



A Guide to Digital Television and Digital Switchover

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A GUIDE TO DIGITAL TELEVISION AND DIGITAL SWITCHOVER

Index

Introduction

1. Facts about digital television

- 1.1 Digital television platforms
- 1.2 Interactivity and digital television
- 1.3 Electronic Programme Guide (EPG)
- 1.4 History of UK digital television broadcasting
- 1.5 Uptake of digital television in the UK
- 1.6 Digital television in other countries
- 1.7 The European dimension to switchover

2. Coverage and Spectrum

- 2.1 Analogue terrestrial coverage
- 2.2 Digital terrestrial coverage
- 2.3 Set top reception
- 2.4 International spectrum planning
- 2.5 Reception and coverage of non-terrestrial digital television
- 2.6 Spectrum planning for switchover

3. Digital Switchover

- 3.1 The Process of digital switchover
- 3.2 Technical trials
- 3.3 Switchover implementation body (SwitchCo)
- 3.4 Government policy and statements
- 3.5 Cost Benefit Analysis
- 3.6 Progress towards switchover - Ofcom and BBC reports

4. Digital Switchover and the consumer

- 4.1 Consumer Expert Group Report
- 4.2 Ofcom Consumer Panel
- 4.3 Attitudes to digital television and digital switchover
- 4.4 Usability and accessibility
- 4.5 Accessibility for disabled people
- 4.6 Informing consumers
- 4.7 Planning permission for satellite dishes
- 4.8 Communal aerial systems and landlord/tenant Issues

Appendices

List of useful websites

Introduction

The UK leads the world in digital television. In just five years from the launch of this new technology, over 50% of all UK homes were accessing digital television services: that's a faster rate of adoption than colour TV, mobile phones or CD players, all of which we now look on as everyday goods. As a nation we are quick to appreciate how new technologies can make our lives easier, and more enjoyable. Whether for entertainment, education, information or business, we can all appreciate that digital television means not just more television but better television. And that readiness to adopt new products attracts investment in Research and Development, manufacturing and content production.

- In the last fifteen years, the world of broadcasting has changed more than it did in the previous thirty. In television, the number of channels has grown from 4 to over 400 since 1988.
- Nearly 62% of households now have digital television. That represents one of the highest rates of digital take-up in the world. Over seven million homes have digital satellite and 200,000 set top boxes are sold, on average, every month.
- Following digital expansion, in 2003-4 annual television subscription revenues (for pay to view channels) were £3.3 billion, exceeding advertising revenues (£3.2 billion) and income from the licence fee (£2.3 billion). The UK spends more on its television market than any other country, as a share of GDP: nearly 1 per cent.

Currently not everyone can join in the Digital TV society. 27% of households are in areas where it is not possible for all the digital television services to be received through an aerial while we continue with analogue terrestrial transmissions. These same households are paying for digital services from the BBC through their licence fee but can only access them free to view if they install satellite equipment. We can only open up access to all the digital public services on terrestrial television by removing the barrier that analogue transmissions create.

Sending out the same television services in analogue and digital form – which is what happens for BBC1, BBC2, ITV1, Channel 4, Five and S4C – is expensive. It is a burden on the broadcasters who have to run two separate transmission networks – they could make better use of the £115 million a year that they spend on the analogue networks if it were invested in programmes, for example. And it is a wasteful use of the radio spectrum frequencies (which are scarce, and could be used for new broadcasting services). Four to eight digital terrestrial television services can fit in the spectrum frequencies required by just one analogue service. That's why all over the world Governments and industry are planning to switch off analogue terrestrial television transmissions and rely wholly on digital transmissions.

As a leading nation in the world economy the UK must not be left behind, particularly in a technology that the UK has led the world in developing. An updated cost benefit analysis published on 10 February 2005, indicated that the UK economy stands to gain quantifiable net benefits in the range of at least £1.1 to £2.2 billion (in Net Present Value terms).

The main benefits from switchover are for:

- Households in areas which cannot receive digital terrestrial TV until analogue transmissions cease;
- Broadcasters who no longer have to transmit the same services in both analogue and digital formats;
- Consumers of the new services which will be provided using spectrum which is freed up by switchover. It is too early to know what these services would be, but they could include broadcasting services to mobile phones or other handheld devices, additional digital terrestrial channels or high definition television (HDTV).

Business too will benefit from creating and deploying new technology, new ways of working and new means of selling their products. And Government can make use of this ubiquitous communications channel to make its services available to those who most need them where they can best use them.

So ensuring that all households are able to benefit from digital television by switching off analogue terrestrial transmissions is a natural progression and the way of the future.

Switchover opens up opportunities for business and Government, but also for all of us as consumers and citizens. We are close to knowing how best to manage the switching over process. We should not then delay our progress to switchover.

1. Facts about Digital Television

In simple terms, digital television is a more efficient means of broadcasting than analogue. Images and sounds are transmitted as compressed data, which means that more services can be delivered in less space. For example, on digital terrestrial a frequency channel used to broadcast a single analogue television channel can, with digital transmission, carry at least 4 digital services.

This extra capacity (or bandwidth) can then be used to provide extra TV or radio channels and other ancillary on-screen services such as 'now and next' programme information, electronic programme guides, enhanced and interactive ("red button") services.

Digital TV also enables transmission of pictures in widescreen format, which will adjust to fit both widescreen TVs (16:9 aspect ratio) or TVs with "squarer" (4:3 aspect) displays. This removes many of the cases where black bands appear at the top and bottom of the screen, or where the picture can appear stretched.

1.1 Digital Television Platforms

There are three main digital television platforms in the UK – terrestrial, satellite, and cable. A further digital platform, television via broadband (DSL) is starting to emerge, but is currently only available in areas of London, Stevenage and in the city of Hull. As data compression techniques improve and as higher speed broadband becomes available at more telephone exchanges, it is expected that DSL television will become a more widely available option.

Digital Terrestrial Television (DTT)

Digital terrestrial television uses the same band of frequencies (UHF) as analogue television. Signals are broadcast through an upgraded transmitter network, and received through a normal TV aerial. These services can then be viewed on a conventional analogue television set either using a set-top box or a recording device with an integrated digital tuner, or they can be viewed directly using an integrated digital television set (IDTV).

A single frequency channel can carry only one analogue TV service. Digital transmission allows typically four to eight TV services, plus radio and text-based services, to be broadcast using a single frequency channel. The term used for a single frequency channel carrying several digital services is a Digital Multiplex (or "mux").

DTT services in the UK are currently broadcast on six national multiplexes. Currently there are around 30 TV channels and 16 radio stations available free to view, plus text-based services such as BBCi and Teletext. Viewers with suitably equipped set top boxes or IDTVs can also access pay TV services from Top Up TV, which offers elements of 10 premium channels for a monthly fee.

Services on DTT include all of the Public Service Broadcasting (PSB) channels. The PSB channels include those services already available on analogue, plus all of the BBC's digital services. There are also many purely commercial services such as ITV2, ITV3, ITV News, ABC1, UKTV History, FTN, Sky News, Sky Travel and QVC.

Available on Analogue and Digital	Available on Digital Only
BBC1 BBC2 ITV1 Channel 4/S4C ¹ Five Teletext	BBC3 BBC4 BBC News 24 BBC Parliament CBBC CBeebies S4C2

UK Public Service Broadcasting Channels

Digital Cable

Digital cable television services are delivered to consumers via networks of fibre-optic cables. The signals are decoded using a set top box. In the UK, set top boxes for cable are supplied by the service provider as part of a subscription package. Digital cable customers can also access telephone services and broadband Internet services. Digital cable can carry around 200 services (TV and radio), plus interactive services. All Public Service Broadcasting channels are available with any digital cable subscription package.

