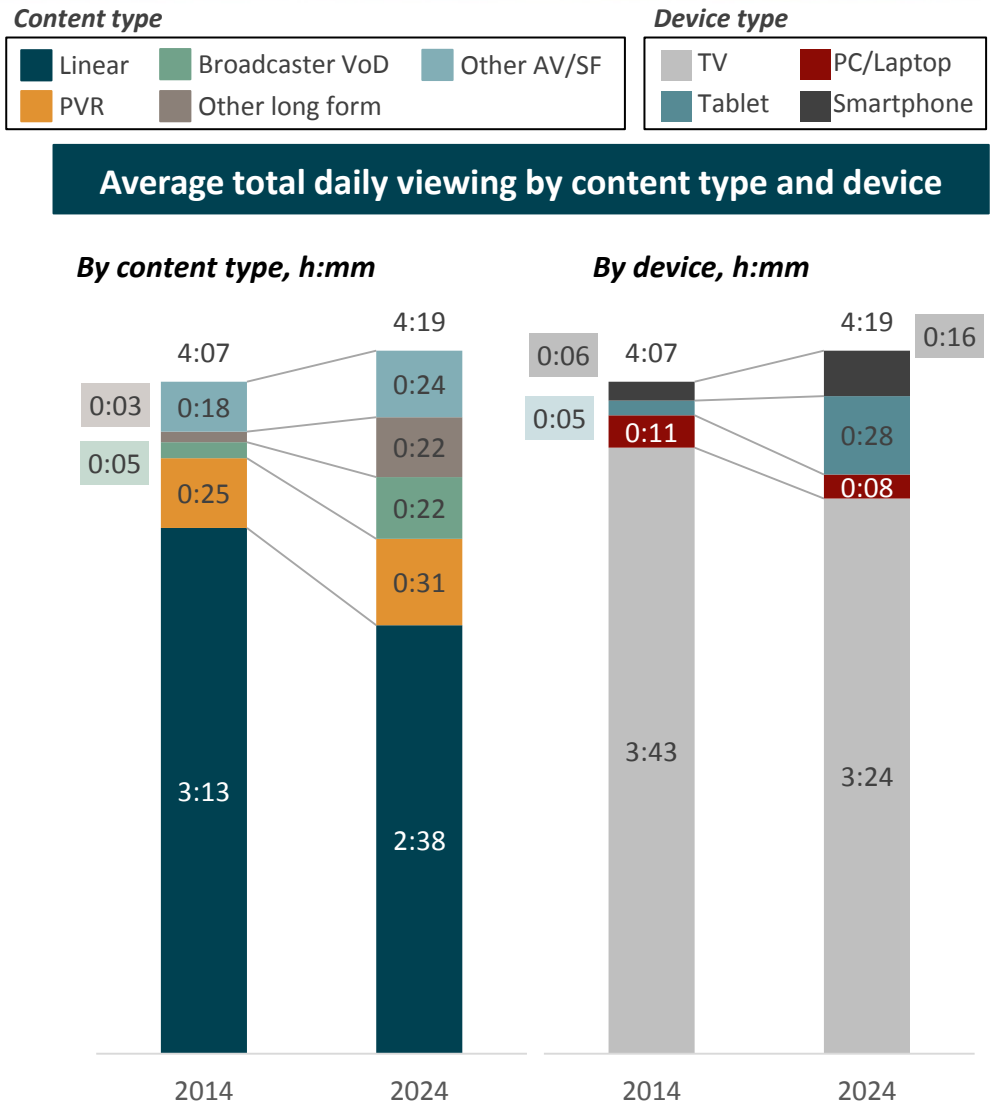
Changes in viewing preferences

There is a natural conservative bias in any forecast methodology which relies, as this does, on the extrapolation of trends and influences we can identify today. It is inevitable that over the course of a 10-year timespan, there will be significant developments we cannot foresee. However, in the context of a forecast for distribution costs, it seems likely that unpredictable, radical developments are more likely to reduce rather than increase PSB viewing share, and therefore are more likely to imply a reduction rather than an increase in PSB distribution costs

The base case viewing forecast suggests that total video viewing will grow and viewing will shift from the TV screen to other devices

1 Shift towards IP-delivered on demand viewing: base case viewing forecast results (1/2)

- Redshift estimates that total viewing across all screens and content types is approximately 4 hours 7 minutes/person/day in 2014
- We expect total viewing to increase to 4 hours 19 minutes/person/day by 2024, driven by a growth in out-of-home viewing
- Viewing of broadcaster VOD and other long form[1] grows from 5 minutes and 3 minutes per person per day to 22 minutes per day of each type
- Other AV and short form, which includes services such as YouTube, Vimeo and DailyMotion, increases from 18 minutes to 24 minutes per person per day
- Growth in PVR viewing driven by increasing PVR penetration is offset by increased viewing of catch-up programming over IP
- Viewing to TV screens decreases from 3 hours and 43 minutes to 3 hours and 24 minutes/person/day
- The main beneficiary of declining TV viewing is tablet viewing, which increases from 5 minutes/person/day to 28 minutes/person/day
- These estimates include all viewing of audio-visual content across all devices, and therefore include far more than PSB content

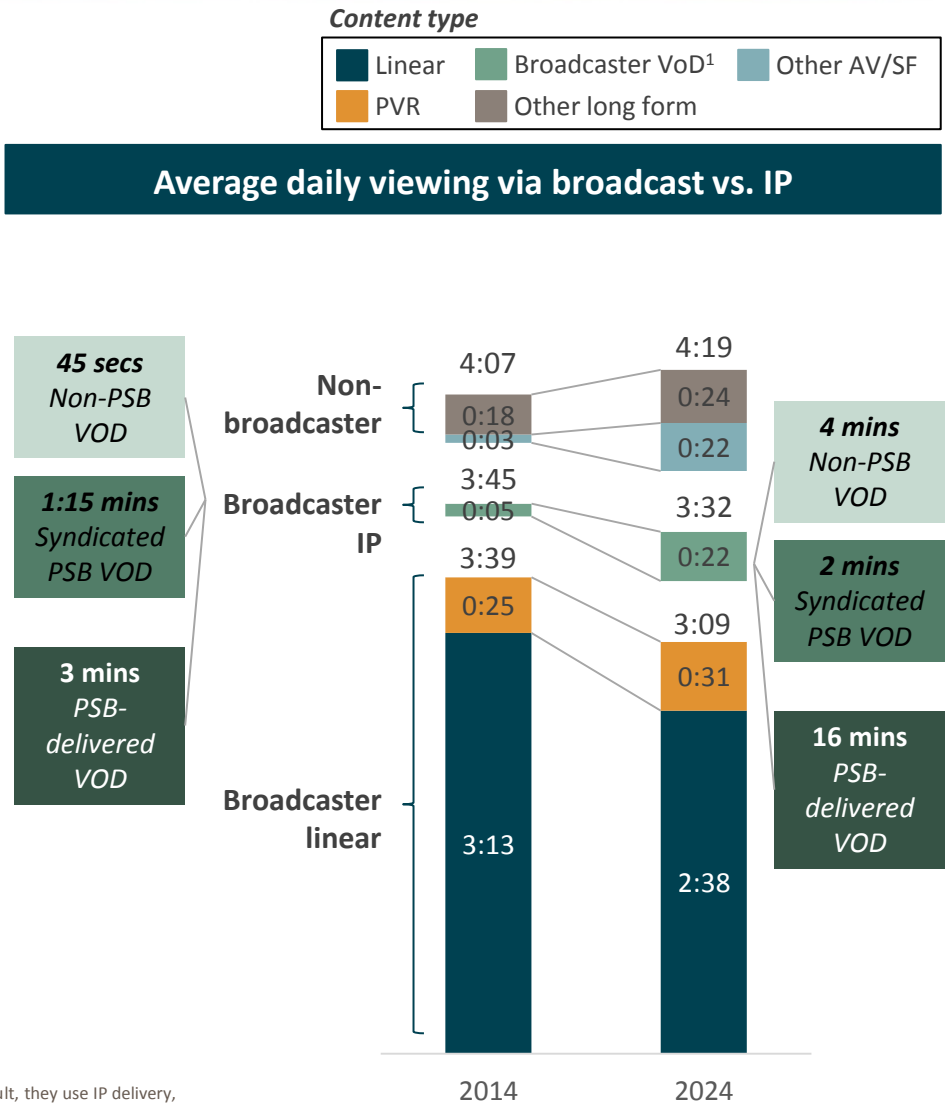


Notes: (1) Long form SVoD and TVoD services like Netflix, Amazon, Blinkbox and Wuaki TV
Source: Redshift viewing model

The base case forecast suggests that the proportion of PSB viewing delivered over IP will grow significantly, from around 5 minutes/day to 20 minutes/day

1 Shift towards IP-delivered on demand viewing: base case viewing forecast results (2/2)

- The overall purpose of the forecast is to divide PSB viewing between content delivered over broadcast transmission and content delivered over IP
- From the viewing forecast, we can divide total viewing into three categories :
  - ***Broadcaster linear:*** viewing of broadcaster content that is delivered over traditional broadcast networks in a linear schedule. This includes viewing via PVR. It is likely that network PVRs(1) will be used by significant platforms during the forecast period, but on the platforms most likely to use them (Virgin and Sky) the PSBs are not responsible for IP delivery costs (see below). It is not easy to see how the free/open platforms like Freesat and Freeview Play will be able to sustain the significant expense of network PVR capability, so we have ignored this for the base case
  - ***Broadcaster IP:*** - viewing of broadcaster content that is delivered over IP networks, via services such as BBC iPlayer, ITV Player, 4OD/All4, Sky Go and Demand 5. This includes viewing of linear programming over IP (e.g. BBC One watched over iPlayer on a tablet). Broadcaster IP viewing needs to be sub-divided twice further:
    - To remove non-PSB IP-delivered programming, e.g. Sky Go, UKTV
    - To remove viewing on platforms on which the PSBs are not responsible for the cost of IP delivery, e.g. Sky and Virgin
  - ***Non-broadcaster IP*** **-** viewing of content that is delivered over IP networks via services such as Netflix and YouTube. While these services can include archive PSB content, the PSBs do not incur delivery costs for this viewing



