



Intervening to secure UHF spectrum for HD PSB

Review of Ofcom's Impact Assessment
Indepen
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1 Introduction and summary

This paper has been prepared by Indepen for the BBC in response to Ofcom's consultation on the digital dividend review (DDR).¹ It sets out how the impact assessment of options for assigning the DDR dividend in respect of high definition (HD) public service broadcasting (PSB) services should be structured and, where possible, quantifies impacts.

Ofcom has concluded that the dividend from digital switchover should be assigned on a technology and service neutral basis through an auction – termed a market-based approach. Ofcom's analysis compares assignment by auction with options for intervention in respect of a number of services, including HD PSB services. The case for intervention rests on there being a market failure in the provision of the services under consideration and the costs of this market failure exceeding the costs of the specified intervention. We have no argument with this overall framework for analysis. However we consider that Ofcom's analysis is in places partial, and this may have lead Ofcom to an inappropriate conclusion concerning 1) whether a market failure is likely to occur or not, and 2) whether this market failure is likely to be material relative to the costs of intervention.

In summary we conclude that private decisions by PSB broadcasters (i.e. the BBC, Channel 4, five and ITV) will not result in socially efficient outcomes. Further, under current funding and institutional arrangements (e.g. the Public Value Test applied to the BBC) it is possible that the publicly owned broadcasters would have difficulty in justifying any bids for spectrum. If this is the case there would be a significant market failure as all four public service broadcasters must bid together if they are to secure spectrum for a single multiplex to provide HD PSB services.

We estimate that the value lost if public service broadcasters are not able to acquire spectrum through auction ranges from £5.4bn to £15.6bn. The higher value of over £15bn applies if a free to view satellite offering does not enter the market, while the lower end of the range – £5.4bn applies if free to view HD PSB services are available on satellite. This sum includes the cost to some households of buying and installing satellite receivers to receive HD services.

Using Ofcom's estimates of the value of spectrum to other potential uses of the spectrum and assuming 48 MHz will be required to support an multiplex providing HD PSB services, the opportunity cost of reserving spectrum for HD PSB services is around £2-3bn. This is significantly less than the £5.4-15.6bn estimate we have derived for the benefits obtained directly and costs avoided by having HD PSB services on DTT. There is therefore a good case for reserving UHF spectrum for HD PSB services.

As a general matter Ofcom argues that reserving spectrum for a particular purpose that generates social value is not appropriate - rather changes should be made to financial and institutional frameworks to ensure that social value is taken into account.² While this may be correct in principle, there is a significant practical issue to be addressed, namely will such financial and institutional frameworks be put in place in advance of the UHF auction? This needs to be done as a matter of urgency.

Two further issues not addressed by this analysis but that could have a bearing on public policy decisions related to digital switchover are as follows

- *The advent of HD services on cable and satellite potentially undermines the government's cost benefit analysis of digital switchover.* In that analysis around half the benefit from switchover

¹ Digital Dividend Review, A consultation, Ofcom, 19 December 2006.

² Paras 6.69-6.72 op. cit.



comes from the extension of DTT to areas not currently served. Much if not all of this benefit will be lost if a significant number of these households must adopt free to view or pay satellite or cable services to receive HD PSB services because of its absence on DTT.

- *DTT is the centrepiece of the government's strategy for achieving switchover and universal free-to-air delivery of public service broadcasting in an all digital world.* Government has made a public policy commitment to the continuation of the DTT platform as the main way to deliver PSB and, in return, industry and consumers have invested significant sums – over £5 billion – in DTT transmission infrastructure and DTT receivers. The public policy commitment to the DTT platform needs to take into account the technological evolution of the platform from standard to high definition in order to remain relevant to consumers.

The rest of this paper is structured as follows. Section 2 sets out the policy appraisal framework. Section 3 discusses whether a market failure could occur if the spectrum is auctioned and estimates the potential loss of value. Section 4 discusses options for intervening to address the market failure and the costs of intervention.



