

Report for Congress

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Digital Television: An Overview

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Summary

Digital television (DTV) is a new television service representing the most significant development in television technology since the advent of color television in the 1950s. DTV can provide sharper pictures, a wider screen, CD-quality sound, better color rendition, and other new services currently being developed. The nationwide deployment of digital television is a complex and multifaceted enterprise. A successful deployment requires: the development by content providers of compelling digital programming; the delivery of digital signals to consumers by broadcast television stations, as well as cable and satellite television systems; and the widespread purchase and adoption by consumers of digital television equipment.

Congress and the Federal Communications Commission (FCC) have set a target date of 2006 for broadcasters to cease broadcasting their analog signals and return their existing analog television spectrum licenses to be auctioned or used for other purposes. While the nation's transition to digital television is proceeding, most observers believe that widespread adoption of DTVs by consumers will not be achieved by 2006, and that television stations will continue to broadcast both analog and digital signals past the 2006 deadline. The key issue for Congress and the FCC is: what steps, if any, should be taken by government to further facilitate a timely, efficient, and equitable transition to digital television? To address this question, Congress and the FCC must confront a highly complex policy landscape, involving different industries, technologies, and interests, including: content providers, commercial and noncommercial television broadcasters, cable and satellite television providers, consumer electronics manufacturers and retailers, and consumers.

No major legislation was introduced into the 107th Congress directly related to digital television. However, Congressional committees continued to monitor the pace and progress of the digital transition. A number of options for Congressional action in the 108th Congress have been proposed. These include: mandating digital tuners; mandating cable and satellite carriage of digital signals; accelerating the vacating of analog television spectrum; legislating a process whereby interoperability standards and copyright protection technologies will be implemented; and extending, strengthening, and/or altering the transition deadlines. While stakeholders and the FCC are working to resolve some of these issues, pressure is building on the Congress to act as the DTV transition deadlines become closer.

This report will be updated as events warrant.

Contents

What is Digital Television?	1
Role of Congress and the FCC	1
Status of the DTV Buildout	8
Creation of Digital Programming	8
Delivery of Digital Signals	8
Consumer Purchase of DTV Products	10
Policy Issues	11
Digital “Must Carry” Debate	11
Mandating Digital Tuners	13
Copyright Protection Technology	14
Cable/DTV Interoperability Standards	17
Digital Conversion of Public Broadcasting Stations	19
Reclaiming the Analog TV Spectrum	20
Low Power TV	21
Fees for Ancillary or Supplemental Services	22
Public Interest Obligations of DTV Broadcasters	23
Tower Siting	24
Activities in the 107 th and 108 th Congress	24
Appendix – Legislation in the 107 th and 108 th Congress Related to Digital Television	27

List of Tables

Table 1. Digital Conversion Schedule for Television Stations	3
Table 2. Recent FCC Proceedings Related to Digital Television	7

Digital Television: An Overview

What is Digital Television?

Digital television (DTV) is a new television service representing the most significant development in television technology since the advent of color television in the 1950s. DTV can provide sharper pictures, a wider screen, CD-quality sound, better color rendition, multiple video programming or a single program of high definition television (HDTV), and other new services currently being developed. DTV can be HDTV, or the simultaneous transmission of multiple programs of standard definition television (SDTV), which is a lesser quality picture than HDTV but significantly better than today's television. Or, alternately, DTV could deliver as part of a multiple offering, some other service such as the distribution of text or data (for example, electronic newspapers or stock quotes) or even a high speed connection to the Internet.

There are three major components of DTV service that must be present in order for consumers to enjoy a fully realized "high definition" television viewing experience. *First*, digital programming must be available. Digital programming is content produced with digital cameras and other digital production equipment. Such equipment is distinct from what is currently used to produce conventional analog programming. *Second*, digital programming must be delivered to the consumer via a digital signal. Digital signals can be broadcast over the airwaves (requiring new transmission towers or DTV antennas on existing towers), transmitted by cable or satellite television technology, or delivered by a prerecorded source such as a digital video disc (DVD).¹ And *third*, consumers must have a digital television product capable of receiving the digital signal and displaying digital programming on their television screens. To receive digital broadcast signals, consumers can buy digital monitors accompanied with a set-top converter box (a digital tuner),² or alternatively, an integrated digital television with digital tuning capability already built in.

Role of Congress and the FCC

Congress and the Federal Communications Commission (FCC) have played major roles in the development of DTV. Starting in 1987, the FCC launched a decade-long series of proceedings exploring the potential and feasibility of a

¹ At present, commercially available DVD technology does not deliver digital high definition programming.

² Set-top converter boxes can also be used to enable conventional analog televisions to receive digital signals over the air. However, analog televisions hooked up to digital tuners cannot display high definition pictures.

transition from conventional analog televisions to advanced television systems. While the original term used to describe the new television system was high definition television (HDTV), the FCC used a broader term – advanced television (ATV) – referring to any television technology that provides improved audio and video quality. After it became clear that ATV would be using digital signal transmission, the FCC began (in 1995) to use the term DTV (synonymous with ATV) to describe the new service more accurately.