Notes: Network PVRs deliver PVR functionality over the network rather than by using local storage in the set top box; as a result, they use IP delivery, whereas programmes viewed over tradition PVRs are delivered using broadcast transmission

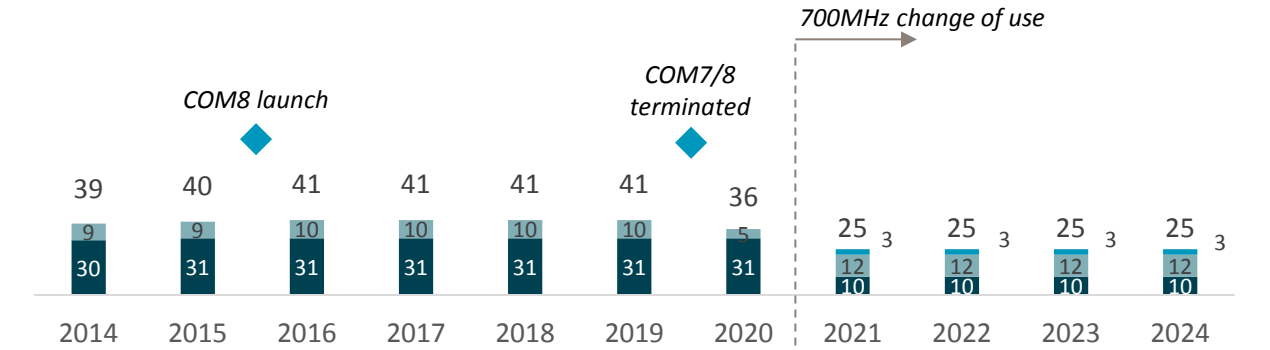
Source: Redshift viewing model

The base case assumes that time-shift channels are discontinued, DTT remains on a mixed DVB-T/DVB-T2 platform, and DTH channels migrate to HD in 2022

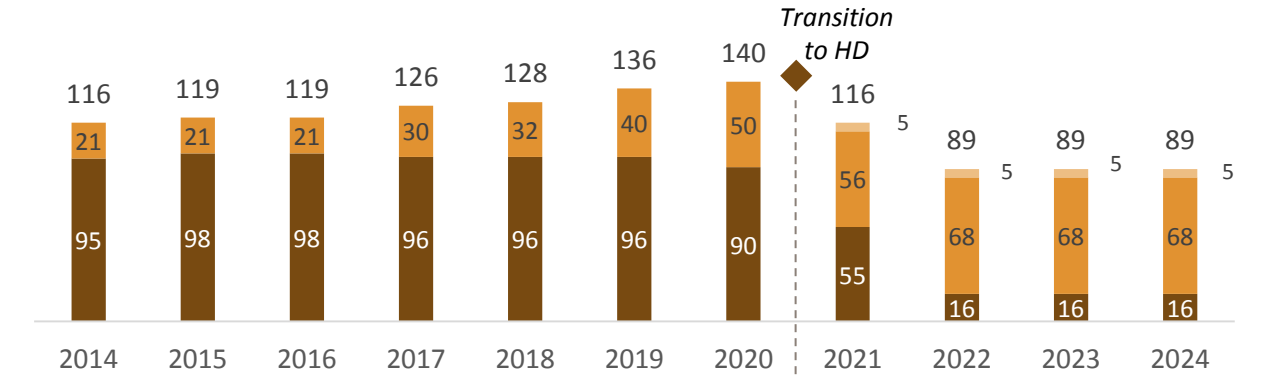
2 Changes to channel line-up and resolution – base case assumptions (1/2)

- In our base case, we expect that time-shift channels will become uneconomic and will be discontinued in 2020
- Our base case does not assume wholesale adoption of DVB-T2/MPEG-4 by the UK DTT multiplex operators – we consider this as an alternative scenario
- In the base case, we assume that the PSBs seek to occupy all capacity on the PSB DTT MUXs; we assume that the PSBs run three simulcast UHD channels to achieve this (e.g. BBC1, BBC2 and C4)
- For satellite, we assume a transition to HD, with some SD channels continuing beyond 2024 to serve legacy customers. We expect that the PSBs will simulcast an increasing number of channels in HD before 2020, motivated by the competitive pressure from pay platforms which will use HD as a means of differentiation. We also expect that the PSBs will launch the five main channels in UHD on DTH
- A key sensitivity in satellite distribution is the extent to which the PSBs provide regional variants for HD channels; we have assumed that the PSBs replicate all regions in HD for their main channels on DTH

Number of PSB digital terrestrial channels



Number of PSB digital satellite channels



Source: Company reports, press releases, industry interviews, Redshift analysis

REDSHIFT the speed of change

Video bitrates will continue to increase; larger screen sizes and greater demand for high definition will be only partially offset by compression developments

2 Changes to channel line-up and resolution – base case assumptions (2/2)

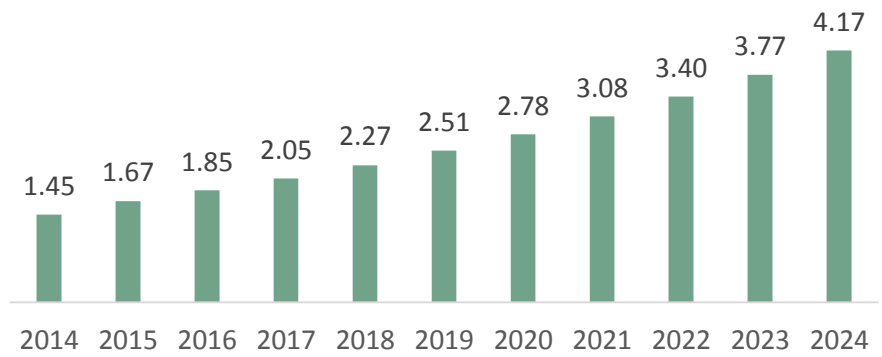
- The base case also assumes a steady increase in the quality of content delivered over IP. We expect this will be driven by three factors:
  - **Higher connection speeds –** better connectivity offered by superfast fixed broadband and new mobile technologies such as 4G and 5G will support higher data rates needed to view content in higher definition
  - **Greater demand for high definition content -** innovation by new SVOD entrants (such as Netflix, Amazon Prime) is likely to increase consumer expectation of IP delivered content
  - **Shift to larger screens –** we expect that a greater proportion of broadcaster VOD viewing will take place on large screens and that, as TV screen resolution grows, the picture quality of IP-delivered content will also improve
- While we expect video bitrates to increase as a result of these factors, there are mitigating factors:
  - **Screen resolution will limit picture quality** - there is a limit to the picture resolution that a given screen size can accommodate before improvements begin to be imperceptible
  - **Compression improvements** – compression improvements in MPEG-4 and HEVC adoption is likely to put significant downward pressure on video bitrates

Demand for high definition content over IP

"[UHD] will be the first format that is internet only. Broadcast, satellite, cable – they're not going to have it at least in the next five years"

Reed Hastings, CEO - Netflix

Average video bitrate, Mbps



Source: Netflix, company reports, press releases, a516digital.com, Redshift analysis

Improvements in media management technology can be exploited by the PSBs on contract renewal, leading to step changes in costs over the forecast period

3 Changes in technology costs – base case assumptions (1/3)

	Contract structure	Impact of technology changes	Impact of market dynamics	Summary
Media management	• Contract lengths differ by PSB, ranging from 3 – 10 years • Within contract terms, costs are broadly fixed; PSBs have the opportunity to renegotiate on contract renewal	• Technology advances in cloud infrastructure, automation and digital storage are likely to offer cost savings for media management suppliers • There are likely to be limitations on the extent to which these advances can be exploited; cloud technology for media management is currently unproven; the PSBs have large elements of live programming that cannot be automated and extremely high requirements for redundancy and disaster recovery • Detailed media management requirements tend to increase over the course of each contract as technology requirements evolve, offsetting the potential for technology-driven cost savings	• There has been significant recent consolidation in the media management marketplace; however, the market remains competitive, and appears likely to continue to be so as new players from the software and IT outsourcing sectors see opportunities to virtualise and automate functions traditionally performed by dedicated broadcast equipment vendors	• We assume the PSBs will be able to negotiate reductions in media management costs in contract renewals as a result of increased automation and the evolution of media management technology • The base case assumes that the functionality requirements remains broadly as it is today; we assume the same number of distinct channels, the same amount of content, and a roughly constant split between live and non-live scheduling

The cost of broadcast delivery for terrestrial channels for the PSBs will remain broadly fixed; we assume a steady decline in satellite costs

3 Changes in technology costs – base case assumptions (2/3)

	Contract structure	Impact of technology changes	Impact of market dynamics	Summary
Broadcast delivery - DTT	• DTT transmission contracts are secured with the MUX operators; all of the PSBs (except C5) have controlling shares in at least one MUX operator • In general, MUX operating costs are subject to long-term contracts with technical infrastructure providers (e.g. Arqiva and BT), and we treat these costs as broadly fixed • In some instances, the PSBs lease capacity from commercial multiplex operators (SDN and Arqiva); the price for commercial capacity is governed by supply/demand market dynamics	• In our base case, we assume that DVB-T/MPEG-2 remains as the main transmission technology for DTT • We expect moderate improvements in compression over the period in question (leading to more capacity per DVB-T/MPEG-2 multiplex) • We consider the alternative scenario of a transition to DVB-T2/MPEG4 below	• The base case does not assume significant changes to the supply or demand for DTT transmission capacity	• For PSB channels on owned-and-operated multiplexes, we hold total costs broadly constant; we assume that compression improvements are used to improve picture quality or launch higher definition simulcast channels • For PSB channels on commercial multiplexes, we assume the market price remains broadly constant
Broadcast delivery - Satellite	• The PSBs secure satellite capacity in bulk, typically on a transponder-by-transponder basis • Contracts are long term and are typically negotiated directly with satellite transponder suppliers (e.g. SES and Eutelsat)	• The base case assumes adoption of DVB-S2 for satellite transmission of HD channels • We expect moderate improvements in compression over the period	• The base case assumes a gradual softening of the market for satellite capacity as consistent supply meets weakening demand for +1, +24 channels	• We expect a steady decline in the cost of satellite transmission