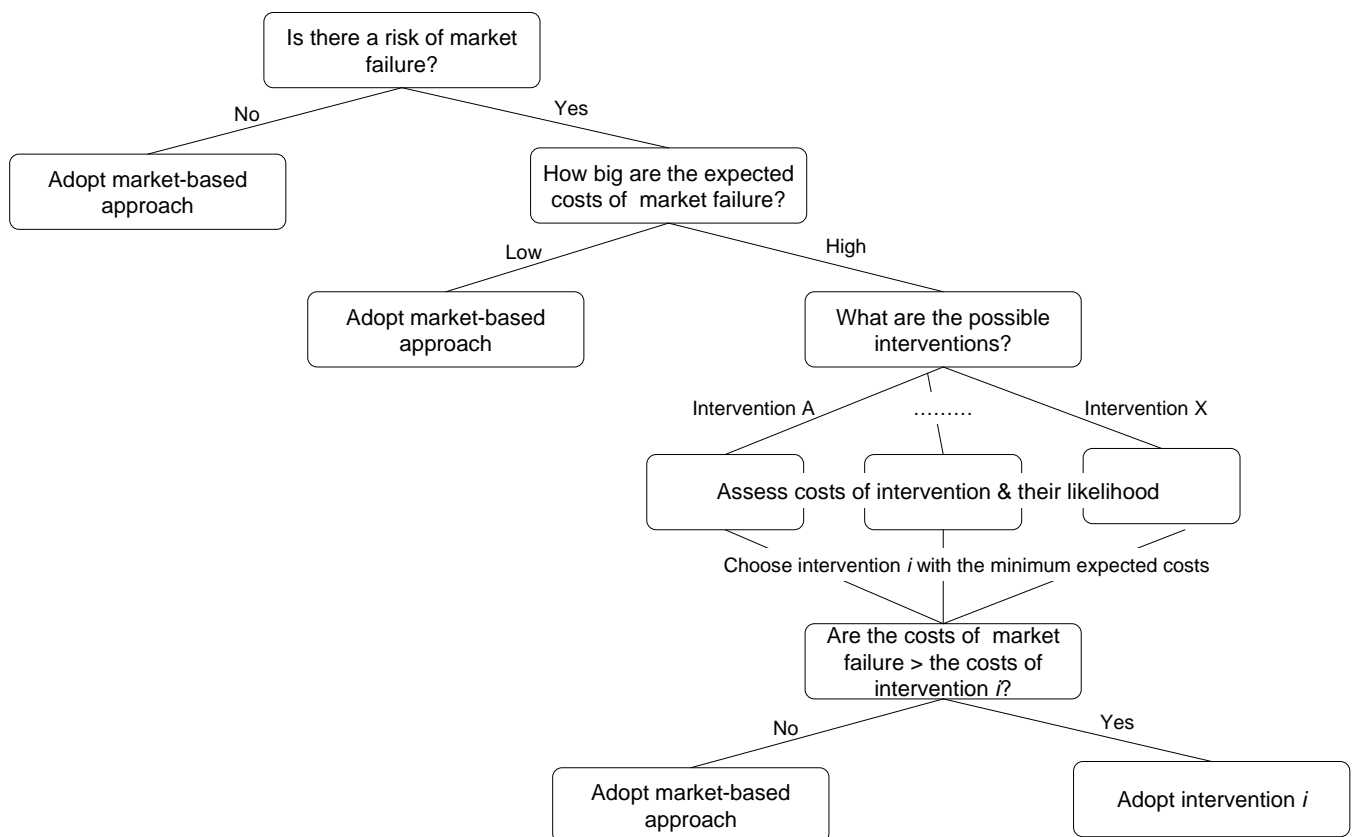
2 Framework and Key Assumptions

2.1 General approach

Ofcom has a statutory duty to carry out Impact Assessments for important policy proposals.³ Annexes 6 and 7 of the DDR consultation document set out the framework Ofcom has adopted for undertaking the impact assessment for policies to assign the spectrum released by digital switchover. The impact assessment is given in Annex 8 of the DDR consultation document. It is developed with reference to Ofcom’s duties to optimise the use of the radio spectrum and its duties in respect of the provision of telecoms and broadcasting services.⁴ Annex 6 analyses these duties and potential conflicts. It concludes that Ofcom should adopt an approach that maximises welfare, where the welfare measure takes account of both private value (to consumers and producers) and social value (i.e. wider value to society that is external to any individual).

We have taken the objective of maximising total welfare as the starting point for our analysis. Figure 2.1 sets out the steps required to evaluate whether there is a case for intervening in the assignment of UHF spectrum for HD PSB services as compared with the base case policy of holding an auction.

Figure 2.1 Steps in assessing whether to intervene or not in allocation of UHF spectrum



³ Section 7, Communications Act 2003

⁴ For example, Ofcom has a specific duty in respect of promoting the fulfilment of PSB in the UK (section 3(4) (a))



Ofcom's key regulatory principles state that it has a bias against intervention and that where intervention is justified the least intrusive form of intervention should be adopted i.e. the least cost option. A pre-requisite for intervention is that there is a demonstrable market failure. Given this, the case for/against intervention relies on conclusions concerning the relative magnitude of the risks and costs of intervention versus the risks and costs of market failure. When assessing the costs of intervention judgement is required concerning the likelihood of the intervention achieving its objective i.e. successfully addressing the market failure without unintended consequences for other markets.

2.2 Potential for “regret”

The impact analysis needs to be undertaken for a number of different possible future states of the world. In particular, the possibility that HD transmission might become the de facto format for broadcast TV over the next 10 or so years and that PSBs may be obliged by government to offer HD services on a universal basis is one possible future state of the world.

Ofcom itself notes⁵ *“There is a plausible scenario in which HD reaches a majority of UK homes over the medium term, and viewers come to expect and require most content to be available in HD, including the five main terrestrial channels”* and that *“if this scenario developed, the DTT platform would probably need to make a similar transition to HD. If it did not, commercial channels might shun the platform preferring only to produce in high definition and large numbers of viewers might switch to other platforms”*.

These considerations change the nature of the decision problem since they introduce the potential for “regret”, in other words a decision that is costly to reverse may turn out, with hindsight, to be wrong. In these circumstances the costs of regret and/or reversing the initial decision should be explicitly included in the impact analysis.