In December 1996, after lengthy debate between television manufacturers, broadcasters, and computer firms, the FCC adopted a standard for DTV signal transmission based on recommendations of the Advanced Television System Committee (ATSC).³ The ATSC standard allows for 18 different video formats, of which four have subsequently been adopted for commercial use.⁴

Meanwhile, the Telecommunications Act of 1996 (P.L. 104-104) provided that initial eligibility for any DTV licenses issued by the FCC should be limited to existing broadcasters. Broadcasters would be issued DTV licenses while at the same time retaining their existing analog licenses during the transition from analog to digital television. The Act provided that broadcasters must eventually return either their existing analog channel or the new digital channel. Also in the 104th Congress, a major debate took place over whether to direct the FCC to conduct auctions for the spectrum allocated for DTV. The FCC estimated the commercial value of the DTV spectrum to be between \$11 billion to \$70 billion. No legislation was enacted, however, and the FCC did not obtain the authority to auction the DTV licenses.

In 1997, the FCC adopted rules⁵ to implement the Telecommunications Act, and granted DTV licenses to some 1600 full power incumbent television broadcasters.⁶

³ *FCC Fourth Report and Order In the Matter of Advanced Television Systems and Their Impact on Existing Television Service*, MM Docket No. 87-268, FCC 96-493, released December 27, 1996.

⁴ Four video formats are being used commercially by U.S. television producers and manufacturers. These four formats are described by the number of lines they produce per each picture frame, and whether they use interlaced (i) or progressive (p) scanning techniques. These are: 480i and 480p (suitable for SDTV broadcasts), and 720p and 1080i (HDTV). The progressive scan video format is more compatible with PC displays, while the interlaced scan is more compatible with analog television receivers.

⁵ *FCC Fifth Report and Order In the Matter of Advanced Television Systems and Their Impact on Existing Television Service*, MM Docket No. 87-268, FCC 97-116, released April 21, 1997.

⁶ A provision in the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (P.L. 107-188, H.R. 3448, H.Rept. 107-481) addresses the digital conversion of full power television stations that received their analog licenses *after* the FCC allocated digital spectrum to existing analog stations in 1997. Section 531 requires the FCC to allot a digital channel to any requesting full-power television station that had an application pending for an analog television station construction permit as of October 24, 1991, and which had its application granted after April 3, 1997. Any station receiving digital spectrum under this provision is required to complete construction of its digital facility within 18 months,

(continued...)

The DTV licenses consist of 6 megahertz (MHz) of unused spectrum within the VHF and UHF frequency bands. Because DTV signals cannot be received through the existing analog television broadcasting system (known as NTSC⁷) the FCC decided to phase in DTV over a period of years, so that consumers would not have to immediately purchase new digital television sets or converters. Thus, broadcasters were given 6 MHz of new spectrum for digital signals, while retaining their existing 6 MHz for analog transmission so that they can simultaneously transmit NTSC and DTV signals to their broadcasting market areas.⁸ The simultaneous broadcasting (“simulcasting”) of the same programs in both digital and analog modes was intended to allow viewers who have not yet purchased DTV sets or converters to continue to receive television programming during the transition to DTV.

The ruling required television stations receiving the DTV licenses to build their DTV facilities according to a schedule determined by the size of their markets. Table 1 shows the time line established by the FCC for DTV conversion. The FCC can grant extensions to licensees unable to meet the schedule due to unforeseeable or uncontrollable circumstances, such as an inability to secure tower locations for new antennas.

Table 1. Digital Conversion Schedule for Television Stations

Stations	Conversion Deadline
affiliates of the four major networks in the top 10 markets. ⁹	May 1, 1999
affiliates in markets 11-30	November 1, 1999
rest of all commercial television stations in the smaller markets	May 1, 2002
noncommercial television stations	May 1, 2003

⁶ (...continued)

without the possibility of an extension. Stations are also prohibited from operating an analog signal on its designated digital channel. The bill’s conference report states that this provision will allow recent broadcast licensees to foster a digital audience during the transition period to digital television without having to terminate analog service, and that without this change, those stations would be denied the flexibility to operate an analog and a digital facility simultaneously in the near term, especially in major markets.

⁷ The National Television Systems Committee (NTSC) was the industry group that developed the currently used U.S. television standards. For a discussion of the difference between analog and digital signals, see CRS Report 96-401 SPR, *Telecommunications Signal Transmission: Analog vs. Digital*.

⁸ Using digital technology, the DTV frequencies can be placed in the vacant portion of the same spectrum band currently allocated for analog (NTSC) television without interfering with analog television broadcasts. For background information on radiofrequency spectrum, see CRS Report RL30829, *Radiofrequency Spectrum Management: Background, Status, and Current Issues*.

⁹ The top ten television markets (in terms of advertising revenue), in order, are New York, Los Angeles, Chicago, Philadelphia, San Francisco-Oakland, Boston, Dallas-Fort Worth, Washington DC, Atlanta, and Detroit.