We assume CDN pricing to continues to decline, but at a slower rate; IP service development spend is likely to increase as the PSBs face pressure to innovate

3 Changes in technology costs - base case assumptions (3/3)

	Contract structure	Impact of technology changes	Impact of market dynamics	Summary
IP delivery - CDN pricing	• CDN contracts are negotiated on a 2-3 year basis • The PSBs are able to negotiate favourable rates due to volume requirements	• All of the PSBs operate on a multi-CDN basis to ensure high levels of redundancy; this structure maintains a downward pressure on CDN pricing • The costs of provision are likely to continue to decline, driven by continuing memory and processing cost reductions	• We expect the CDN market to continue to be extremely competitive • It is unlikely that large players will be able to acquire a sufficiently dominant market share to create an upward pressure on pricing • Although there may be some consolidation; many CDNs[1] also offer other value-added services, and content delivery is a means of accessing these markets	• We expect CDN unit pricing to continue to decline over our timeframe • Technology improvements, reduced storage costs and competitive intensity will maintain the downward pressure on CDN pricing • We take a conservative estimate; our projected rate of decline is lower than that observed to date
IP service development and operations	• The PSBs employ a mixture of in-house and external teams for their IP service development and operations; the cost is predominantly the cost of human resource	• PSBs will benefit from increased standardisation of web formats (e.g. increasing adoption of HTML5) • IP services will undergo commoditisation that PSBs can exploit • However, we expect the requirement of the PSBs to support legacy systems will continue to be a burden over this timeframe	• The PSBs are facing significant competitive pressure in IP video services; global players with significant service development expertise such as Netflix, Apple, Google and Amazon will raise consumers' expectations for IP video service functionality • We expect the PSBs will need to continue to compete on functionality as well as content	• We expect annual spend by the PSBs on IP service development and operations to increase over our timeframe • Despite industry trends towards commoditisation of current services, the competitive intensity of the IP video market will pose a significant incentive for the PSBs to continue to innovate

Notes: 1) Amazon Cloudfront, Microsoft Azure, Netflix

Table of Contents

1. Executive Summary
2. Introduction
3. PSB distribution costs to date
4. Future outlook for PSB distribution costs – base case
5. **Future outlook – alternative scenarios**
6. Potential PSB responses to distribution cost increases

We have considered three major alternative scenarios in which distribution costs might vary significantly from the base case

Alternative scenarios to test

Content type

- Linear
- Broadcaster VoD[1]
- PVR
- Multicast

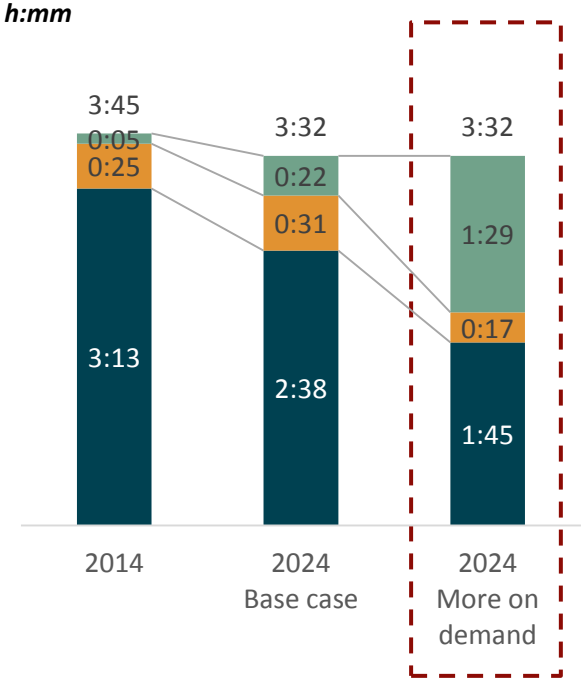
Channel type

- DTT SD
- DTT UHD
- DTT HD

1 Faster switch to on demand

In this scenario, we consider the impact of a significant increase in IP-delivered on demand viewing on distribution costs

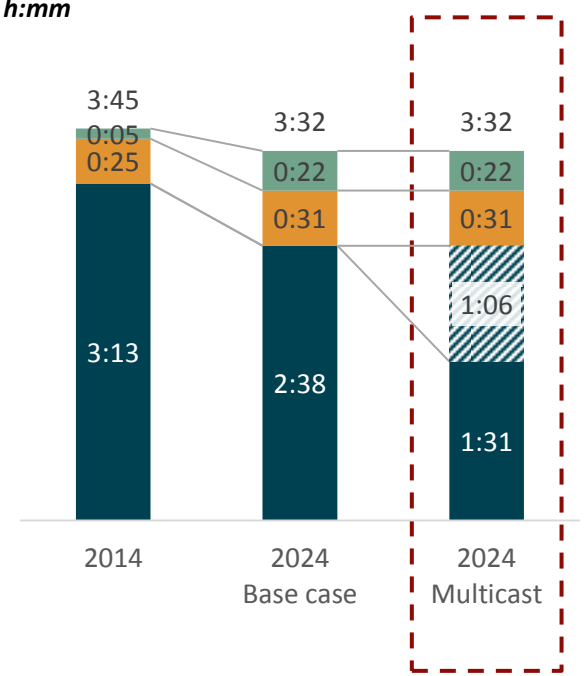
Average daily broadcaster viewing per person, h:mm



2 Linear TV over IP via multicast

In a 'linear TV over IP' scenario, we consider how PSB distribution costs might change in a landscape in which ISPs have opted to deliver linear television over multicast

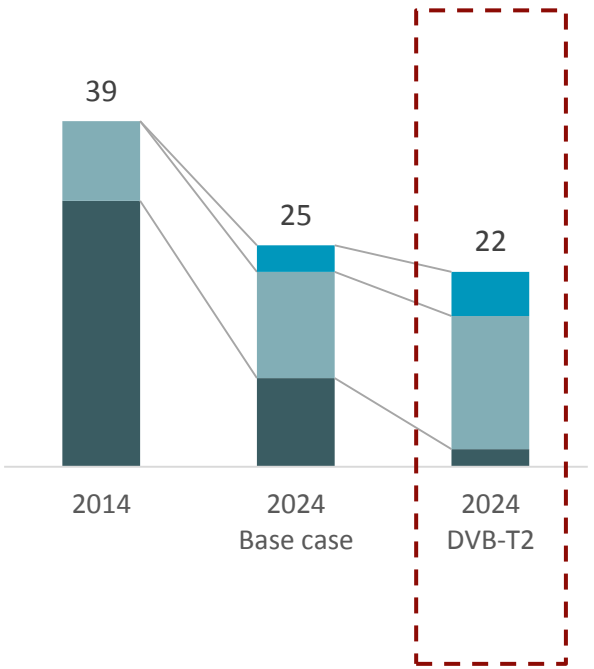
Average daily broadcaster viewing per person, h:mm



3 DTT transition to DVB-T2/MPEG-4

In this scenario, we consider the likely impact of a transition to DVB-T2/MPEG-4 on DTT on PSB distribution costs

Number of DTT channels



Source: Company reports, press releases, industry interviews, Redshift analysis

This scenario envisages dramatic changes to the way user interfaces present viewing choices, leading to a rapid increase in on demand viewing

1 Faster switch to on demand - rationale

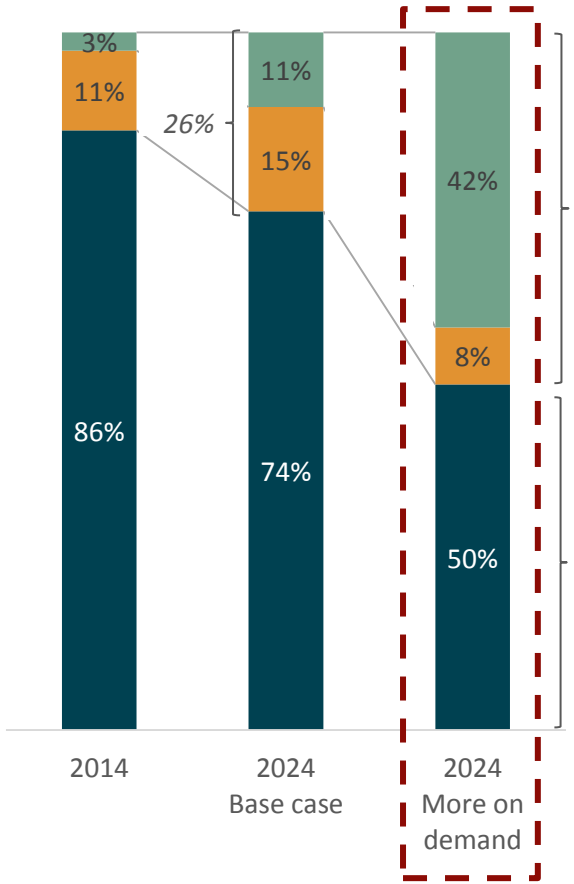
- The most likely cause of an increased shift to on demand viewing is a wholesale reconfiguration of TV interfaces towards a more personalised approach, in which the traditionally separate linear grid and provider-focused on demand areas disappear, to be replaced by a set of recommendations personalised to the viewer. In this scenario, from the viewer's point of view the distinction between linear and on demand delivery disappears. If personalised recommendations can be made more relevant and compelling, there is little reason for the viewer to be concerned with how the programming is delivered
- Such a reconfiguration could be driven by well-resourced players like Google and Apple, who compete on UI design and who have no existing content or channel brands to protect
- It could also be encouraged by improved cross-promotion/ recommendation within individual content provider areas (e.g. myBBC)
- Although these factors are taken into account in the base case, in this more radical scenario we assume that their impact is much greater, leading to a much faster decline in linear as a share of total viewing
- For the purposes of this scenario, it is assumed that PSB share of viewing remains as in the base case for linear, PVR and broadcaster VOD