We have identified a number of reasons why it may be costly to reverse a decision not to reserve spectrum for HD PSB services.

- First, once the released spectrum is awarded investors will begin to sink capital into developing and marketing the associated services. If the decision were reversed they would expect to recoup this investment and any associated harm to goodwill, in addition to the price paid for the spectrum. The cost of reversing the decision therefore rises over time.
- Second, the way the spectrum is configured by users may also change over time, through trading. Repackaging the spectrum so that it was suitable for use by TV services providing universal coverage could involve substantial transaction costs and take some time, if it happens at all.
- Third, a market based spectrum allocation may be difficult to reverse because potential sellers of spectrum may hold out for a strategic gain, unless of course Ofcom was able to intervene and take back the spectrum using its administrative powers. Though by exercising these powers Ofcom could undermine market confidence in the value of spectrum assets and thereby undermine the efficient operation of a spectrum market.

Ofcom does not explicitly deal with the issue of “regret” in its impact assessment. We have made a partial attempt at doing this by counting the costs to consumers denied service if universal coverage for HD PSB services is not achieved. We doubt this fully captures the social and political value of universality.

⁵ para A8.481 of the consultation document



2.3 Policy options

The framework given in Figure 2.1 involves comparing social welfare in different states of the world under alternative policies. The main policy choice considered by Ofcom is between auctioning the spectrum and reserving spectrum for HD PSB services. Ofcom briefly refers to but does not analyse in any detail two other policy options involving market intervention, namely bidder credits and reform of funding and institutional arrangements for public service broadcasting. We comment on these options in Section 4.

For the option of reserving spectrum a key issue is how much spectrum will be required. Ofcom suggests a number of different spectrum configurations for a multiplex providing national coverage: in Annex A of the consultation document it is suggested that 48-140 MHz is required while in Annex 9 between options involving between 24 and 112 MHz are mentioned.⁶

In our analysis we have assumed sufficient spectrum to provide one multiplex with 98.5% coverage is reserved. We understand from the BBC that this requires around 48 MHz used nationally on an interleaved basis. This provides sufficient spectrum to support 3 HD PSB services and programme making and special events (PMSE) and local TV services in gaps in the interleaved channels.

There are two other important assumptions we make concerning the provision of HD PSB services on DTT. These are that

- 1 after switchover the PSBs' existing multiplex capacity will not be sufficient to support three HD PSB services
- 2 a transition from MPEG2 to MPEG4 will also not be a feasible mechanism for delivering capacity for universal HD PSB services in the next five to ten years.

Detailed support for these two assumptions is given in Appendix A.

2.4 Market assumption

We assume that HDTV will become a technology with widespread appeal, rather than a niche product. This assumption is based on the growing market evidence of the popularity of available HD services⁷, rapid growth in the take-up of HD ready TV sets (see Figure 2.2),⁸ high consumer awareness of the service and market research evidence showing that consumers expect that they will be able to receive HD TV in future.⁹

⁶ See Table 9.1 of the consultation document

⁷ On 3 November 2006, BSkyB's quarterly report stated that HD subscribers had more than doubled to 96,000 – the fastest customer take-up of a new Sky product, representing three times the sales levels achieved by Sky+ in its first year. On 31 January 2007, they announced that their HD subscribers had almost doubled again by the end of 2006, covering 184,000 homes. BSkyB, <http://phx.corporate-ir.net/phoenix.zhtml?c=104016&p=irol-newsArticle>; 31 January 2007

⁸ Over five times as many HD-ready television sets (2,377,000) were sold in the year to December 2006, compared with 2005. GfK research; January 2007

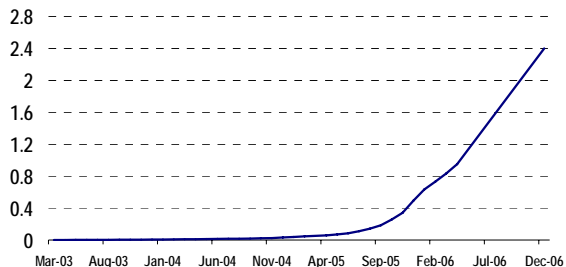
⁹ Research on public expectations of High Definition TV, BRMB for Digital UK, 23 February 2007



Figure 2.2

HD-ready sets

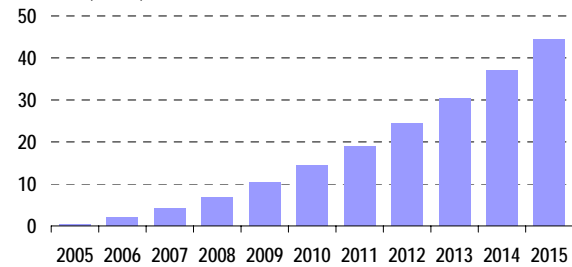
Million (based on cumulative sales volume)



Source: GfK LekTrak

Forecast installed HD-ready sets

Year end (million)



Source: 3 Reasons Ltd

The implication of this assumption is that over time the attractiveness of HD services on cable and satellite platforms will grow relative to Freeview (on which the main services will be transmitted in standard definition (SD)). Migration from Freeview to cable and satellite services will logically follow.