Digital Satellite (D-SAT)

Digital satellite signals are received by a dish mounted on the outside of a building, and decoded using either a set-top box or a satellite-compatible integrated digital television set.

Most digital satellite television in the UK is accessed through a set top box provided by British Sky Broadcasting (BSkyB) to its customers. Around 400 services (TV and radio) are currently available on the platform. Most of the more popular channels are available only by subscription to BSkyB, but there are also a wide variety of free-to-view channels. In October 2004, BSkyB launched a free to view satellite service that offers access to almost 200 television and radio channels for a one-off payment of £150. Customers get a Sky box, a minidish, initial viewing card and standard installation.

At present, the BBC transmits its PSB channels “in the clear” on digital satellite, in other words not encrypted. This means that anyone in the UK with a satellite dish pointing at the Astra family of satellites (as also used by BSkyB) can access all the BBC digital services “free to air”, i.e. without a subscription. ITV1, Channel 4 and Five are transmitted encrypted. To receive these channels at present the consumer must have an active viewing card.

Encryption and Conditional Access

Satellite signals cover a wide area, and are not limited to national boundaries. Most satellite services for the UK market are transmitted from the Astra family of satellites, the signals from which cover most of Western Europe. Many services are encrypted, and can only be accessed using a viewing card which allows decryption of the signals. Access to services is constrained for a number of reasons – broadcasting rights are usually bought only for specified territories; regionalisation of programming and advertisements; and revenue collection for Pay TV services.

¹ S4C is broadcast in Wales on the same analogue frequency as that used by Channel 4 in England, Scotland, and Northern Ireland.

1.2 Interactivity and Digital Television

Digital television platforms have differing levels of interactivity for the viewer, depending on the available bandwidth and whether or not the platform has a “return path”, which means that the user’s equipment can communicate with the service provider.

All platforms offer “Enhanced TV” services. These are, strictly speaking, not interactive services as they are one-way services, mostly accessed using the Red Button, including digital text (such as BBCi, Teletext and Sky Text), programme information, and a choice of viewing/audio streams. For example you can choose amongst a number of football or tennis matches being played at the same time. Some companies now produce interactive TV advertising. In addition, satellite and cable offer shopping, banking, and access to Government services, often in conjunction with a return path which allows viewers to go online and complete the purchase of products, obtain more information on products which are advertised, etc.

On satellite, the return path is via a telephone line connected to the set top box. On digital cable, the return path uses the same cable that provides the television signal to the set top box. Currently only one Digital Terrestrial Television receiver offers return path connectivity via a telephone line. This model also incorporates a web browser to access the Internet.

1.3 Electronic Programme Guide (EPG)

The electronic programme guide (EPG) is essentially similar to having a TV guide on screen, accessed using the remote control. The EPG gives listings of channels available and the programmes on them; a synopsis of the programme; and information on whether the programme is in widescreen or subtitled, signed or audio described.

All digital television platforms offer an EPG. On digital satellite, full seven day listings are available. On DTT, depending on the equipment used, the user can access listings up to 7 days in advance. A similar service is offered on digital cable depending on the network used.

Depending on the equipment used, the user can simply select/highlight a preferred programme due to be broadcast at a later time or date, and at the relevant time the channel will change automatically. Some receivers can use the EPG for recording television programmes, automatically using the relevant start time and duration. This removes a lot of the complexity of recording experienced in the analogue world. With a personal video recorder (PVR), programmes can be recorded onto a hard disc. Some receivers can control recording on an external device such as a video recorder (VCR).

1.4 Brief History of Digital Television Broadcasting in the UK

In 1997, the first digital terrestrial television multiplex licences were issued. The ITC licensed one multiplex to Digital 3&4 (a joint venture between ITV and Channel 4), one to SDN² (a company jointly owned by S4C, NTL and United News & Media), and three

² SDN was bought by ITV plc in April 2005

to British Digital Broadcasting (later OnDigital, later ITV Digital) to operate a Pay TV service. The sixth DTT multiplex was allocated to the BBC.

The first digital service was on digital satellite when Sky Digital launched in the UK in October 1998. A month later DTT, which included a number of free to view channels and a subscription-based service operated by On Digital, was launched. Digital cable services began the following summer.

In September 2001, BSkyB switched off its analogue satellite transmissions – the first television platform operator in the world to be wholly digital.

In the spring of 2002, there were two significant events for the DTT platform – ITV Digital (formerly OnDigital) went into administration, and Pace launched the first retail DTT set-top box costing under £100.

The ITC invited tenders for the 3 multiplex licences surrendered by the administrators of ITV Digital. One was licensed to the BBC and the other two to Crown Castle International. The BBC and Crown Castle submitted a joint bid which included the creation of the Freeview brand, and the intention to create DTV Services Ltd, a body designed to promote the Freeview brand and DTT generally. A third partner in DTV Services Ltd is BSkyB.

On 30 October 2002, Freeview launched in the UK, which re-launched DTT as a free to view service offering around 30 TV channels and 16 radio stations.

On 30 June 2003, the BBC moved all its services on digital satellite from encrypted to non-encrypted (or “in the clear”). This allowed access to viewers without a Sky viewing card.

On 31 March 2004 Top Up TV launched a service on the DTT platform offering elements of 10 premium channels on a subscription basis.

In June 2004 Homechoice re-launched broadband tv in the London area.

In October 2004 BSkyB launched a Free to View digital satellite service for a one-off cost of £150.

In December 2004 Ofcom issued Digital Replacement Licences to the Channel 3 companies, Channel 4, Five and Teletext.

In April 2005 ITV acquires multiplex operator SDN

1.5 Uptake of digital television in the UK

Ofcom estimates that at the end of March 2005, 61.9% of households (15.4m) were accessing digital television, via all platforms

Pay TV digital subscribers

Digital Satellite	7.3m
Digital Cable:	2.5m
TV over ADSL	20,000

Total 9.9m

Free-to-view digital households

Digital Terrestrial:	4.5m
Digital Satellite (Free to View):	445,000
Total	5.5m

These figures are updated quarterly and are published on www.ofcom.org.uk

1.6 Digital television in other countries

The world is going digital...

More and more digital television services are appearing around the world, and more and more viewers are turning to digital. Increasingly, digital is entirely replacing analogue. How and when this change is made is different from one country to another, depending on the way that television broadcasting markets have developed in each. Switching to digital presents different challenges in countries where cable is the most common platform, from those where a very large proportion of viewers rely on terrestrial transmission. So each country is proceeding to its own timetable, though they share the aim of bringing more and better services to consumers and creating new opportunities for industry and services.

In August 2003, Berlin-Brandenburg in Germany became the first region in the world to switch off analogue terrestrial television. The transition went smoothly, and many useful lessons were learned - not only technical and supply issues, but also on how to ensure that consumers were kept fully informed. Now several more regions have switched off analogue, with the aim for national switchover to be completed in Germany by 2010.

Finland plans to have digital terrestrial television reaching 99% of the population by the end of 2005, and switch off by February 2008. Sweden plans to switch off analogue by 2008, with the first region switching over in Autumn 2005.

Italy has an ambitious timetable to switch off analogue at the end of 2006. In Spain DTT will be rolled out in Q3 2005, and the final switch over to digital will take place at the beginning of 2010, two years earlier than initially planned.

France launched digital terrestrial television services in March 2005 for free-to-view channels and from September 2005 expect to launch pay TV channels. The aim is to reach 35% of the population at launch from 17 transmitter sites, rising to 115 sites reaching 80% of the population in due course.

In the USA, the Federal Communications Commission favours a switch off by 2009. A legal ruling ensures that analogue TVs will no longer be sold after the end of 2006. Australia is reviewing its commitment to switch off by the end of 2008.