Variations on the base case	
Media management	Media management remains as in the base case
Broadcast delivery	Broadcast distribution remains as in the base case
IP delivery	IP volumes substantially increased CDN pricing decline to reflect volume discounts and PSB investment in CDN infrastructure
IP service development and operations	IP service development investment increases compared to the base case

In this scenario, the proportion of broadcaster viewing which is on demand increases from 25 to 50%, and shifts almost entirely to IP delivery

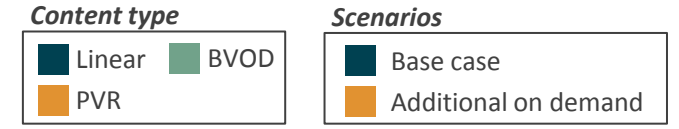
1 Faster switch to on demand - assumptions

Average daily viewing to PSBs, per person, %

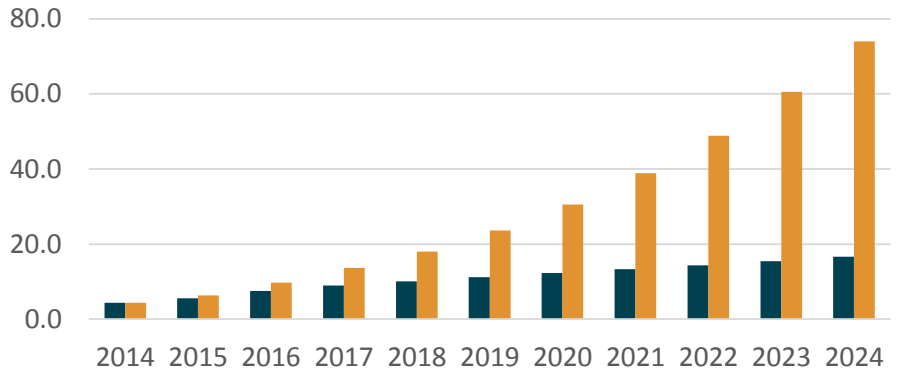


In this scenario, we assume that the switch to video-on demand is faster in comparison to the base case

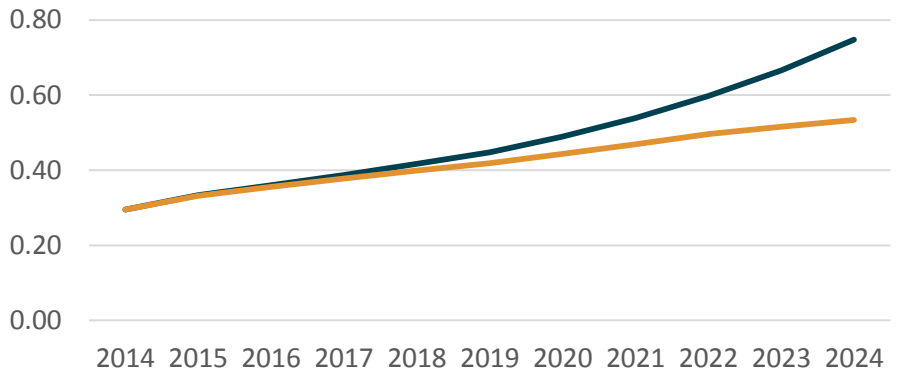
Broadcaster linear viewing decreases to 50% as viewers opt for on demand forms of content



Annual PSB IP requests, bn



Delivery cost per request, pence



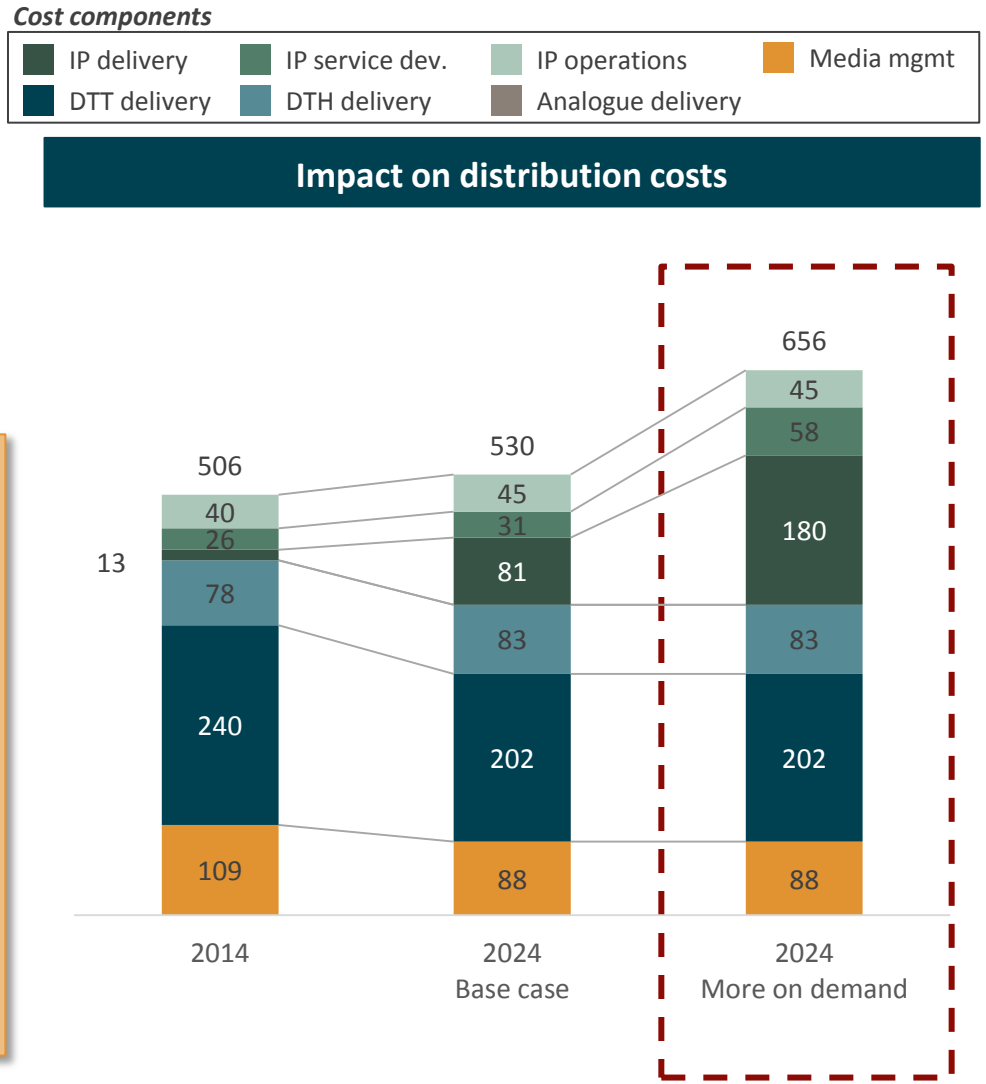
Source: Company reports, press releases, industry interviews, Redshift analysis

The analysis suggests that distribution costs could increase by over £120m under this scenario

1 Faster switch to on demand - impact

- The scenario assumes there will be an increase in IP service development costs, since it is predicated on a dramatic expansion of viewers' use of the features and functionality offered by on demand services
- The result suggests that variable IP delivery costs could increase by around £120m in addition to the increase in service development costs

- This is an extreme case; it assumes a dramatic reshaping of the way TV programming is presented onscreen
- The impact on PSB distribution costs is significant, but not catastrophic
- The result is highly sensitive to assumptions about CDN pricing; if CDN pricing remains at today's level, the 2024 figure could increase by £200m compared to this case
- Most disruptive viewing scenarios focus on loss of PSB viewing share to new entrants like Netflix and YouTube; from a distribution cost perspective, these scenarios do not present a challenge, since the amount of material the PSBs need to deliver decreases
- By contrast, the PSBs might see a faster switch to on demand as a good problem to have, since it implies a significant increase in viewer engagement
- The impact on the cost of IP service development is hard to quantify; it is logical to assume that there would be a significant increase, since this outcome implies much greater use of on demand functionality



Source: Industry interviews, Redshift analysis

The multicast scenario focuses on the potential impact of the ISP-based TV platforms switching to IP delivery for linear TV