At present it is uncertain whether HD services will be provided for free on other platforms (e.g. cable and satellite).¹⁰ We therefore consider two possible states of the world in terms of the delivery of HD PSB services

- Scenario 1: HD PSB services are not provided free on satellite or cable
- Scenario 2: HD PSB services are provided free on a satellite service (either Sky's Freesat service or a new satellite service).

¹⁰ The BBC Trust has given provisional approval for a free to view standard definition service on satellite. This has the potential to offer HD services. See http://www.bbc.co.uk/bbctrust/consult/open_consultations/freesat.html



3 Is there a Market Failure?

A market failure arises if PSBs do not bid for spectrum in an auction (or in a market for multiplex capacity) in a way that reflects the private and social value associated with HD PSB services. Below we present arguments as to why PSBs will not bid in a way that reflects private and social value and quantify the private and social value that might be lost if PSBs are not able to win the spectrum they require at auction.

3.1 PSBs' bids will not reflect the private and social value of HD PSB services

There are two issues that need to be considered here

- Can PSB broadcasters capture the private value associated with HDTV?
- Will private decisions made by PSB broadcasters reflect social value?

In both cases the answer is no – in other words private decisions by PSB broadcasters will not result in socially efficient outcomes. Further, under current funding and institutional arrangements it is possible that the publicly owned broadcasters would have difficulty in justifying any bids for spectrum, in which case there would be a significant market failure as all four PSBs must bid together if they are to secure spectrum for a single multiplex to provide HD PSB services. We have assumed that such co-ordination is not blocked on competition grounds and can be achieved practically.

3.1.1 Can PSB broadcasters capture the incremental private value associated with HDTV?

Market and survey evidence indicates that consumers do attach private value to HDTV, however, it is far from clear that advertising funded PSB services (ITV1, Channel 4 and Five) can capture any, or at least much, of this value. In contrast to pay to view models, advertisers are primarily interested in audience size and composition, rather than the intensity with which viewers value a particular service and so advertising rates will not reflect viewers' willingness to pay for services. Furthermore there is evidence that advertisers will not pay more for advertising airtime in an HD schedule as compared with an SD schedule.

For example, the head of CBC, Mr. Rabinovich, has stated that "*There's no evidence either in Canada or the United States that we have found for advertisers willing to pay a premium for a program that's in HD...so basically they're saying if you want to shoot in HD, that's your business, we're not going to pay you more.*"¹¹

This means that provision of HD PSB services will imply additional cost (transmission and production costs and any spectrum fees) but little or no additional revenues. Hence for the commercially funded PSBs (i.e. Channel 4, Five and ITV), any bid for spectrum would have to be motivated by defensive concerns i.e. value of the audience lost to other platforms/channels. This value is likely to be less than the private value of HD services unlike the situation for a pay TV provider.

In the case of the BBC no additional revenue is earned by transmitting services in HD under current funding arrangements. Its willingness to bid will therefore depend on how it interprets achievement of its PSB objectives and its funding situation. This is considered below.

¹¹<http://www.theglobeandmail.com/servlet/story/RTGAM.20061127.wcrtc1127/BNSStory/Business/home>



3.1.2 Will decisions made by PSB broadcasters reflect the incremental social value associated with HDTV?

The privately owned PSB broadcasters (ITV and Five) would be expected to make decisions on HDTV based on private not social value and so will underbid for the spectrum from a social perspective.¹²

The BBC and Channel 4 (as publicly owned bodies) would be expected to reflect social (as well as private) value in their bids for spectrum, but they have constrained resources that mean they are unlikely to be able to bid for spectrum to reflect its full private plus social value. Given that HD services are likely to bring additional costs but no additional commercial revenue from it seems unlikely that Channel 4 could justify borrowing to bid for additional spectrum.

The BBC is in a somewhat different and more complex position. Any new service, such as a new HD service, launched by the BBC must be subject to a Public Value Test. This involves Ofcom undertaking a market impact assessment and the BBC Trust assessing the public value of the proposition and coming to a conclusion as to whether the proposed service is in the public interest or not. These assessments and the associated consultations would need to be concluded in advance of the auction of UHF spectrum.

It will be difficult to undertake these assessments in a transparent manner without revealing the value of the BBC places on the spectrum in advance of the auction, which could in turn cause problems for the conduct of the auction. These complications are not discussed by Ofcom, but they seem likely to mean that the BBC's participation in an auction will not be as straightforward as Ofcom suggest.

Ofcom suggest that reform of institutional and funding frameworks for public sector bodies in general (i.e. in this case the BBC and Channel 4) is necessary if a market based policy in respect of spectrum management is to achieve its goals¹³ and that such reform would promote efficient and effective use of spectrum together with the achievement of public service goals for broadcasting.¹⁴ Implicit in the discussion appears to be the view that the current institutional and funding arrangements for PSBs are not consistent with a market based approach to spectrum management. This means application of a market based approach will result in some form of market failure. Ofcom's consultants seem to be of a similar view and comment that "*in the absence of funding considerations, not for profit PSBs would be likely to reflect this broader social value [of HD PSB content] in their assessment of the value of additional spectrum*"¹⁵.