Countries with later timetables include Lithuania, which will switch off in 2012 and Poland which plans to launch DTT this year after a long period of trial transmissions, with switch-off completed in 2014.

1.7 The European Dimension to Switchover

The European Union's "e-Europe 2005 Action Plan" requested that by the end of 2003 all Member States submit their plans for achieving switchover to digital television. The European Commission also issued a Communication in September 2003 giving guidance to Member States on the issues that they should consider in their plans. Analysis of the plans submitted and soundings by the Commission of new Member States indicate that most countries are planning to complete switchover by 2015. The commission published a further Communication in May 2005. This advocates a common timescale for completing switchover by the beginning of 2012. Further information can be found on www.europa.eu.int/information_society/eeurope/2005/index_en.htm

2. Coverage and Spectrum

One of the main reasons for switching off analogue terrestrial transmissions is that until the analogue terrestrial transmissions are switched off, around 27% of households will not be able to receive all the digital services through an aerial. This is because it is not possible to transmit the digital terrestrial services at sufficiently high power levels to cover the UK whilst we have to protect the analogue services from interference.

However, when in 1999 Chris Smith, then Secretary of State for Culture, Media and Sport, set out the long term aim to switch off analogue transmissions, he announced the "availability" test: before analogue transmissions can be switched off everyone who can receive the main public service broadcasting channels in analogue form must be able to receive them in digital form (ie terrestrial, satellite or cable). [see section 3.4].

2.1 Analogue Terrestrial Coverage

In the UK, analogue television signals are broadcast from a network of 50 main transmitter stations, and over 1100 smaller relay stations.

In order to ensure that the "availability" test can be fulfilled, it was necessary to ensure that an accurate view of current analogue terrestrial television coverage was available. In 2004 the Digital Television Project published a study which showed that 95.6% of households are able to receive a "good" analogue signal for BBC1, BBC2, ITV1 and Channel 4/S4C³, and a further 2.9% of households are able to receive a "marginal" analogue signal. A "marginal" signal is one which suffers from a greater or lesser degree of interference (for example fuzziness, flickering or shadows). 98.5% of households in the UK are therefore able to receive these four channels with a greater or lesser degree of interference. Five was not included in this analysis as it is unable to broadcast to the whole of the UK on analogue.

³ S4C is broadcast in Wales on the same analogue frequency as that used by Channel 4 in England, Scotland, and Northern Ireland.

If the coverage for individual channels is examined, the figures are slightly different. For example, BBC1 “good” analogue coverage (or the percentage “served”) is 97.9%, rising to 99.5% if “marginal” coverage is included. Core coverage means the ability to receive all 4 channels. The full results of the study are summarised in table 1 below.

<i>Table 1</i>	BBC1	BBC2	ITV1	Channel 4	Core
Served	97.9%	96.9%	96.7%	96.9%	95.6%
Served + Marginal	99.5%	99.2%	99.0%	99.2%	98.5%

2.2 Digital Terrestrial Coverage

Digital transmission allows typically four to eight TV services, plus radio and text-based services, to be broadcast using a single frequency channel. The term used for a single frequency channel carrying several digital services is a Digital Multiplex (or “mux”). DTT services in the UK are broadcast on six multiplexes.

The six digital multiplexes are designated 1, 2, A, B, C and D. The first three (1, 2 and A) are currently designated public service multiplexes. This means that the multiplex operators are obliged to carry the main public service broadcasting channels (BBC1, BBC2, ITV1, Channel 4, S4C, Five and Teletext). Mux 1 carries BBC1 and BBC2, Mux 2 carries ITV1, Channel 4 and Teletext, and Mux A carries Five and S4C (and also S4C2). As part of the switchover process, Mux B will replace Mux A as a public service mux, with Five and S4C moving.

At present, DTT is transmitted from the 80 major transmitter sites (50 main transmitters and 30 relays) around the country. Currently, 82% of households in the United Kingdom are within the coverage of Muxes 1 and 2, and consequently the digital transmissions of BBC1, BBC2, ITV1, Channel 4 and Teletext. 73% of households have access to all six muxes, and therefore to all the digital terrestrial services (although a few may need a new aerial to receive the signal). It will not be possible to significantly increase coverage until the analogue signals have been switched off.

In the same way that analogue channels can have different coverage depending on factors such as interference and signal strength, so the coverage for digital muxes can also vary. There is however a significant difference between analogue and digital signals in terms of reception. Whereas in the analogue world a picture can still be received via a weak signal or one subject to interference (the picture may of course be of low quality), in the digital world the picture is either there or it is not. One way of increasing the robustness of the signal is to change the transmission mode (or “modulation scheme”) of the transmissions, although this reduces capacity.

There are two transmission modes used in the UK for DTT: 16 QAM and 64 QAM. It is only possible to broadcast 4 to 5 TV channels on a mux operating at 16 QAM, whereas one operating at 64 QAM could broadcast between 6 and 8. However, for a given level of transmission power coverage from a 64 QAM mux will be less than that of a 16 QAM mux, and the signal will not be as robust. Currently Muxes 1, B, C and D use 16 QAM, and Muxes 2 and A use 64 QAM. There is a trade-off between coverage/robustness of signals, and capacity.

Ofcom published a consultation on 9 February 2005 considering options for combinations of power and mode. On 1 June, Ofcom announced that it is supporting a mix of mode and power which allows for DTT coverage to reach at least the same proportion of households (98.5%) after switchover as are reached by current analogue broadcasts and allows for at least as many services as are currently available. Ofcom is undertaking further research of the 1.5% of households currently not served by the public television services, considering if and how they are using television at present and what options will be available to them at switchover.

2.3 Set-top Reception

Many viewers use a set top aerial – perhaps because of the type of accommodation, or their rooftop aerial is only connected to one TV set, or for reasons of cost. Predicted coverage will in general be poorer for a set-top aerial than for a rooftop aerial, and will be poorer for sets used on the ground floor than those used on an upper floor in the same building. The same concepts of "good" and "marginal" reception apply to sets using a set top aerial for analogue or digital terrestrial signals.

Research is ongoing to evaluate the quality of set-top reception after switchover, and research to date indicates that "good" coverage of digital services through set top aerials should be at least as extensive as "good" coverage of analogue services.

2.4 International Spectrum Planning

The radio spectrum is a finite and key resource for communications in the private and public sectors. Its effective management is essential if we are to make the UK the most dynamic and competitive communications market in the world while at the same time making spectrum available for defence purposes, essential public services and scientific applications.

Ofcom are extending and developing policies on auctions, incentive pricing and spectrum trading within a regulatory framework that ensures that sufficient spectrum is available for essential public services, safeguards competition, minimises harmful interference and ensures compliance with international obligations.

Global Framework for Spectrum Planning

Spectrum Planning is not just a domestic issue. There are international agreements governing the use of Spectrum, and the hierarchy is as follows:

- ITU: The ITU (International Telecommunications Union) is part of the United Nations, and is responsible for reaching global agreement on electronic communications issues.
- WRC: The World Radiocommunication Conference (WRC), is a subset of the ITU, responsible for reaching international agreement on use of the radio spectrum. This includes broadcasting and telecommunications (including military use) and scientific applications such as radio astronomy. The WRC designation for the UHF spectrum specifies broadcasting as the only/primary use. The WRC takes place approximately every 3 years, and the next meeting is in 2007.

- RRC – Regional Radiocommunication Conference. The WRC comprises four “regions”, responsible for reaching agreement on spectrum use within each region, within parameters set down by the WRC.