2 Linear TV over IP via multicast - rationale

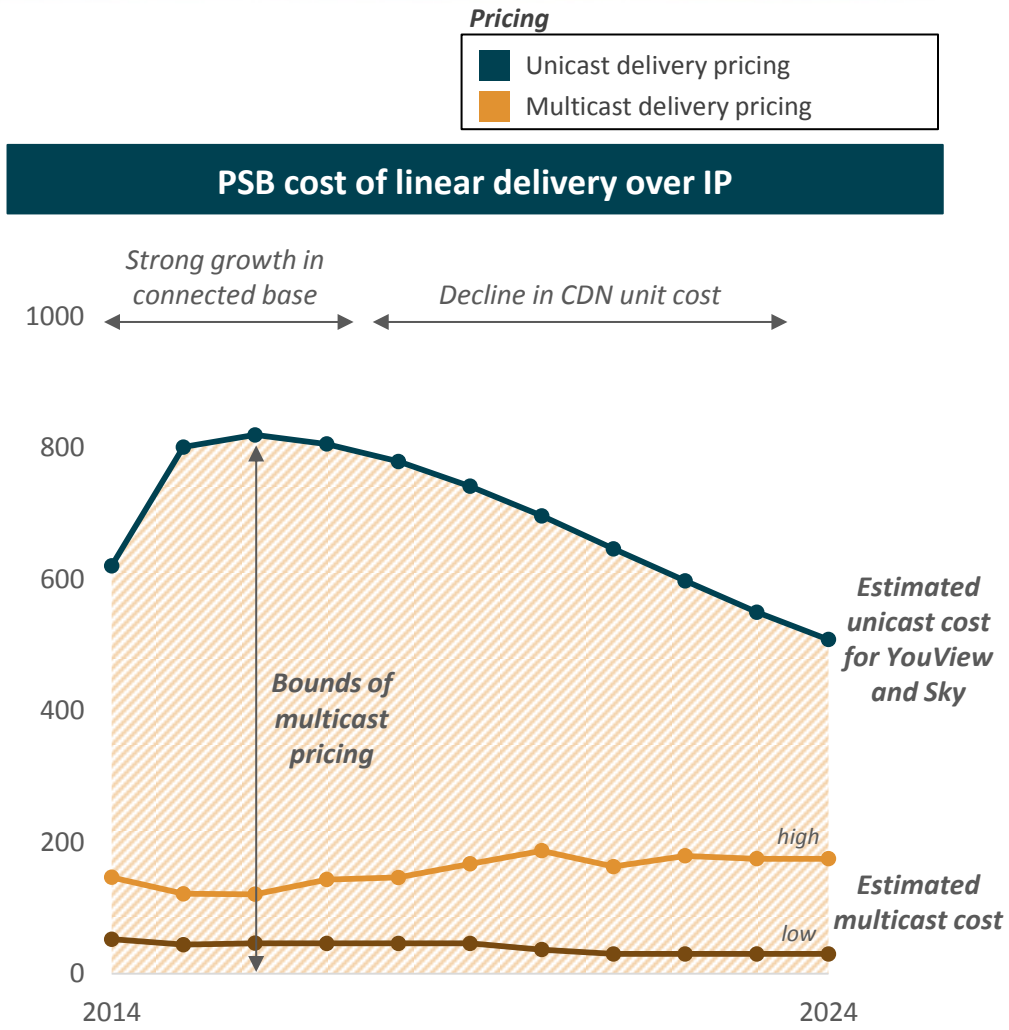
- In a 'linear TV over IP' scenario, we consider how PSB distribution costs might change in a landscape in which ISP-controlled platforms (Sky & YouView) opt to deliver linear television over multicast
- Multicast is already deployed in the market today: BT and TalkTalk use multicast to deliver bouquets of pay linear channels on YouView
- The ISPs have a potential incentive to drive a switch to multicast in order to bring all elements of delivery under their direct control and extract greater value for their core networks from content providers
- All major telcos are moving towards a converged fixed and mobile strategy in which they are in a position to offer customers a complete bundle of access services across fixed and mobile networks (e.g. BT/EE, Sky developing MVNO capability, Vodafone entering TV)
- In this environment, telcos are likely to want to see a roadmap to switching to IP delivery for linear as soon as possible, since it will drive traffic to their networks and accelerate DTT switch-off, which will free up new spectrum capacity for their mobile networks
- In this scenario, we assume BT, TalkTalk and Sky switch to a full multicast system for the delivery of all linear content and that the PSBs negotiate with each ISP individually for multicast carriage
- Viewing on these platforms remains the same; the same number of hours of content is consumed, and the split between linear, PVR and VOD remains as in the base case, and PSB share of viewing remains as in the base case for linear, PVR and broadcaster VOD

Variations on the base case	
Media management	No change
Broadcast delivery	Broadcast distribution remains as in the base case
IP delivery	Linear content is delivered over IP using multicast technology on BT, TalkTalk and Sky networks
IP service development and operations	No change

Using current technology, each multicast provider is a monopoly, so multicast is priced as part of a carriage deal rather than as a separate product like CDN

2 Linear TV over IP via multicast - assumptions

- While multicast remains platform-specific, the cost of multicast delivery is part of a broader deal for carriage; it is not a separate product provided by an independent supplier like the CDN service for which it substitutes
- It is extremely difficult to develop benchmarks, because its use at present is very limited. In this scenario, we use the current BT TV Connect ratecard, duplicated across three ISP networks, as the basis for multicast pricing
- The cost to the broadcaster will depend on their negotiating leverage as part of a broader carriage deal
- There are minimum volume requirements for the service provider, although these are unlikely to apply to PSB channels which tend to have substantial audiences
- Price will be bound at the top end by the cost of equivalent unicast delivery, although unicast delivery of PSB linear channels is impractical in the medium term at least, giving the multicast provider an incentive to price significantly below this level
- At the bottom end, the platform can provide delivery at zero cost if the channel is particularly attractive
- The theoretical price will therefore be between 0 and 100% of equivalent unicast
- This scenario assumes that Sky argues that linear delivery should continue to be a broadcaster cost (as with satellite costs on Sky today) rather than a platform cost (as with VOD costs on Sky). It also assumes the PSBs continue not to have to pay for carriage on Virgin



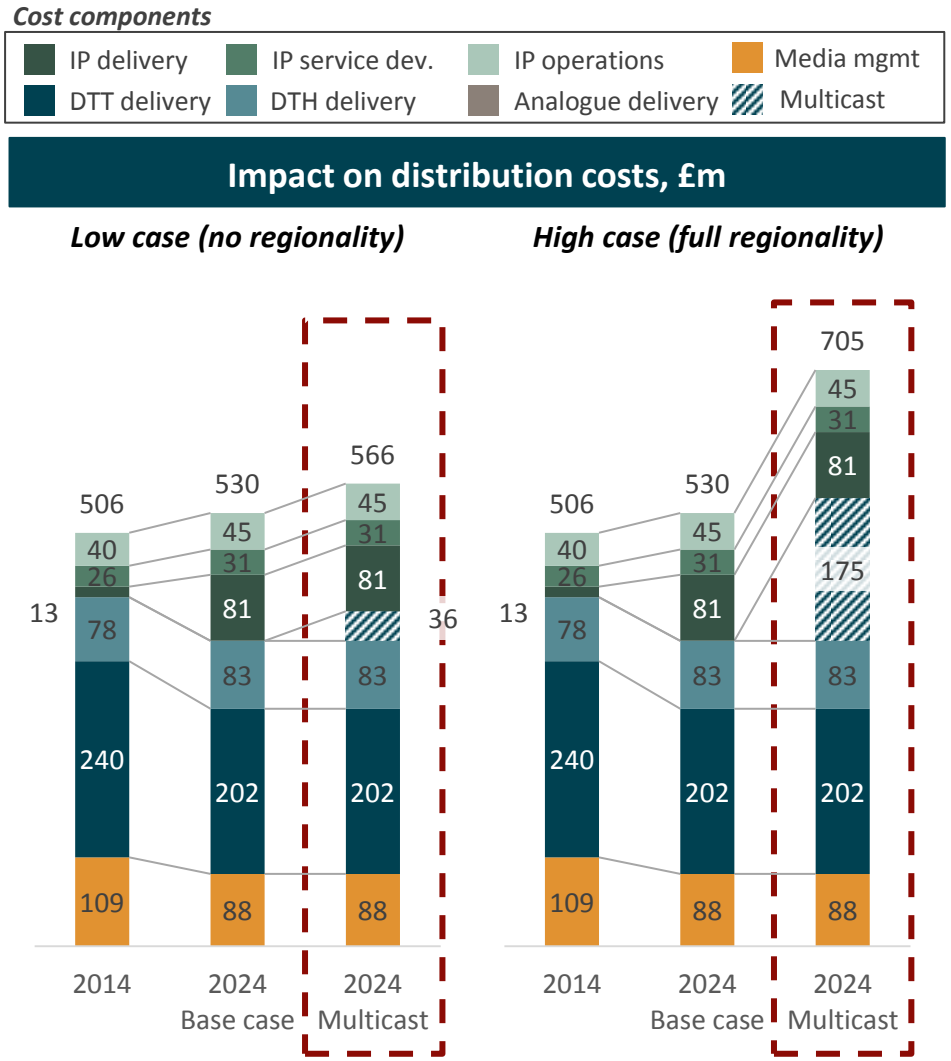
Source: Company reports, press releases, industry interviews, Redshift analysis

The outcome of this scenario is extremely uncertain, but it could add significantly to PSB distribution costs without enabling compensating savings

2 Linear TV over IP via multicast - impact

- In this example, the basis of multicast costs to the PSBs is the current BT TV Connect ratecard, duplicated across three ISP networks. We consider two cases; a low case where regionality can be achieved without channel duplication (like DTT) and a high case where channel duplicates are required (like DTH)
- The PSBs would not be able to switch off DTT and DTH delivery because there would still be substantial audiences on Freesat and Freeview, so the cost of multicast would be entirely incremental

- In theory, this is a significant threat to PSB distribution costs because the cost is entirely incremental
- However, there are real practical questions about the likelihood of this outcome:
  - The commercial PSB channels will have real negotiating power because of the size of their audiences, although they are unlikely to be able to negotiate en bloc. The BBC's situation is less clear, but points to the likely impact of regulatory intervention, either real or threatened
  - Other more flexible technical alternatives to multicast for linear over IP are already emerging which are likely to put further pressure on potential multicast pricing



Source: Company reports, press releases, industry interviews, Redshift analysis

This scenario focuses on the potential impact of a transition to DVB-T2/MPEG-4 for DTT transmission

3 DTT transition to DVB-T2/MPEG-4 - rationale

- In this scenario, we consider the likely impact of a transition to DVB-T2/MPEG-4 transmission for DTT on PSB distribution costs
- Transition to DVB-T2/MPEG-4 is an important goal for the members of the DTT ecosystem as they seek to plan for the future of the DTT platform. It is under very active consideration, although the economics are challenging
- DVB-T2 switchover conducted by the end of 2022
- Our assumptions for the interim MUXs (COM7 and COM8) are:
  - COM7 continues to operate until 2020; the channel line up remains broadly the same (i.e. BBC and Channel 4 keep two channel slots each)
  - COM8 launches in 2016 with 5 HD PSB channels and is terminated in 2020 to facilitate a transition to DVB-T2
- The total costs of the PSB MUXs are assumed to remain broadly stable at DVB-T rates; costs on commercial MUXs are assumed to decrease slightly as supply increases