In practice appropriate funding arrangements are not in place, in the sense that the BBC and Channel 4 do not necessarily have sufficient funding available to it to bid for spectrum in a manner that reflects the private plus social value of HD PSB content given their other obligations. There is therefore a real risk that neither the BBC nor Channel 4 will bid for spectrum at auction, and certainly will not bid in a way that captures the private and social value of the services they offer.

3.2 Loss of private and social value

The value lost by the absence of HD PSB services on the DTT platform is as follows (see Figure 3.1).

- The loss of social value that arises from reduced audiences for PSB content and the deterioration in the quality of PSB services resulting from the reduced ability of commercial PSBs to fund PSB

¹² Unless this yielded benefits for their shareholders.

¹³ In paras 6.68-6.72 of the consultation document.

¹⁴ In paras A8.513-A8.514 of the consultation document.

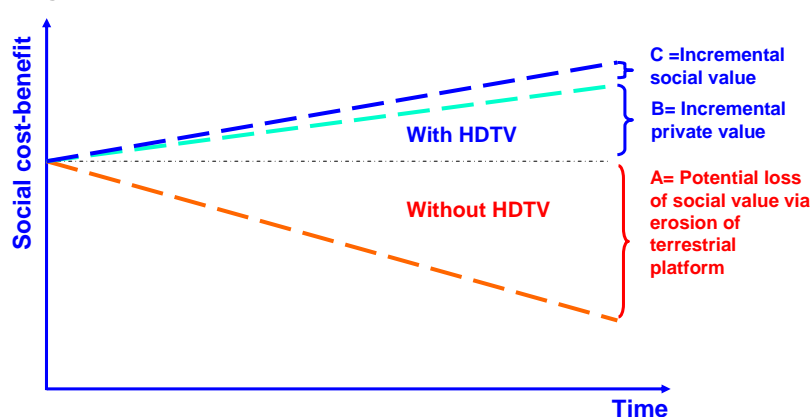
¹⁵ p63, "Preparatory study for UHF spectrum award, report for Ofcom, Analysys et al 2006.



content. These effects are a consequence of the loss of audience caused by migration to other platforms. (Area A in Figure 3.1).

- The loss of private value from either 1) not receiving HD PSB services for those households that do not have a choice of TV platform or 2) the cost of having to invest in additional equipment (e.g. satellite dishes) and possibly also pay subscriptions to access HD PSB services for those households that do have a choice of platforms. (Area B in Figure 3.1).
- The social value directly associated with the HD PSB services – Ofcom estimates this to be around 5% of the private value of the services. It is unclear whether this includes any allowance for the loss of social value associated with universal provision of HD PSB services, should HD become the default format. (Area C in Figure 3.1).

Figure 3.1 Private and social value associated with HD PSB services



We assess private and social value for two possible states of the world in terms of the delivery of HD PSB services

- Scenario 1: HD PSB services are not provided free on any platform other than DTT.
- Scenario 2: HD PSB services are provided free on a satellite service (either Sky's Freesat service or a new satellite service).

In each case we calculate values as the net present value (NPV) of benefits lost/costs incurred over a 20 year period assuming the Treasury discount rate of 3.5%.

3.2.1 Loss of private value

3.2.1.1 No free HD PSB services on cable or satellite

Using the results of the BBC's research on willingness to pay for an incremental HD BBC TV service¹⁶ we estimate that the value of a 20 year NPV of consumer surplus from such a service is £5.7bn for all households. If we assume conservatively that this is not available to the 50% of households using the DTT platform for main set reception then this gives a value of £2.85bn. It is important to note that this is the estimate of the value of the HD service over and above the value of the content in standard definition and is net of any equipment costs.

We conservatively double this value to give an estimate of value for 3 HD PSB services i.e. around £5.7bn.

¹⁶ Survey respondents were shown a schedule on which HD content would be shown between 1500 and 2400 hours each day, extended when appropriate to accommodate live events. Outside 1500 to 2400 hours, a barker will run.



3.2.1.2 Free HD PSB services on satellite

In this case we assume (based on the BBC's willingness to pay data) that it could be worthwhile for 25% of DTT households to take-up the satellite service¹⁷ i.e. around 3m households.¹⁸ The loss of private value is then given conservatively by the cost of purchasing and installing satellite equipment by these households. If this is for one set only then there is a total cost £450m.¹⁹ Households will wish to convert all sets over time if HD becomes the de facto format and there are there are on average 2.6 TV sets per household. We assume that the signal would be distributed internally using a wireless video sender and this would cost £50-100 per household.²⁰ This would imply an additional cost of £150-300m. Note that these calculations take no account of churn between platforms.

The remaining 75% of DTT viewers would lose the direct private value of HD PSB services. While these are viewers that place a lower than average value on the service we estimate the NPV of lost private value could be around £2.3bn.²¹

For this scenario, we therefore estimate that around £3bn²² of private value would be lost.

3.2.2 Loss of social value

The loss of social value comprises

- the loss in the value of PSB caused by migration from the DTT platform
- the social value directly associated with the HD PSB services, including the social value from universal provision of HD PSB services, should HD become the default format.

Migration from the DTT platform has two impacts that lead to a loss of social value.