The RRC, of which the UK is part, met in May 2004 to agree the principles for re-planning the region’s VHF and UHF broadcasting spectrum. Using these principles, the UK, in common with all other countries in the region, put forward its preliminary proposals in February 2005 for post-switchover planning of this spectrum. Revised final proposals must be submitted by 31 October 2005. These proposals will be discussed at the second stage of the RRC to be held early in 2006. This is the first time the broadcasting spectrum has been re-planned since the Stockholm Conference in 1961. All spectrum planning in the UK is based on the provisions of the Stockholm Plan.

The Chester Conference in 1997 amended the Stockholm plan to allow the interleaving of digital signals within the existing TV broadcasting frequencies, and agreed the principle of analogue conversions. The Chester Agreement provides the basis for spectrum planning for digital transmissions and switchover in the UK.

2.5 Reception and coverage of non-terrestrial digital television

Digital Satellite

In order to receive digital satellite services it is necessary to install a satellite dish with line of sight access to the satellite signal. The vast majority of UK households have such access and are able to receive digital satellite services. However, some households are shielded by local features such as tall buildings or trees and are therefore unable to install a dish in order to receive a signal successfully. It is generally accepted that digital satellite services can potentially reach around 98% of UK households, but the potential level of coverage can be affected by planning restrictions on the erection of satellite dishes, and restrictions found in covenants and tenancy agreements.

Digital Cable

Approximately 50% of homes in the UK are passed in the street by a cable network, mostly in urban and suburban

areas <http://www.ntl.com/mediacentre/company/faqs.asp?section=2> and

<http://www.telewest.co.uk/ourcompany/index.html> and email from Nick Collins, Ofcom, 3

June]. The two main cable providers are ntl and Telewest, and both networks are in the process of converting from analogue to digital. Approximately 75% of cable TV customers use digital services.

Increases in coverage appear unlikely in the near future, as the costs of making cable available in areas of lower population density exceed the potential benefits for the cable companies.

TV via DSL (Broadband)

DSL coverage is constrained currently by the technical capabilities of the telephone network used and the cost of extending the network. Currently services are available in some parts of London and Stevenage (provided by HomeChoice), and in the city of Kingston upon Hull (KIT, provided by Kingston Communications). Data compression techniques are improving and as higher speed broadband becomes available at more

telephone exchanges, it is expected that TV via DSL will become a more widely available option.

2.6 Spectrum Planning for Switchover

Digital terrestrial coverage depends not only on the power at which the digital signals can be transmitted and on the modulation scheme adopted for each mux but also on other factors:

- interference from broadcasts from our near-continental neighbours (there are international agreements covering permitted international interference levels);
- the numbers of transmitters and relays from which the digital signals are transmitted; and
- the frequencies used.

In the UK, television is transmitted using frequencies in the UHF part of the spectrum from 470 to 862 MHz. These frequencies are split into channels, each of 8MHz. The channels are numbered 21 to 69. (Numbers 1 to 20 are at lower frequencies – in the VHF spectrum – which until 1982 were used for black & white 405 line television transmissions.)

Currently, in any particular area, the digital multiplexes are transmitted in between the frequencies used for analogue. In order to protect the analogue broadcasts from interference, the power is kept relatively low. The analogue transmissions use the frequencies approved for high power transmission in the UK, which gives maximum coverage.

Switchover is being planned on the basis of analogue conversions. In each region three frequencies currently used for analogue will be converted to carry three Public Service Broadcasting digital muxes (known as “3PSB”). The PSB multiplexes will be allocated these most favourable frequencies to help achieve the “availability”⁴ test. The frequencies used by the three Commercial muxes (known as “3COM”) will have slightly lower potential coverage.

The final frequency plan is still being determined. The report “The Principles of Spectrum Planning”, which is available on www.digitaltelevision.gov.uk, explains analogue conversions in more detail. What is known is that, based on the current plan, switching off analogue will free up 14 frequency channels in two blocks for re-use.

Adapting 1,154 sites for DTT coverage increases coverage significantly, but does not guarantee in itself that DTT availability will reach the 98.5%. Other variables such as the power at which the services are transmitted and the transmitter mode used will affect the coverage of signals. On 9 February 2005, Ofcom issued a consultation on “Planning Options for Digital Switchover” which sought views on which of five DTT planning options is best suited to the achievement of switchover. The consultation also considered two other related matters, the potential use of the 8K variant of the DTT standard, which allows the use of single frequencies, and how current coverage deficiencies should be managed at switchover.

⁴ See introduction to this section

On 1 June 2005, Ofcom issued a statement setting out their view on which option is the most appropriate. Their main conclusions are that:

- all three muxes which broadcast public service broadcasting channels should aim to achieve similar levels of coverage at all sites being operated for DTT, adopting the same mode and similar levels of power;
- the commercial mux operators should be able to determine their own coverage objectives in the light of their own particular commercial interests provided that they do not allow the coverage of any muxes to fall below the current level and should also aim to achieve similar levels of coverage to each other;
- public service multiplex operators should adopt the 64 QAM mode; and
- the adoption of the 8K format in all areas by the final switchover date.

Ofcom is also concerned with the interests of the 1.5 per cent of UK households (around 375,000 households) currently unable to receive all four of the main public service television channels. They are undertaking research considering if and how these households are using TV at present and what options will be available to them after switchover. The aim of this work is to help ensure that the interests of all UK television households continue to be protected through switchover.

Further details of the consultation and statement are available on www.ofcom.org.uk .

3. Digital Switchover

3.1 The Process of Digital Switchover

The technical process of switchover and the principles of analogue conversions, are explained in Section 2 of this document. The purpose of this section is to explain current thinking on how the switchover in each region would affect viewers.

It will take around four to five years to complete the switchover process. It will take place region by region (most likely to be based on ITV regions). Viewers in each region will have a minimum of two years' notice about when the switching process will start in their region.

In December 2004, Ofcom issued digital replacement licences for Channels 3, 4, 5 and Teletext. These licences included a backstop date of 31 December 2012 by which all analogue transmissions must end. The licences also require these broadcasters to adopt all the current existing transmission sites in the UK for digital transmissions and to ensure that DTT signals have coverage equivalent to, or substantially the same as, that served by existing analogue terrestrial services.

The exact order in which different regions are switched will reflect technical and logistical issues. For example, it is only possible to replace equipment at the top of the main transmitters in good weather, so all this work will be scheduled for April to October in successive years. The number of skilled engineers will affect the number of main and relay transmitters which can be handled at one time. The need to coordinate frequency planning with our international neighbours will affect the timing of a number of regions. Commercial, marketing and communication issues will also play a part. On 9 February 2005, Ofcom proposed an indicative region by region timetable for switchover, based on research and technical analysis – this is available on the Ofcom website.

The Government will confirm the timetable for switchover when it is sure that the needs of the elderly and other vulnerable groups are protected.

In any one region, consumers can expect changes to take place over a period of weeks. This might happen as follows:

- Messages appear on screen saying that from a certain date one analogue service (for example BBC TWO) will no longer be available
- On the named date, the analogue service stops and the digital multiplex carrying BBC TWO (and also BBC ONE, BBC THREE, BBC FOUR, CBBC, CBeebies) will move to the frequency channel vacated by analogue BBC TWO
- Shortly afterwards, messages appear on screen saying that some or all of the other analogue services are about to stop
- On the named day, or days, BBC ONE, ITV1, Channel 4 (or S4C in Wales) and Five stop transmitting in analogue, and the multiplexes carrying these digital services move to the frequency channels vacated by the analogue service

Each change should happen overnight. Each set top box or integrated digital television for terrestrial services will need to rescan (either automatically or manually) so that the viewer can watch the digital services at their new settings.