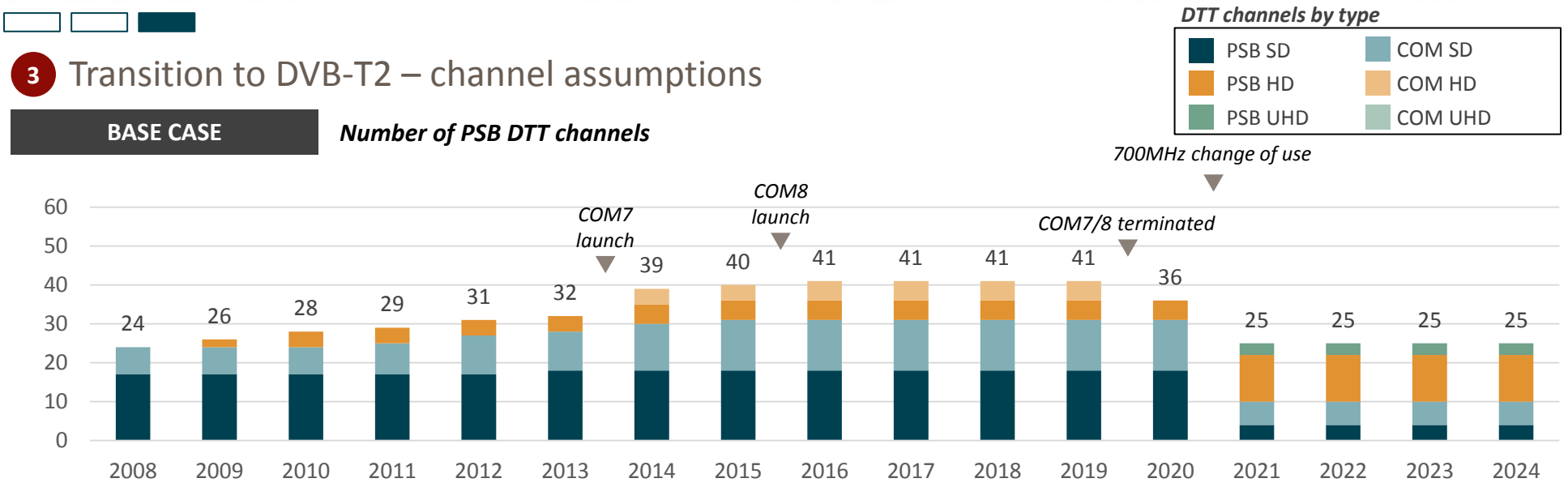
Variations on the base case	
Media management	Media management remains as in the base case
Broadcast delivery	DVB-T2 switchover by the end of 2022 Interim MUXs are switched off in 2020 Additional HD channels launched on COM8 in 2016 and UHD channels in 2022 Per channel MUX costs reflects DVB-T2 upgrade
IP delivery	IP delivery remains as in the base case
IP service development and operations	IP service development and operations remains as in the base case

Source: Company reports, press releases, industry interviews, Redshift analysis

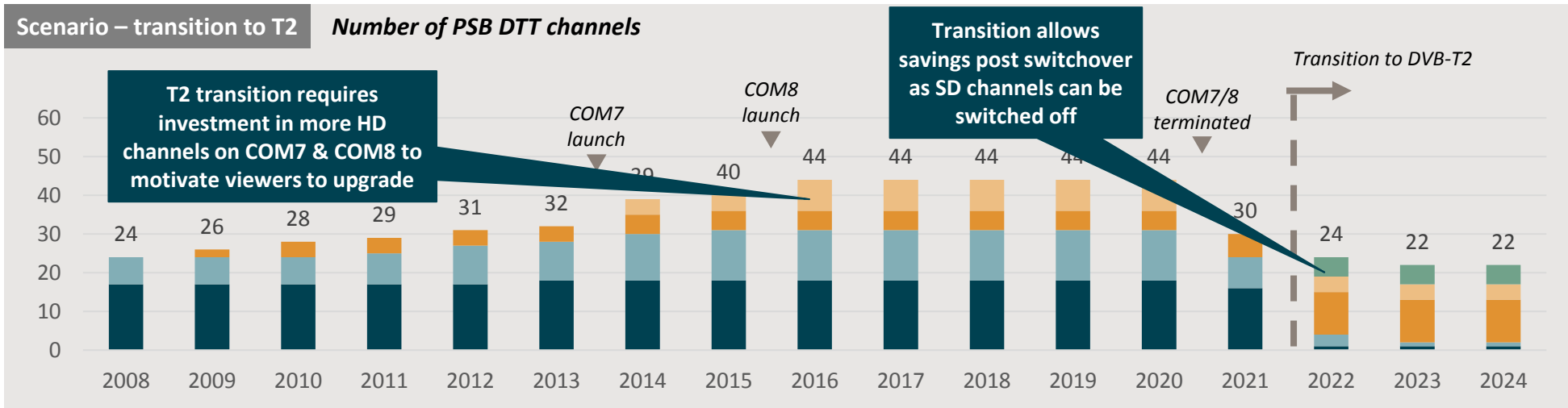
The comparison with the base case shows an increase in channels pre-transition, followed by a reduction afterwards as SD channels can be switched off

3 Transition to DVB-T2 – channel assumptions

BASE CASE ***Number of PSB DTT channels***



Scenario – transition to T2 ***Number of PSB DTT channels***



Source: Company reports, press releases, industry interviews, Redshift analysis

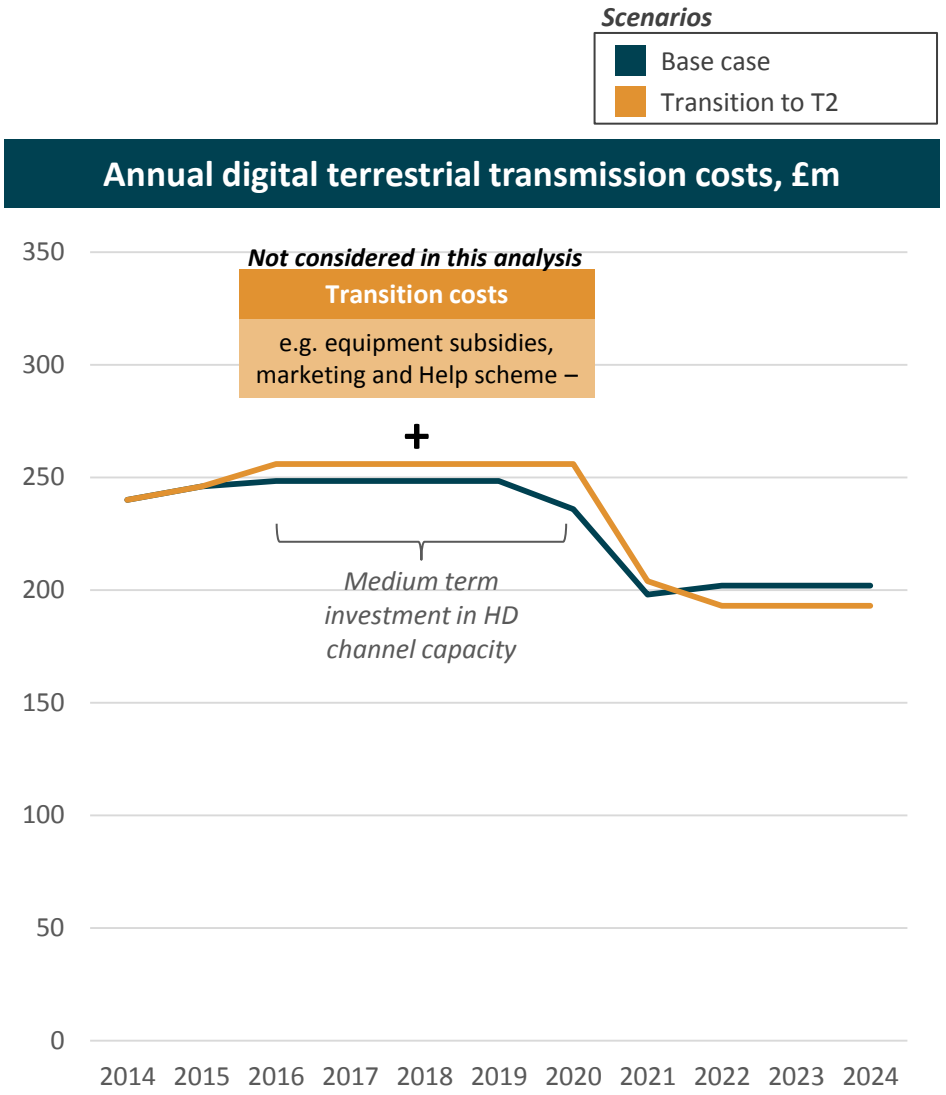
REDSHIFT the speed of change

A shift to DVB-T2 presents an opportunity for the PSBs to maintain the competitiveness of the DTT platform

3 Transition to DVB-T2 – impact

- Following a transition to T2, DTT spend by the PSBs declines by £9m in 2024 compared to the base case
- This decline is driven by the reduction in the number of channels resulting from the removal of simulcast channels (i.e. switching off SD variants) and replacing with UHD variants
- Our analysis considers the impact of DVB-T2 on transmission costs only; we have not considered the very considerable additional costs that might be incurred in the management of the transition process

- On the basis of these assumptions, the overall net impact of the transition is a £9m reduction in total PSB distribution costs in 2024
- We have not carried out detailed analysis of how the technical costs of switchover would be recouped; this might change the overall impact substantially
- As noted on the exhibit, this analysis does not take into account the consumer-facing costs of managing the switchover



Source: Company reports, press releases, industry interviews, Redshift analysis

We have also considered scenarios to test the sensitivity to CDN, commercial MUX and satellite transponder pricing

Other sensitivities

Cost components

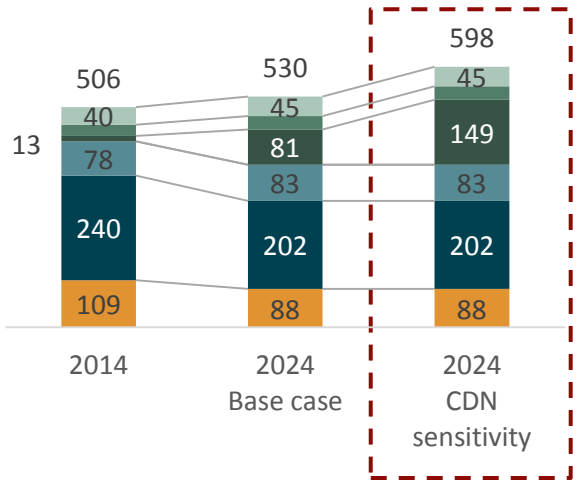
IP delivery | IP service dev. | IP operations | Media mgmt
DTT delivery | DTH delivery | Analogue delivery