- First the scale and quality of PSB content on the platform by advertiser funded broadcasters will inevitably fall. Ofcom forecasts that "*if there is no real change to the policy environment, ... provision of PSB will fall substantially*"²³ because of anticipated real reductions in the revenues of the commercial PSBs.²⁴ Even a 10% loss of audience (decrease in advertising revenue) would imply around a further £300m reduction in revenues (operating profit).
- Second reduced viewing of PSB as a consequence of the reduced quantity of PSB content and migration to platforms where viewing of PSB content is likely to be lower. For example, viewing of PSB channels for DTT households is 20-100% higher than in satellite households (see Figure 3.2).

¹⁷ At the average willingness to pay value it is worthwhile taking up a satellite service i.e. the WTP exceeds the additional equipment costs.

¹⁸ Screen Digest forecast that by 2010 around 50% of households will use free to air DTT as their main means of receiving TV.

¹⁹ Assuming an installation cost of £150 per household.

²⁰ This is based on an internet search of prices.

²¹ We assume that the value per household is 40% of the average value per household obtained by the BBC.

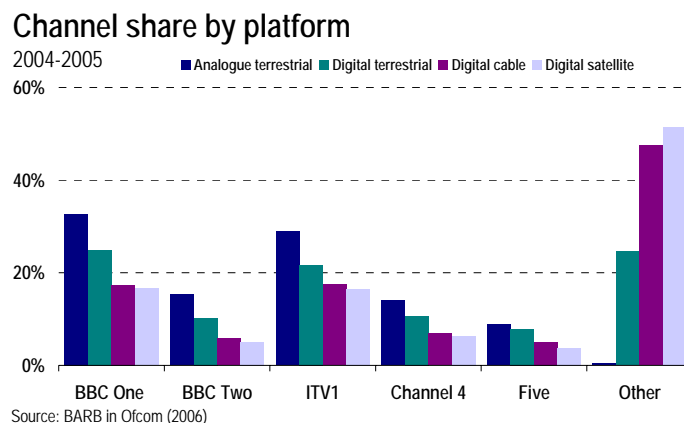
²² £2.3bn plus £0.6-0.75bn.

²³ Para 3.59, Ofcom Review of Public Service Broadcasting, 2004

²⁴ Economic analysis of the TV advertising market, PWC, for Ofcom 2004



Figure 3.2



The scale of these impacts depends on the extent of the migration from DTT to other platforms and the extent of competition from non-PSB channels on other platforms. Migration away from PSB viewing will be lower in the scenario where there is a free satellite HD PSB service. We do not have any market evidence on the scale of migration to other platforms, but it does not seem unreasonable to assume that loss of viewing of PSB services in the 5-20% range (on average over the next 20 years) would be possible – where the low end of the range applies in scenario 2. Current and forecast rapid growth in sales of HD ready TV sets means that around 50% of households are expected to be HD ready by 2010. This and the rapid take-up of pay HD services both suggest the migration to platforms offering HD TV could be considerable.

To evaluate the impact on social value it is necessary to consider the value to society of PSB TV services. Ofcom has estimated that the costs of PSB interventions for TV amount to around £3bn p.a.²⁵ - this arguably gives an estimate of the value society places on PSB TV. Discounted over a 20 year period this has an NPV of around £45bn.

Hence for scenario 1 the potential value lost could be around 20% of £45bn i.e. £9bn, and for scenario 2 could be around 5% of £45bn i.e. £2.3bn.

In addition, we need to count the social value associated with HD PSB services themselves which Ofcom estimates to be around 5% of the private value i.e. is £0.3bn²⁶ for scenario 1 and £0.1bn²⁷ for scenario 2.

3.3 Conclusions

In summary we conclude that private decisions by PSB broadcasters will not result in socially efficient outcomes. Further, under current funding and institutional arrangements it is possible that the publicly owned broadcasters would have difficulty in justifying any bids for spectrum, in which case there would be a significant market failure as all four PSBs must bid together if they are to secure spectrum for a single multiplex to provide HD PSB services.

We estimate that the value lost if PSBs are not able to acquire spectrum through auction ranges from £5.4bn to £15.6bn. The higher value of over £15bn applies if a free to view satellite offering does not enter the market, while the lower value of £5.4bn applies if free to view HD PSB services are available on satellite.

²⁵ Table 3.2, Ofcom review of public service broadcasting, Phase 2 – Meeting the digital challenge, 24 November 2004

²⁶ 5% of £5.7bn

²⁷ 5% of £2.5bn



The £5.4bn includes the cost to some households of buying and installing satellite receivers. We note that such costs may not be affordable by lower income households. Our estimates take no account of these distributional issues, though we note this was an important consideration in Ofcom's decision to provide standard definition PSB services to 98.5% of the population using the digital terrestrial TV (DTT) platform rather than satellite services.²⁸

Table 3.1 Potential loss of private and social value under scenarios 1 and 2

	Scenario 1: No Free to View HD PSB services on cable or satellite	Scenario 2: Free to View HD PSB services on satellite
Private value	£5.7bn	£3.0bn
Social value lost from deterioration of the DTT platform	£9.6bn	£2.3bn
Social value from the HD service	£0.3bn	£0.1bn
Total value	£15.6bn	£5.4bn