There are unlikely to be any significant changes in coverage of DTT before switchover. This means that the households that are unable to receive digital television services through an aerial today because they are not within coverage of a DTT transmitter, will not be able to receive DTT until switchover. The sequence of changes at switchover in a region will provide an extra prompt and opportunity to obtain equipment before all analogue terrestrial services stop, although it would be preferable for consumers to obtain equipment able to receive digital television – whether DTT, satellite or cable - sooner.

3.2 Technical Trials

Technical trials help inform our decisions on the implementation of the nationwide switchover from analogue to digital terrestrial television. They help by assisting better understanding of the practical and social issues consumers face in switching from analogue to digital television services.

Go Digital

The first technical trial was the Go Digital Project which started in 2001, with the main phase in Summer 2002. This studied the conversion of around 300 homes in the Sutton Coldfield, Litchfield and Tamworth area to all-digital TV reception. The area was chosen because there is good coverage of all three digital platforms, including both main cable TV networks. Also, the signal strength for DTT was roughly equivalent to that of a post-switchover environment. The trial was a partnership between the Industry, the Independent Television Commission⁵ and Government.

Trial households were offered free installation and use, for the duration of the trial only, of the television equipment required to convert all existing TV sets in the house. Some households were given Personal Video Recorders (PVRs) rather than converting their Video Cassette Recorders (VCRs). The trial was designed to offer free to view content only. The majority of the research was conducted after the demise of ITV Digital, and before the launch of Freeview, so the number of channels available on DTT was relatively limited.

Research showed that before the trial, around a fifth of all participants said they were not interested in getting digital television: after the trial the majority of this group (68%) said they would convert with many others showing increased interest. Only 6% still had no interest in switching at all to digital television.

DTT Technical Trial

The DTT Technical Trial went further than the Go Digital project in several ways. Whilst the Go Digital project was a “switch on” trial, the Technical Trial was a “switch off” trial, converting an analogue terrestrial transmitter to digital terrestrial only. The trial was a partnership between the Government and the Broadcasters.

⁵ ITC were responsible for licensing and regulating all television services broadcasting in the UK, other than BBC licence fee funded services S4C before Ofcom

The selected transmitting station was the small relay at Ferryside in West Wales serving the village of Llansteffan and part of the village of Ferryside, Carmarthenshire. Following a public consultation with the community in May, the trial started on 26 November 2004.

After three months of receiving the digital services, the trial households were asked whether they wished to retain the digital services only, or revert to the analogue services only. Over 85% of households responded of whom 98% wished to retain the digital services and the analogue signals were switched off on 30 March 2005.

All the basic equipment necessary to access digital television transmissions was provided. Householders installed equipment to receive digital terrestrial television themselves to simulate the reality of switchover as realistically as possible. For those elderly people and people with disabilities who wished it, extra assistance was available, including installation of their equipment. A helpline number was provided for all triallists.

The trial enabled an assessment of the technical issues associated with the switchover process at the transmitter end and in the household.

3.3 Switchover implementation body (“SwitchCo”)

Following completion of the Digital Television Action Plan in November 2004, the next stage is implementation.

SwitchCo, which was launched on 13 April, is the organisation which will co-ordinate the switchover to digital television. It is an independent organisation set up by the public service broadcasters and multiplex operators, with representation from the digital television equipment supply chain. It will work closely with DCMS, DTI and Ofcom.

SwitchCo has three major tasks:

- To communicate with the public about digital switchover to ensure everyone knows what is happening, what they need to do, and when.
- To liaise with TV equipment manufacturers, retailers, digital platform operators and consumer groups to ensure understanding of and support for the switchover programme.
- To co-ordinate the technical roll out of digital terrestrial television across the UK, region by region, to a timetable agreed by Government.

Further details are available on www.switchco.co.uk.

3.4 Government Policy and Statements

In September 1999, the then Secretary of State for Culture, Media and Sport, Chris Smith, gave a speech to the Royal Television Society in Cambridge in which he said that the switch to digital would be subject to ensuring that:

- everyone who currently receives public service channels in analogue form can receive them through digital means;
- switching to digital is an affordable option for the vast majority of people.

He said that switchover “could start to happen as early as 2006 and be completed by 2010, but this depends very much on how the broadcasters, manufacturers and consumers behave over the next seven years”. The criteria were reaffirmed in the White Paper “A New Future for Communications”, published in December 2000.

The White Paper “Opportunity for all in a world of change”, published in February 2001 said “Our aim is for the UK to have the most dynamic and competitive market for digital TV in the G7, as measured by take-up, choice and cost. As the first part of our strategy to achieve this, we will:

- Bring together key public and private sector stakeholders to develop a comprehensive digital TV action plan.
- Work with the broadcasters and others to launch a series of digital TV projects in 2001, giving participating communities the opportunity to help shape the future of Digital TV.
- Work with the broadcasters to promote public understanding of the benefits Digital TV can offer.
- Work with the industry to ensure clearer and more informative labeling of digital TV services and equipment.”

In the autumn of 2001, the Government began to work with broadcasters, manufacturers, retailers and consumer organisations on creating the Digital Television Action Plan.

The joint Government-Industry Action Plan was first published In January 2002. The objective of the Plan was “to ensure that the criteria set [by Chris Smith] for switchover are met so that Ministers can, if they choose, take the decision to proceed to full switchover by ordering the switching off by 2010 of analogue terrestrial transmissions”.

In September 2003 Tessa Jowell, Secretary of State for Culture, Media and Sport, gave a speech to the Royal Television Society in Cambridge in which she announced the government’s commitment to switchover. She confirmed that it is no longer a matter of *whether*, but *when and how* analogue is switched off. This was, in part, prompted by the results of the Cost Benefit Analysis of switchover (see section 3.5). It was also evident from work to date that it would not be possible to meet the criteria until switchover.

To reflect this commitment, the remit of the Action Plan was revised to “enable Ministers to decide how and when to switch over, with completion by 2010 an option; and then help prepare for a successor project to do the job”.

On 19 May 2004, Tessa Jowell made a Written Statement to the House of Commons on Digital Switchover: the Next Steps. She said that “in view of the progress to date, completing switchover by 2010 remains attainable. However, it is apparent that more concerted action by broadcasters, retailers and manufacturers, supported by the Government and Ofcom, is required if the full benefits of digital television are to be made available to the whole population within the desired period”.

The Government then invited the commercial terrestrial broadcasters and the BBC to engage with the Government and Ofcom on how to achieve a complete switchover and to establish an appropriate timetable in liaison with other stakeholders. Progress on this work was reported in a written statement to the House of Commons by Tessa Jowell on 22 July 2004.

In that statement she said that while the broadcasters have not reached a full consensus on the optimum timetable, some – including the BBC – have suggested that 2012 may be the most appropriate date for the completion of switchover. The statement also said that we believe that switchover should be broadcaster-led but that the final decision on timetable should balance the benefits against the need to ensure that the interests of the most vulnerable consumers are protected. (The full statement can be found on www.digitaltelevision.gov.uk)

The Action Plan was completed in November and the final report is available on www.digitaltelevision.gov.uk

On 2 March 2005, the Government published its Green Paper: A Strong BBC, Independent of Government, which contains its proposals for the future funding, governance and purposes of the BBC. In Section 2: A changing landscape – building digital Britain, the Government re-affirmed its policy of wanting to extend the benefits of the digital revolution to all UK households and said that one of the conditions of the new licence fee settlement will be that the BBC should play a leading role in the process of switching Britain over fully from analogue to digital television.

The Government said in its Manifesto that we will achieve digital switchover between 2008 and 2012 ensuring universal access to high quality, free-to-view and subscription digital TV. This will happen region by region, and we will ensure that the interests of elderly people and other vulnerable groups are protected.