CDN pricing

By holding CDN prices at 2014 levels, we can assess the relative sensitivity of PSB distribution costs to CDN pricing

Impact on distribution costs, £m

Assuming no change in CDN pricing would result in IP delivery costs increasing £68m between 2014 and 2024

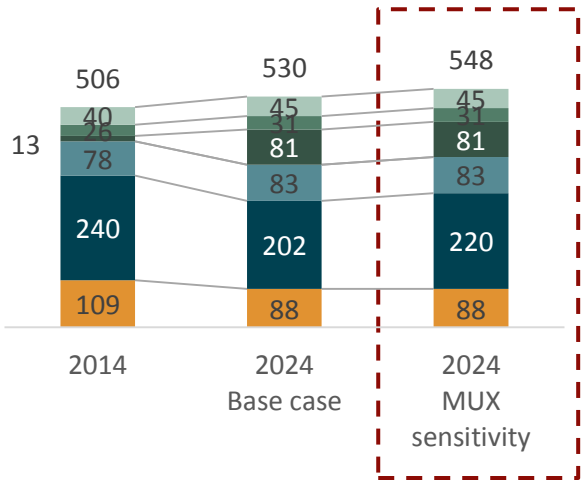


MUX pricing

We consider the impact of increases in commercial MUX pricing on PSB distribution costs: we assume pricing for MUX capacity returns to 2005/6 levels[1], a 50% increase on current pricing

Impact on distribution costs, £m

Assuming increases in MUX pricing results an increase in commercial MUX spend by c. £20m, a 3.5% increase on total distribution costs

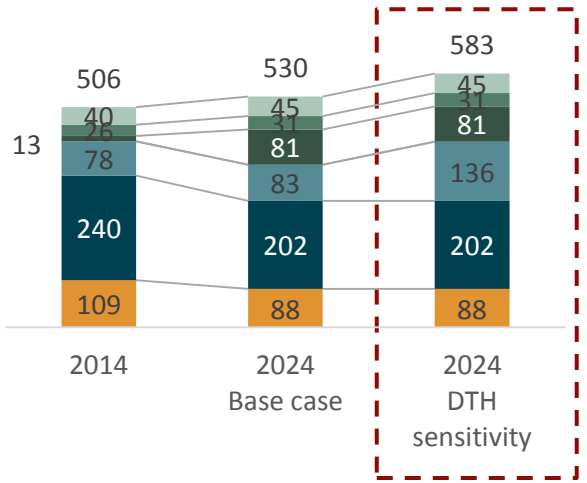


DTH pricing

By holding satellite prices at 2014 levels, we can assess the relative sensitivity of PSB distribution costs to satellite pricing

Impact on distribution costs, £m

Assuming no reduction in satellite pricing results in an increase of satellite spend by £53m, a 10% increase on total distribution costs

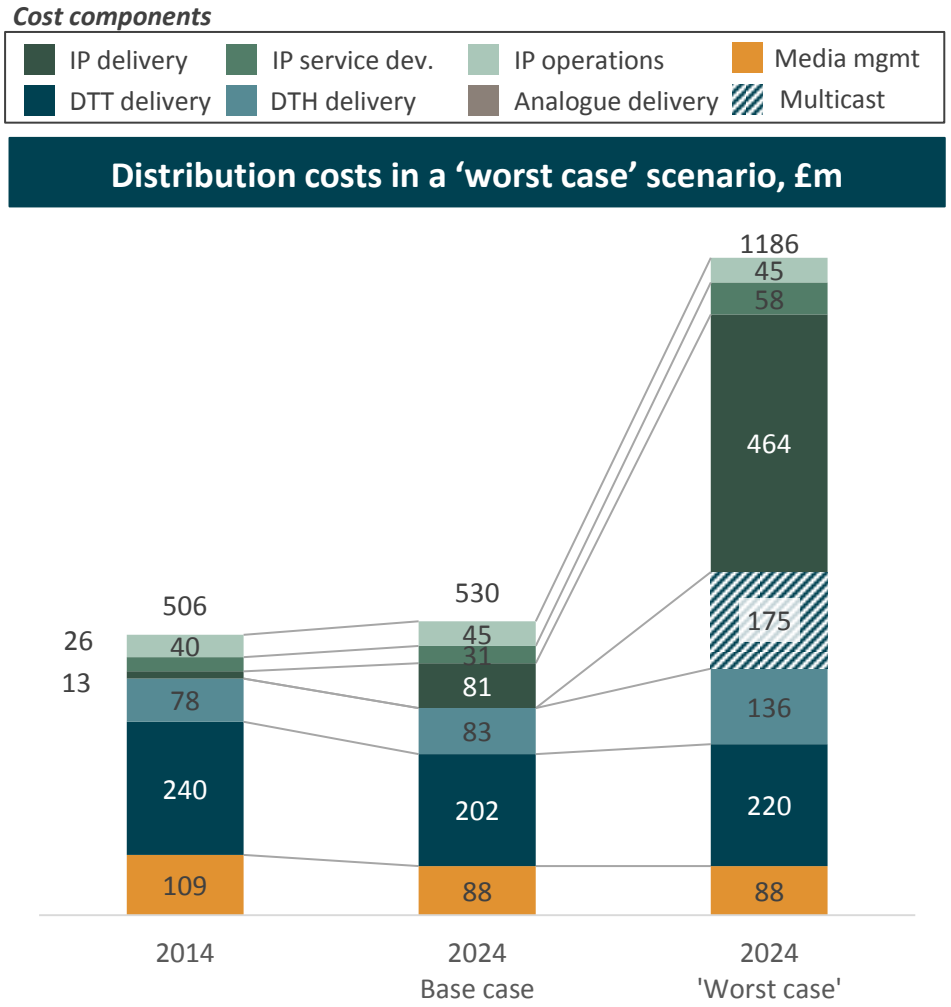


Notes: (1) c. £10m per COM channel slot in 2006 vs. c. £6m in 2014
Source: Company reports, press releases, industry interviews, Redshift analysis

In an unlikely scenario in which a multitude of factors stack against the PSBs, distribution costs could rise to as much as £1.2bn per annum

'Worst case' scenario

- We consider a scenario in which the factors described above combine to create a 'worst case' scenario for the PSBs
- As discussed, simultaneous occurrence of all these outcomes is highly improbable, and these figures should be treated with caution: we consider this scenario for illustrative purposes only
- The factors we have included are:
  - ***On demand viewing increases*** – consumption of on demand increases; spend on IP service development increases to encourage changes in viewing behaviour
  - ***DVB-T/MPEG-2 with inflated channel pricing*** – DTT maintains DVB-T/MPEG-2 as standard; commercial MUX pricing increases to return to levels seen in 2005/6
  - ***Full DTH HD line-up at today's pricing*** – per channel pricing of satellite channels remain at today's levels; PSBs switch to a full HD line-up in 2022, including regional variations
  - ***Adoption of multicast*** – Sky, BT and TalkTalk adopt multicast for linear delivery; multicast transmission needs to replicate channels in order to deliver full regionality
  - ***CDN pricing remains at today's levels –*** there is no further reduction in CDN price levels



Source: Company reports, press releases, industry interviews, Redshift analysis

Universality requirements are unlikely to have a large impact on PSB costs; we expect the PSBs to continue their widespread coverage of connected TV devices

Potential impact of universality requirements

- The PSBs are deployed on many of the connected TV devices that are available in the market today; the exceptions are the major games consoles (for ITV) and some flavour of Smart TV
- It is not easy to see many significant new operating systems emerging – the investment required to gain traction in the marketplace is beyond all but the largest players - so although existing platforms will continue to develop rapidly, it is likely there will be a period of relative stability in terms of platform landscape
- A 'universality requirement' for PSB VOD as a policy objective could take one, or a combination, of many different forms. 'Universality' would not necessarily require PSBs to deliver their content to all new platforms, or for all new platforms to carry PSB services
- 'Universality' understood as PSB VOD presence across a range of connected platforms would not impose very significant additional costs of development for multiple devices; the PSBs already have a wide presence across most devices available on the market
- It is likely that there will be technical evolution to enable content owners to centralise development efforts and port application and service iterations more easily to new platforms and devices (e.g. BBC Standard Media Player)
- We anticipate that the PSBs will continue to have strong commercial and remit incentives to maintain services across a wide range of platforms to allow engagement with audiences in an increasingly connected world

Current device implementations

	BBC iPlayer	ITV Player	All4	Demand 5
Freeview Play[1]	✓	✓	✓	✓
FreeTime	✓	✓	✓	✓
Sky	✓	✓	✓	✓
Virgin	✓	✓	✓	✓
YouView	✓	✓	✓	✓
Sony Bravia	✓	×	×	✓
Samsung	✓	✓	✓	✓
LG	✓	×	×	✓
Panasonic	✓	×	✓	×
Roku	✓	✓	✓	✓
PS3[2]	✓	×	✓	✓
PS4	✓	×	×	✓
Xbox 360	✓	×	✓	✓
Xbox One	✓	×	✓	✓
Browser	✓	✓	✓	✓
Android	✓	✓	✓	✓
iOS	✓	✓	✓	✓
Windows 8	✓	×	✓	✓

Notes: 1) Assumes Freeview Play will launch with all PSB on demand players
2) ITV have removed their player from the PS3 app store. ITV Player is still available via the browser on PS3 consoles, but we do not consider this as a separate implementation

Source: BBC iPlayer, ITV Player, 4OD/All4, Demand 5, Redshift analysis

Table of Contents

1. Executive Summary
2. Introduction
3. PSB distribution costs to date
4. Future outlook for PSB distribution costs – base case
5. Future outlook – alternative scenarios
6. **Potential PSB responses to distribution cost increases**

There are a number of potential responses available to the PSBs to mitigate rising distribution costs, although none are particularly attractive