Source: Indepen analysis

Two further issues not addressed by this analysis but that could have a bearing on public policy decisions related to digital switchover are as follows

- *The advent of HD services on cable and satellite potentially undermines the government's cost benefit analysis of digital switchover.* In that analysis around half the benefit²⁹ from switchover comes from the extension of DTT to areas not currently served. If a significant number of these households adopt free to view or pay satellite or cable services because of the HD content offered, much of the benefit calculated in the government's cost/benefit analysis will be lost. If this migration occurs before the consumers have bought DTT equipment then there will be an offsetting cost saving, but if the migration happens after consumers have bought DTT reception equipment then there will be no cost saving – just a loss of net benefit.
- *DTT is the centrepiece of the government's strategy for achieving switchover and universal free-to-air delivery of public service broadcasting in an all digital world.* Government has made a public policy commitment to the continuation of the DTT platform as the main way to deliver PSB and, in return, industry and consumers have invested significant sums – over £5 billion – in DTT transmission infrastructure and DTT receivers. The public policy commitment to the DTT platform needs to take into account the technological evolution of the platform from standard to high definition, just as the terrestrial platform has done in the past, in order to remain relevant to consumers.

²⁸ Digital replacement licences to be offered to channel 3, 4,5 and public teletext, Ofcom, September 2004

²⁹ For switchover in 2012 there is a gross benefit of £6244m of which £2725m is the consumer benefit from DTT in current non-DTT areas and £659m is consumer benefit from additional DTT services that may be supplied (from commercial multiplexes) in DTT areas. See http://www.digitaltelevision.gov.uk/publications/pub_archive2006.html and http://www.digitaltelevision.gov.uk/pdf_documents/publications/Switchover_memo.pdf



4 Interventions to address market failure

4.1 Options

In undertaking its analysis of HD PSB services on DTT Ofcom considers three possible interventions³⁰

- Option 1: Direct grant of spectrum to public service broadcasters to provide HD services
- Option 2: Advantage PSB bidders in an auction
- Option 3: Ensure a suitable financial and institutional framework to allow acquisition of spectrum by PSBs to most effectively meet consumer and citizen needs

Only Option 1 is considered in any detail by Ofcom. Ofcom regards Options 2 and 3 as preferable to Option 1 but does not describe or analyse these options in any detail.

Option 2 involves giving bidder credits to providers who undertake to use the spectrum to provide universal access to the five main channels in HD on the DTT platform. Ofcom does not discuss how the bidder credits would be defined or how their level would be decided. The main problems identified with this approach are: getting the level of the credits wrong and if the bidders win spectrum they would face less than optimal incentives for efficient spectrum use.³¹ With regard to the level of the credits, we note that if as we have argued there is a market failure then it is clear that assuming zero credits (i.e. running a market auction) is incorrect and that a move to positive values will be an improvement.

Option 3 is not defined at all – indeed Ofcom argues it is beyond the scope of their work. This perhaps suggests that it is not a credible option for analysis. However, Ofcom seems to suggest that reform of institutional and funding frameworks for public sector bodies (i.e. in this case the BBC and Channel 4) is necessary if a market based policy in respect of spectrum management is to achieve its goals³² and that such reform would promote efficient and effective use of spectrum together with the achievement of public service goals for broadcasting.³³

Implicit in the discussion appears to be the view that the current institutional and funding arrangements for PSBs are not consistent with a market based approach to spectrum management and so the latter is likely to result in some form of market failure. Ofcom's consultants seem to be of a similar view and comment that "*in the absence of funding considerations, not for profit PSBs would be likely to reflect this broader social value [of HD PSB content] in their assessment of the value of additional spectrum*"³⁴

In practice appropriate funding arrangements are not in place, in the sense that the BBC and Channel 4 do not necessarily have sufficient funding available to it to bid for spectrum in a manner that reflects the social value of HD PSB content given their other obligations. Furthermore, purely commercial broadcasters are not likely to take this value into account when bidding for spectrum. The issue of appropriate funding arrangements should therefore be addressed before the auction proceeds.

³⁰ Figure 8.10, Consultation Document

³¹ In paras A8.511 and A8.512 of the consultation document

³² In paras 6.68-6.72 of the consultation document.

³³ In paras A8.513-A8.514 of the consultation document.

³⁴ p63, "Preparatory study for UHF spectrum award, report for Ofcom, Analysys et al 2006.



4.2 Direct grant of spectrum

Ofcom discusses the opportunity cost of a multiplex dedicated to HD TV services in Annex 8 of the consultation document.³⁵ It concludes³⁶ that the opportunity costs of reserving this spectrum for HD PSB services are significant but gives no estimate of the cost. The associated opportunity cost is given by the welfare foregone because of denial of access to the spectrum to other uses i.e. the denial of access to 48 MHz of UHF spectrum on a national basis.