3.5 COST BENEFIT ANALYSIS OF DIGITAL SWITCHOVER

When contemplating whether or not a particular policy is advisable it is important to assess whether or not the economic costs outweigh the economic benefits. These costs and benefits need to be measured in terms of real resources. The “opportunity cost” of a policy can then be assessed - the value of the opportunities that have to be foregone because a particular course of action has been chosen. This analysis of costs and benefits, a Cost Benefit Analysis (CBA), takes into account a much wider range of costs and benefits than analysis based solely on financial costs and benefits.

Economists in the Department of Trade and Industry (DTI) and the Department for Culture, Media and Sport (DCMS), working with Ofcom and its predecessors, have developed a model to evaluate the economic costs and benefits to the UK of completing digital switchover. The policy choice that is analysed is between switching off analogue terrestrial transmissions coupled with subsequent use of the UHF spectrum, and continuing with both analogue and digital transmissions as at present.

The CBA for switchover, in line with standard CBA methodology, estimates opportunities forgone in taking policy choices by estimating the welfare generated by policy changes. Most purchasers of a product are prepared to pay more than the current market price for that product. Households which have already gained access to digital TV have already assessed that for them the personal benefits outweigh the costs. This is because the product generates more welfare than is represented by the financial cost those households have paid for the product. The extent to which this is so is a measure of the net welfare that the product yields – this is known as the consumer surplus.

At the same time, most producers are prepared to supply a product at a price lower than its market price. Selling at the market price creates a surplus for such producers called producer surplus. The change in total welfare prospectively generated by a policy change may be derived by estimating producer and consumer surplus (the respective size of producer and consumer surplus i.e. the distribution of the surplus from a policy, will depend on a number of factors including the impact of price on demand for specific products and the degree of competition on the supply side).

Whilst taking broader welfare into account it is also necessary to bring the estimates of costs and benefits onto a comparable basis. There are two adjustments which must be made. First, inflation means that the nominal value of costs and benefits rises over time and so later welfare gains appear greater than present ones. To avoid distortion, all costs and benefits are calculated in terms of constant prices. Second, even when using constant prices, a pound's worth of welfare earned today is worth more to a person than a pound's worth earned in the future. For this reason it is necessary to bring all values into present-day terms by discounting to calculate their Net Present Value (NPV).

The CBA takes into account a wide range of market information such as consumer preferences and broadcasting costs. These are incorporated into a working model which allows economic costs and benefits to be added over time. It is also designed to take account of the many interrelationships between different factors. Finally, the model allows changes to be consistently made in the light of new information.

The model incorporates estimates provided by various industry stakeholders of costs and of benefits to broadcasters from not having to maintain analogue networks. Estimates of the benefits from future use of spectrum are based on survey work undertaken initially by the Radiocommunications Agency and updated in 2004 for the DTI. It includes estimates of the future take up of digital TV.

The CBA includes estimates of the consumer and producer surplus yielded by the spectrum that is no longer needed for existing analogue transmission and which can be used for other TV transmissions. It also includes the benefits which equipment and content suppliers are likely to receive from a switch to digital technology. Finally, it takes account of investment in digital transmission equipment and receivers.

The first results from the model were published in September 2003. At that time the central case showed quantifiable benefits in the region of £1.5 to £2 billion in NPV terms. This shows that switching to digital transmission rather than maintaining the present dual transmission system yields clear economic benefits. However, these results were not robust enough to indicate which is the preferred year for switchover but did suggest that sooner is better than later.

Since then, the model has been developed to explore the impact of switchover on different groups of consumers and producers. It has been possible to refine the model and to take into account new information on digital take-up and survey information on the use of video recorders.

It has also been possible to identify the main groups of beneficiaries of the policy. They are:

- Those households in areas which cannot receive digital terrestrial TV until analogue transmissions cease.
- Consumers of the new services which will be provided using spectrum which is freed up by switchover.
- The broadcasters who no longer have to transmit the same services in both analogue and digital formats.

The most recent full cost benefit analysis shows quantifiable benefits in the region of £1.2-2.2 billion in NPV terms. It is published on www.digitaltelevision.gov.uk.

3.6 Progress towards switchover

As part of the Action Plan, Ofcom and the BBC were asked for reports by March 2004 on progress towards switchover.

Ofcom report

The Ofcom report, "Driving Digital Switchover" was published on 30 March 2004. (see http://www.ofcom.org.uk/media_office/news_archive/nr_20040405) Ofcom's projections suggested that digital adoption is highly unlikely to reach 95% by the end of 2010 under the current commercial and policy environment. Ofcom believes that digital switchover is desirable, practical and achievable. Everyone involved must move from planning to implementation. There is a need to solve the problem of co-ordination over all the interested parties not just those likely to bear the transitional costs.

To accelerate progress, Ofcom suggested:

- Greater certainty over switchover timing.
- Refine the regulatory framework to drive switchover - Ofcom will seek to include obligations for nationwide DTT rollout in the new digital public service broadcasting licences before the end of 2004 and as part of the Charter review Government should replace the BBC's current general obligations to promote digital television with more specific obligations on roll-out, the provision of public information and supporting free to view satellite services.
- Provide information and advice to consumers.
- As switchover moves from planning to implementation, establish a delivery body to lead switchover.
- Address affordability issues, any financial support scheme should be available to all qualifying households not just digital non-adopters.
- In forthcoming international radiocommunications conferences seek to secure full clearance for UK's switchover plans and seek the greatest flexibility in the use of cleared spectrum after switchover.

BBC Report

The BBC report "Progress Towards Digital Switchover", published on 26 April 2004, (<http://www.bbc.co.uk/info/policies/switchover.shtml>) focused on the importance of Government action to boost digital take-up. The report was cautiously optimistic about the possibility of achieving a UK-wide digital switchover by 2010. The continuing consumer enthusiasm for digital television during 2003 has generated this optimism. The

report commented that over the last year the popularity of *Freeview* has increased as consumer knowledge about *Freeview* increased and the retail price of DTT receivers fell to the point where they became impulse buys for many. The BBC feels that *Freeview* specifically appeals to viewers who are not attracted by satellite, cable or pay TV in general.

The report forecast that, left to the market alone, digital penetration would not reach 95 per cent of households (primary TV set only) until 2013. The BBC felt that continued Government commitment to switchover (including financial investment in the process) is essential. The report pointed to several challenges which the BBC felt should be addressed by Government in conjunction with other stakeholders:

- The marketing and communication of digital to unconverted households.
- The conversion of secondary TV sets.
- The ease of recording from digital channels.
- The regional switchover sequence.
- The replication of analogue coverage with DTT coverage.
- A guarantee that satellite viewers could receive the public service channels, without paying monthly subscriptions.
- A large-scale switchover pilot.
- The establishment of an organisation to manage the switchover programme.

Building Public Value – renewing the BBC for a digital world

On 29 June 2004, the BBC published “Building Public Value”, its contribution to the debate on the review of its Charter. The document said that the BBC can take a leading and coordinating role in building a digital Britain, and gave (amongst others) the following commitments:

- Commit ourselves to the full roll-out of digital terrestrial television (DTT) with a target digital switchover date of 2012.
- To work with government and industry to find ways of funding and co-ordinating the DTT build-out for all the public service broadcasters.
- To lead and part-fund the large-scale marketing and public information effort which will be required to achieve switchover.
- To take a special responsibility for bringing the final cohorts into the digital television universe.
- To work with others to create a successful free digital satellite service, offering a broader range of channels and interactivity than DTT can currently support, and able to reach those households who will not be able to receive DTT.