Potential PSB responses to rising distribution costs

1 Reduce regionalisation

- The base case assumes that the PSBs continue to operate multiple DTH channel variants in order to support regionality
- A possible course of mitigation is for the PSBs to reduce the DTH capacity dedicated to regional variants, on the basis that regionality is available to many satellite homes via DTT or IP

2 Reduce ambition for IP service development

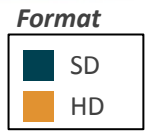
- The base case assumes that the PSBs continue to increase their investment in IP service development in order to continue to provide UK viewers with market-leading functionality and user experience for on demand
- The PSBs could consider scaling back this investment and relying more heavily on third party outsourced components

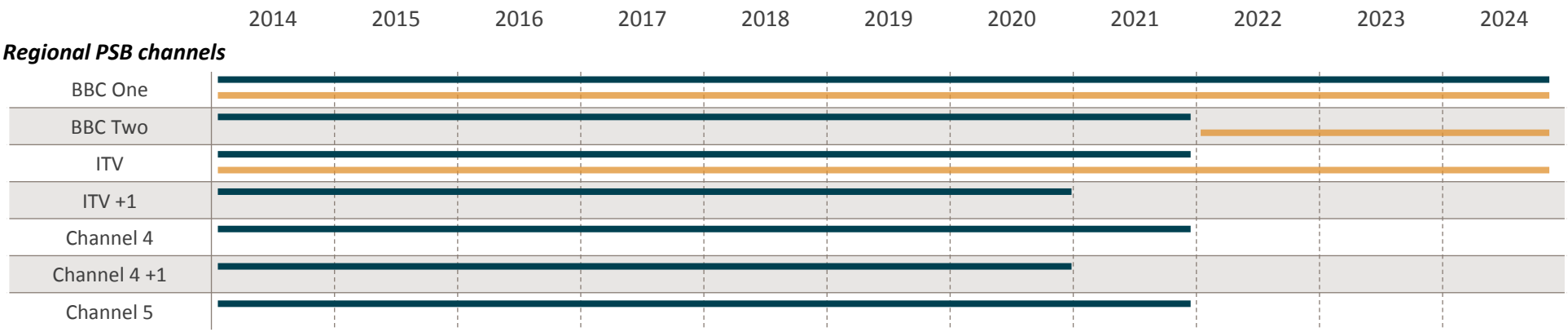
3 Adopt more positive approach to syndication

- The base case assumes that, as a matter of policy, the PSBs continue to develop and operate their own IP video services, incurring development and delivery costs
- In order to reduce these costs, the PSBs could take a more positive approach to outsourcing online video to external services which will pay for delivery

The potential cost benefit from eliminating regionalisation on DTH is relatively low, and there is a lack of viable alternatives for delivering regional content

1 Mitigation responses – reduce regional variation on DTH





Total regional variants

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SD	59	59	59	59	59	59	53	33	3	3	3
HD	6	6	6	6	8	16	26	33	45	45	45

Estimated potential savings

Potential cost savings, £m	***35.6***	***33.8***	***32.1***	***30.5***	***31.4***	***39.1***	***46.2***	***44.9***	***45.7***	***43.4***	***41.2***

Potential barriers/limitations

- ***Lack of viable alternatives to provide regionalisation –***many DTH households in the UK no longer have DTT access, so DTH is the only means of receiving PSB programming. PSBs may reduce the reach of their regionalised services dramatically, potentially threatening their ability to fulfil public service remits
- ***Impact on advertising revenue –*** for the commercial broadcasters, regional DTH variants facilitate the sale of advertising on a more localised basis; for Channel 4 and Channel 5, it is reasonable to assume the advertising revenue benefits gained from regional DTH variants in SD outweigh the costs of providing the channels. Whilst we expect this incremental benefit to continue for SD, it may not do so for to HD DTH regionalisation, due to the relative increase in capacity costs

Source: Company reports, press releases, industry interviews, Redshift analysis

The PSBs may be able to reduce their spend on their online services, although there may be limited appetite for this

2 Reduce ambition for IP service development

- The base case assumes that the PSBs make a small increase in their investment in IP service development in order to continue to provide high quality on demand services to UK viewers
- The PSBs are well aware of the challenges of being drawn into a technology 'arms race' with global players, many of whom have significant technical expertise at their disposal and far greater resources
- For example, it is clear that none of the PSBs will be able to match Netflix's $500m investment in technology development in 2015; we estimate PSBs spend on service development will be approximately £30m
- The PSBs could consider scaling back this investment and using more third-party components to provide their services to consumers; some of the PSBs have already adopted this approach in many service development areas (e.g. Channel 5 outsourced device client development in 2006); for others, this approach could require a shift in their attitude towards online services
- In any event, the scope for reduction is relatively modest: the potential saving from reducing the number of device platforms is likely to be very small (less than 1% of total costs)

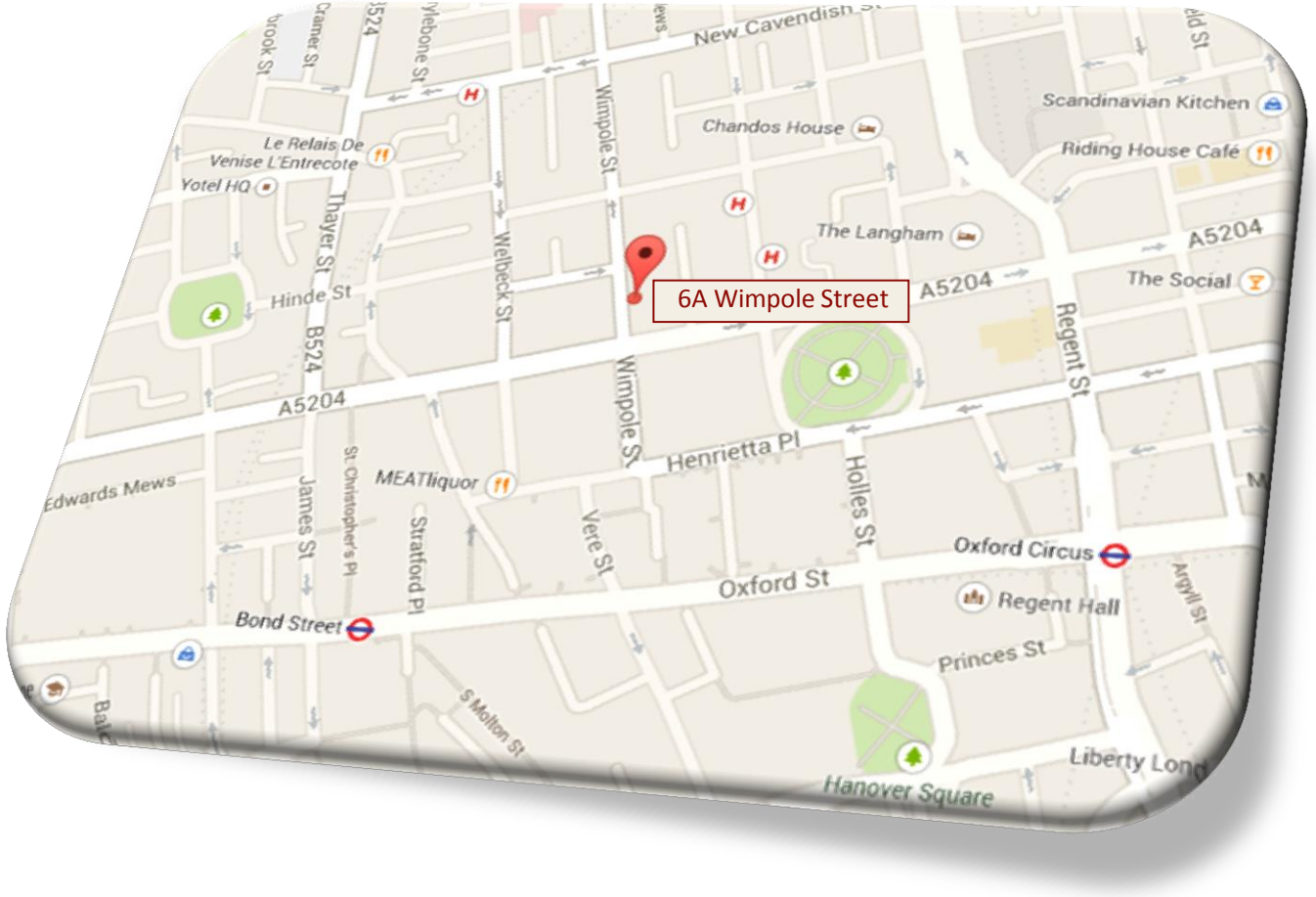
"In 2015, we'll invest over $500M on technology development to continue to improve our service and our app on the very broad range of platforms we support"

Netflix

3 Adopt more positive approach to syndication

- The base case assumes that, as a matter of policy, the PSBs continue to develop and operate their own IP video services, incurring development and delivery costs
- In order to reduce these costs, the PSBs could take a more positive approach in outsourcing online video to external services
- The PSBs currently take a syndicated approach on some platforms; for example, the Sky and Virgin TV platforms. Online distribution costs could be reduced if the PSBs were to offer more parties syndicated access instead of pursuing an owned-and-operated online video strategy
- Adopting higher levels of syndication has significant potential barriers/limitations, particularly in terms of its potential implications on commercial revenues, so scope for mitigation here is likely to be limited:
  - ***Reduction in viewer relationship –*** the PSBs risk diminishing the value of their channel/online brands and, with increased intermediation, may suffer from a lack of guarantees over quality of service
  - ***Increased competition for viewing*** **-** the PSBs will face increased competition for viewing on syndicated platforms, potentially reducing viewing share
  - **Impact on advertising revenue –** for the commercial PSBs, online syndication would result in a loss of control of advertising sales, which is likely to have a significant negative impact on advertising revenue, which could need to be shared with syndication partners

Source: Netflix, company reports, press releases, industry interviews, Redshift analysis



6A Wimpole Street
London, W1G 8AL
+44 (0) 20 7636 4522

stephen.taylor@redshiftsc.com
janice.hughes@redshiftsc.com
rob.collier@redshiftsc.com