Ofcom estimates that the net present value of the incremental private and social value for other uses (Figure 4.4, Consultation Document) are as follows

- Mobile multi-media: £0-3bn plus up to 10% for 8-48 MHz
- DTT SD: £0.5-3bn plus up to 10% for 24-112 MHz
- Mobile broadband: £0-2.5bn plus up to 15% for 0-56 MHz
- Mobile communications: £0-2.5bn plus up to 15% for 0-64 MHz
- Local TV: £0.1-1bn plus up to 10% for 8-24 MHz
- PMSE: £0.1-0.5bn for 8 MHz.

Mobile services may have difficulty sharing the spectrum with HD TV because of the need for continuous geographic coverage over wide areas, and so we assume conservatively the whole 48 MHz is sterilised for these services. Taking the top end of the range for the higher value services this data suggests the net present value of the opportunity cost of reserving spectrum for HD PSB services would be around £2-3bn.

4.3 Conclusion

The estimated of opportunity cost of reserving spectrum for HD PSB services of around £2-3bn derived is significantly less than the £5.4-15.6bn estimate we have derived for the benefits obtained directly and costs avoided by having HD PSB services on DTT. There is a good case therefore for reserving UHF spectrum for HD PSB services.

³⁵ paras A8.496-A8.514

³⁶ Figure 8.6



Appendix A: Finding capacity for HD PSB services on DTT

In this Appendix, we discuss whether additional capacity for HD PSB services might be provided from PSBs' existing capacity on DTT multiplexes or by making a transition from MPEG2 to MPEG4 compression on the DTT platform.

A.1 Using existing multiplex capacity

On page 88 of the Digital Dividend Review consultation, Ofcom says that it would be possible, using extra capacity from a transmission mode change and re-arranging multiplexes, to provide 5 HD channels to at least 90% of homes within the existing six DTT multiplexes without any loss of existing services. We understand that analysis undertaken by the PSBs shows that this is incorrect because insufficient capacity will be released by the transmission mode change.

The only way HD PSB services could be accommodated would be for the PSBs to buy additional capacity from the commercial multiplex operators. It can be expected that this capacity would be auctioned by the multiplex operators to maximise revenue and because capacity must be provided on a non-discriminatory basis. As nearly three times the capacity is required for HD as compared with SD services, payments will need to be substantial to secure the capacity – multiplex capacity has recently traded at a price of between £5-10m p.a. for a single SD channel.³⁷ If there is market failure in the auction of spectrum it will also apply in the case of auction of multiplex capacity hence purchase of additional multiplex capacity does not solve the problem.

Furthermore the capacity that would be released is on multiplexes that provide only 90% coverage. While this coverage might be increased to 96% through investment in additional transmitters, it will not provide universal coverage as currently defined for DTT services. The importance of achieving 98.5% rather than 96% coverage was underlined by Ofcom in its analysis of coverage options for SD DTT services.³⁸

A.2 MPEG2 to MPEG4 transition

MPEG4 compression is two to three times more efficient than MPEG2. If all DTT services were transmitted in MPEG4 this would provide sufficient capacity for HD services but as Ofcom note this will only occur in the long term – well beyond 2012. None of the 14 million DTT receivers (set top boxes and integrated digital televisions) sold to date³⁹ can decode MPEG4 signals and unless a move to MPEG4 is signalled very soon the 20-25m STBs/iDTVs that will be required by switchover⁴⁰ will also be MPEG2.

Transmission of DTT services using MPEG4 will start with pay TV services⁴¹ where subscriptions may be used to part fund the boxes. PSBs have an obligation to provide their services in MPEG2 format and these would have to continue until government policy changed in this regard. Other free to air services will only move to MPEG4 when most consumers have (backward compatible) MPEG4 boxes.

³⁷ See values reported by Ofcom in Figure 4.7 of the Communications Market Review 2006 at <http://www.ofcom.org.uk/research/cm/cm06/tv.pdf>

³⁸ Digital replacement licences to be offered to channel 3, 4,5 and public teletext, Ofcom, September 2004

³⁹ Digital Television Update – Q3 2006

⁴⁰ 25.5m sets are still to be converted to digital reception and around 80% are secondary etc sets. (source Indepen analysis based on Ofcom and Digital UK Switchover Tracker Survey – Switchover Progress Report Q4 2006) We assume the majority of these sets convert to DTT as this is the least cost option.

⁴¹ Sky has proposed such a service.



Such boxes are already available in the market (to serve other markets e.g. France) but are not marketed in the UK and will not be until there is an attractive set of MPEG4 services for consumers to receive. HD could provide an incentive for such a move.

PSBs alone could not achieve this move as they are obliged to provide their SD services in MPEG2 format and do not have the spare capacity to also offer services in MPEG4 under the existing multiplex licence conditions. Initially viewers will not have MPEG4 equipment and so MPEG2/MPEG4 simulcasting of PSB services will be essential. PSBs do not have sufficient spare capacity to undertake such simulcasting and so again additional capacity will have to be bought from the market – either as spectrum or as multiplex capacity of commercial multiplexes.

Any capacity released by a hypothetical migration of SD services from MPEG2 to MPEG4, with the only incentive being additional channels, will take a long time to be released (beyond the timeframe in which HD services seem likely to become popular). Without intervention, MPEG4 is not therefore a practical way forward in the short-term for delivering capacity to transmit HD PSB services on the DTT platform.