BBC Charter Review Green Paper

In the Charter Review Green Paper: A Strong BBC, Independent of Government, published on 2 March 2005, the Government proposes that the BBC should have an additional public purpose – building digital Britain. This means helping to bring the benefits of digital services to all households and providing high quality content to drive

up take-up of those services. In particular, it means the BBC taking a leading role in the process of digital switchover in television.

In summary this means that the BBC will be asked to:

- Help to establish and manage SwitchCo, the organisation that will co-ordinate the technical process of switchover
- Play a leading role in the public information campaign that will tell consumers when and how the switch will happen, what choices of equipment they will have and how they can install it
- Help to establish and fund schemes to help the most vulnerable customers make the switch

Fuller details are available on the BBC Charter Review website
www.bbccharterreview.org.uk/have_your_say/green_paper/gp_changing_landscape.pdf

4. Digital Switchover and the Consumer

The needs and concerns of consumers are central to Government policy on digital switchover. The Government will ensure that for consumers, digital television means: choice, quality, affordability and accessibility across a range of services, digital platforms and equipment. Ultimately it is for individuals to decide how best to take advantage of digital television and to make informed choices.

4.1 Digital Television Consumer Expert Group

The Digital TV Consumer Expert Group announced by Lord McIntosh on 17 June 2003, was set up to clarify the criteria for switchover and to reflect them in ways which are measurable and meaningful and to advise on consumer issues. The Group's report *Persuasion or Compulsion? Consumers and analogue switch-off* was published on 11 October 2004.

The report concludes that consumers will not be ready for analogue switch off unless Government takes the lead in dealing with outstanding consumer concerns, including the cost of digital TV and the fact that 30% of households cannot get signals at the moment.

Key recommendations the Group made to Government include:

- Assisting low income households with the cost of converting to digital television, including the cost of replacing aerials and installation where necessary
- Developing a free-to-view digital satellite service, giving all households the option to switch to digital before the analogue signal is switched off
- Launching a public information campaign to improve the information that is available to consumers about the Government's analogue switch-off policy and the transition process

- Ensuring that the features and potential benefits of digital TV are accessible to all consumers, including disabled and older people

4.2 Ofcom Consumer Panel

In her Statement to the House of Commons on 22 July 2004, Tessa Jowell said that she had asked the Ofcom Consumer Panel consider what measures might be necessary to ensure that the needs of the most vulnerable consumers are protected, and to report to her later in 2004 with their advice. The Consumer Panel Report *Supporting the most vulnerable consumers through digital switchover* was published on 24 November and is available on www.ofcomconsumerpanel.org.uk. The Report took into account the findings of the Consumer Expert Group.

The main conclusion of the report is that help for vulnerable groups should focus on those who are socially isolated – who may have difficulty in finding out about switchover and understanding what it means and taking steps to deal with it. The report suggests that the balance should be on practical support; though financial barriers to digital conversion exist they are of secondary importance. It recommends that SwitchCo, the new body that will implement switchover, should work with the voluntary sector and local Government to develop a plan to help these people.

Consumer Advice

Whilst the final timetable and regional order for digital switchover has not yet been confirmed by Government, it will happen and there is an obligation to communicate the information that is known now, in particular to consumers who are buying a new television or video recorder today. Therefore the Government has been working with retailers and manufacturers to ensure that in-store information about digital switchover is impartial and accurate.

As part of this process, a digital switchover logo has been developed. This distinctive logo is designed to indicate sources of accurate, reliable and impartial information about digital switchover, and to indicate products and services that are designed to work through switchover. A licensing scheme for the logo has been established and the Government has encouraged retailers and manufacturers (of digital television equipment and certain aerials/coaxial cable) to apply to use the logo under licence. Under this scheme, users have to commit to using standardised materials, either in-store following training (in the case of retailers), or on products that meet certain standards (in the case of manufacturers).

Over 250 retail organisations (representing over 2300 retail outlets, covering both nationwide chains and small independent stores), 20 manufacturers (covering most major brands) and 7 manufacturers of certain aerials and/or coaxial cables had registered to use the logo by June 2005.

The Government has also been working on a public awareness campaign to help educate the media and the public about switchover.

4.3 Attitudes to Digital Television and Digital Switchover

Digital switchover will affect everyone in the UK, and we need to ensure that the process is as smooth and painless as possible for everyone. We need to understand what motivates consumers, to understand their needs and concerns so that they can be addressed, and to plan how best to communicate to consumers what switchover is and how it will affect them.

Therefore as part of the Digital Television Action Plan, the DTI commissioned a comprehensive study from the Generics Group, which led to the publication of three reports: Digital Television for All (see section 4.4), Attitudes to Digital Television, and Attitudes to Digital Switchover (all of which can be downloaded from www.digitaltelevision.gov.uk). The research was based around a postal questionnaire of 4000 households, focus groups, and in-depth interviews in 1500 households.

The research told us that

- People's attitudes to digital television are not only based on practical concerns such as cost and complexity, but more fundamental concerns about the quality of content on offer. Many peoples' views about digital television are based on how they feel about television itself.
- People's views about switchover are separate and distinct from their views on digital television. Although the transition is seen to be an inevitable technological advance, even people with an open mind towards digital television object to analogue being switched off.
- Announcing a switchover timetable will change people's attitudes towards digital television, and will have a major impact on their purchasing decisions.
- If switchover is to succeed, it will rely on people to be fully informed, fully engaged, and confident in their choices. And the industry must be ready to meet this opportunity.

Key findings included that even without switchover, by 2010 over 70% of households intend to go digital. With switchover, up to 95% of households intend to go digital – but 20% will only do so because they have to. Of the remaining 5% who ruled out ever converting to digital, at least half wanted to keep watching TV after switchover, but were deterred by perceived cost and complexity. People do not like the principle of switchover – they do not understand or accept why it is being imposed upon them, and why it is not being left to market forces alone.

The research told us that to achieve a smooth transition, we needed to address the relevance of digital TV in people's lives, explain why digital TV can mean better TV, and perhaps most importantly help people to understand and accept why analogue should be switched off, and why we believe digital switchover is worth striving for.

4.4 Usability and Accessibility

As part of our work to understand the "human aspects" of digital television, DTI commissioned the Generics Group to undertake research into the usability and accessibility of digital television equipment. The research, carried out from March-July

2003, took the form of extensive questionnaires, focus groups, usability audits of Digital Terrestrial Television equipment, and hands-on user trials of DTT equipment.

The report, "Digital Television for All" (available at www.digitaltelevision.gov.uk) showed that to many people DTT equipment is difficult to set up, install and use. Although the study concentrated primarily on DTT equipment, there remain common usability and accessibility issues for all Digital TV platforms – some relating to the use of set top boxes, and others due to the nature of the DTV platform. For example, a consumer who is unfamiliar with digital television or IT would find navigating and using menus and electronic programme guides difficult. Also, the addition of further equipment into the audiovisual installation creates complexity for the user, however user-friendly the interface might be. The report made recommendations to manufacturers, broadcasters and retailers on ways to improve the usability of digital television equipment and services to minimise potential exclusion.

Of particular note were the findings that around 2 million people would be unable to use today's DTT set-top boxes for simple everyday viewing. A further 700,000 people would be unable to use digital text and interactive services. This was seen to be a particularly important issue for the over 75 age group. According to the study, nearly 50% of those aged 75 and over would have great difficulty buying, installing and using a DTT set top box without help. Although this is based on DTT equipment, users of cable or satellite would face some similar issues to a greater or lesser degree (depending on the nature of the user interface and the individual equipment provided).

4.5 Accessibility for people with disabilities

Digital television brings improved access to television services for viewers with sensory impairments through the provision of subtitling, sign language and audio description.

Hearing impaired consumers can access subtitling and signing services on digital terrestrial television and on digital satellite television. The Communications Act 2003, and the subsequent Ofcom codes on accessibility (July 2004) extended the requirements to provide these services to many digital cable and satellite channels. On many digital products, subtitling can be selected by pressing a single key.

Visually impaired consumers are being supported through the introduction of audio description on a number of broadcasts that can be received on selected digital receivers. As well as the usual programme soundtrack, another is carried in the quiet periods in between speech to describe action on screen. This can greatly assist visually impaired people or others when not in sight of the TV to better understand the context of what is happening.

There are two methods of receiving audio description. The method used by Sky Digital (known as "broadcast mix") offers, as an additional selectable soundtrack, audio description narration pre-mixed with the programme's soundtrack. The audio description service is the soundtrack played to all users in the room when selected. To receive the service you use your EPG and on-screen menu to choose the audio description option. The method used by digital terrestrial television broadcasters (known as "receiver mix") is that the receiving equipment in the home mixes the original programme with a second sound channel which contains the audio description. This system also provides the

option of a headphone allowing an individual to listen on headphones whilst others can watch the programme without audio description. It is also possible to change the volume of both the original programme and the audio description soundtrack.

To receive audio description on digital terrestrial, you need to buy a set top box that can deliver the service. Currently there is only one on the market. Every digital satellite box incorporates audio description functionality. In addition to the audio description offered on the Sky channels, the BBC, Channel 4, ITV and Five have begun transmitting audio description on digital satellite. Cable operators are not yet providing any service. For advice on services contact the Royal National Institute of the Blind (RNIB) www.rnib.org.uk

Audio description is not available on all programmes and you need to refer to programme listings for details. For people with a sight problem there are programme listings in a range of formats, including Braille, CD, website.

4.6 Planning permission for satellite dishes

There are restrictions on where you can put a satellite dish on your home. For the majority of households this is not a problem, as the permitted development regulations allow a certain amount of flexibility that covers most circumstances. However, satellite reception relies on a clear line of sight from the satellite to the dish. If there are any local features (such as tall buildings or trees) in the way planning permission may be needed in order to put the dish where it can get reception.

Designated areas (such as conservation areas, national parks, and areas of outstanding natural beauty) have greater restrictions on permitted development. The main difference for homes in designated areas is that a satellite dish cannot be put on a wall or roof slope that faces the road. This means that in some places houses on one side of a street can have a satellite dish, and those on the other side cannot. In some cases it may be possible to install the dish somewhere other than the house itself, but this is only an option if there is a clear line of sight with the satellite; this may not always be available.

The Government believes that it is important for people to have a wide choice of digital television platform and/or service provider. In very rural and remote parts of the UK where it may not be possible to access digital terrestrial television services after switchover, digital satellite is the simplest option to ensure digital television coverage.

It is with that in mind that the Digital Television Action Plan included working closely with the Office of the Deputy Prime Minister, the Devolved Administrations and the Northern Ireland Office to explore the scope for relaxing the current permitted development rights for satellite dishes across the UK. The Government hopes to have new measures in place during 2005.

The Office of the Deputy Prime Minister Planning Portal (www.planningportal.gov.uk) or the Planning Department of your local authority can advise you on current permitted development rights. If you want more information about permitted development rights in

Scotland, Wales and Northern Ireland you should contact the Scottish Executive, the Welsh Assembly Government or the Northern Ireland Office.

4.7 Communal television systems

Communal television systems, where one aerial or dish serves a number of housing units and televisions in a building (or in some cases more than one building) will be affected by the switch to digital television. This includes systems in care homes, schools and other non-domestic settings. Research carried out by the Digital Television Group (DTG) indicates that the majority of communal television systems set up to carry analogue terrestrial transmissions will need some attention if they are to work with a digital signal.

The costs of ensuring that communal systems can deliver digital television services will vary according to the age, size and condition of the system and its cabling. In addition, communal aerial designs have variations in digital capability and consequently for costs. There are three options available:

- Installation of an Integrated Reception System (IRS) gives residents a choice of free or pay television services from terrestrial or satellite, or even both at the same time provided they have obtained the necessary receiving equipment. It allows tenants to swap from one to the other whenever they want with no impact on the infrastructure of the system. IRS can carry both FM and DAB radio as well as other services. IRS involves the complete replacement of the existing analogue system including cabling.
- Conversion of the existing analogue system to receive digital signals and relay them to individual homes. This will not give tenants the same choice of television service as IRS, or the same level of access to other information services. Nevertheless it does provide a reasonably inexpensive way of upgrading to digital as existing cabling can normally be reused.
- Installation of a cable-based solution, provided either by the digital cable networks or via DSL/broadband. Cable-based systems provide a similar range of benefits to IRS, but they do not include a free to air option for households who do not want to subscribe to pay services. If residents covered by a system do not all want pay services, this would need to be factored into discussions with providers.

Many landlords, following consultation with tenants, have already taken steps to upgrade existing systems. Research carried out by NOP World for DCMS and published on 4 February 2005, found that:

- 83% of social landlords have made plans or started to upgrade their TV reception systems to digital.
- 50% of local authorities and 47% of registered social landlords have started to upgrade their systems.
- nearly one in three landlords have already upgraded over 30% of their communal TV systems.

Further details are at;

http://www.digitaltelevision.gov.uk/press/2005/social_housing_survey.html

The Government's role is to provide clear, independent advice and give all the housing industry impartial help and guidance on preparing for digital switchover. We have established a Housing Sector Communications Group that brings together key Housing Bodies such as the National Housing Federation, the Chartered Institute of Housing, the Housing Corporation, the National Residential Landlords Federation as well as the Local Government Association, COSLA and representatives from the Welsh Assembly Government to work with key television industry representatives including the industry standards body for digital television, the Digital Television Group.

The Group is developing detailed guidance that will help landlords and those responsible for communal aerial systems to assess their needs and make the right choices. This will be published in the summer of 2005.

Appendix - Useful websites

(a selection of information sources, which is not intended to be a definitive list)

Government

Department for Culture, Media and Sport (DCMS)
<http://www.culture.gov.uk>

Department of Trade and Industry (DTI)
<http://www.dti.gov.uk>

The Government's Digital Switchover website
<http://www.digitaltelevision.gov.uk>

BBC Charter Review
<http://www.bbccharterreview.org.uk>

Communications Act
<http://www.communicationsact.gov.uk>

Office of the Deputy Prime Minister (ODPM)
<http://www.odpm.gov.uk>

Regulator

Office of Communications (Ofcom)
<http://www.ofcom.org.uk>

International

European Union
http://europa.eu.int/index_en.htm

Broadcasters and platform operators

BBC
<http://www.bbc.co.uk>

ITV
<http://www.itv.com>

Channel 4
<http://www.channel4.com>

Five
<http://www.five.tv>

S4C

<http://www.s4c.co.uk>

Teletext

<http://www.teletext.co.uk>

British Sky Broadcasting

<http://www.sky.com>

Freeview

<http://www.freeview.co.uk>

ntl:

<http://www.ntlhome.com>

Telewest

<http://www.telewest.co.uk>

Home choice

<http://www.homechoice.co.uk>

KIT (Kingston Communications)

<http://www.kcom.com>

Industry Groups and Trade Associations

Digital Television Group

<http://www.dtg.org.uk>

Intellect

<http://www.intellectuk.org>

Confederation of Aerial Industries

<http://www.cai.org.uk>

Consumer organisations

Royal National Institute of the Blind (RNIB)

<http://www.rnib.org.uk>

RNID

<http://www.rnid.org.uk>

Which? (formerly the Consumers' Association)

<http://www.which.co.uk>