The FCC set a target date of 2006 for broadcasters to cease broadcasting the analog signal and return their existing analog television spectrum licenses to be auctioned for other commercial purposes. During the 105th Congress, the Balanced Budget Act of 1997 (P.L. 105-33) made the 2006 reversion date statutory, providing that a “broadcast license that authorizes analog television service may not be renewed to authorize such service for a period that extends beyond December 31, 2006.” However, the Act requires the FCC to grant extensions for reclaiming the analog television licenses in the year 2006 from stations in television markets where any one of the following three conditions exist:

- if one or more of the television stations affiliated with the four national networks are not broadcasting a digital television signal;
- if digital-to-analog converter technology is not generally available in the market of the licensee; or
- if at least 15% of the television households in the market served by the station do not subscribe to a digital “multi-channel video programming distributor” (including cable or satellite services) and do not have digital TV sets or converters.

The FCC continues to monitor the status of the DTV conversion of both commercial and noncommercial broadcast stations. On October 11, 2001, FCC Chairman Michael Powell announced the creation of an FCC Digital Television (DTV) Task Force to review the ongoing transition to DTV, and to make recommendations on how to facilitate the transition and promote the rapid recovery of broadcast spectrum for other uses.

Ongoing DTV-related FCC activities and proceedings are presented in Table 2. The FCC is issuing periodic progress reports on the DTV buildout,¹⁰ and has the option of granting deadline extensions to broadcasters. On November 8, 2001, the FCC announced it would modify a number of its DTV transition rules, in order to facilitate and speed the DTV transition. The changes permit stations to initially build lower-powered (and less expensive) DTV facilities, while retaining their option to expand their coverage area as the digital transition progresses. Meanwhile, the FCC declined to issue a blanket extension of remaining DTV construction deadlines. However, the FCC will consider, in limited circumstances, individual requests for extensions due to financial hardship. Specifically:

Stations seeking an extension of time to construct DTV facilities on this basis must provide detailed evidence that the cost of meeting the minimum buildout requirements exceeds the station’s financial resources . . . a brief downturn in the economy or advertising revenues will not be considered a sufficient showing of financial hardship. Rather, the showing must reflect the particular station’s financial status over an economically significant period of time. In addition, the applicant must provide detailed evidence of its good

¹⁰ The most recent progress report is contained in: *Second Report and Order and Second Memorandum and Order*, MM Docket No. 00-39, August 9, 2002, FCC 02-230, 41 p.

faith efforts to met the deadline, including its efforts to obtain the necessary financing.¹¹

Approximately three-quarters of the 1,240 full-power commercial stations in the United States did not meet the May 1, 2002 conversion deadline.¹² Most have received six-month deadline extensions from the FCC. On May 16, 2002, the FCC adopted a Notice of Proposed Rulemaking (NPRM) which proposes increasingly severe sanctions every six months on stations who have not constructed digital facilities and do not demonstrate that their failure to do so was either unforeseeable, beyond their control, or due to legitimate financial hardship. Sanctions progress from admonishment, to issuance of a notice of apparent liability for forfeiture, to rescission of the station's DTV license.¹³

On August 8, 2002, the FCC announced actions intended to further encourage the roll-out of DTVs by the December 31, 2006 target completion date. Specifically, the FCC adopted a Second Report and Order and Second Memorandum Opinion and Order (FCC 02-230) which requires television receivers and receiving equipment (such as VCRs and DVD players/recorders) to include DTV reception capability (see section in this report, "Mandating Digital Tuners" for further details). Also on August 8, the FCC issued a Notice of Proposed Rulemaking (FCC 02-231) which explores whether the FCC can and should mandate copy protection technology for digital broadcast television (see section in this report, "Copyright Protection Technology" for further information). The FCC is planning to adopt additional major orders intended to hasten the DTV transition. One will address the carriage of DTV broadcast signals on cable and satellite TV systems. The other will address the issue of compatibility between cable systems and commercial electronics devices.¹⁴

On January 27, 2003, the FCC initiated its second periodic review of the DTV transition. The Notice of Proposed Rulemaking (FCC 03-8) seeks comment on a number of issues related to the DTV conversion.¹⁵ Included in the NPRM is the issue of how the FCC will determine whether 85% of American households have access to digital signals by 2006. The NPRM also reopens the issue of public interest obligations of DTV broadcasters.

Meanwhile, on September 18, 2002, the House Committee on Energy & Commerce released a "staff discussion draft" of a comprehensive DTV bill which would require the FCC to take actions necessary to advance the transition to digital

¹¹ FCC News Release, "FCC Acts to Expedite DTV Transition and Clarify DTV Buildout Rules, November 8, 2001.

¹² See: General Accounting Office, *Telecommunications: Many Broadcasters Will Not Meet May 2002 Digital Television Deadline*, GAO-02-466, April 2002.

¹³ See: [http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-222561A4.pdf]

¹⁴ *Communications Daily*, "Powell Readies Orders on Cable Compatibility and Carriage, August 13, 2002, pp. 2-3.

¹⁵ See: Notice of Proposed Rulemaking, *Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MB Docket No. 03-15, FCC 03-8, Jan. 27, 2003.

television service. Intended as a legislative starting point on the DTV debate, the draft bill would address the DTV transition from a number of different aspects. Specifically the draft bill would:

- require broadcasters to return their analog spectrum by December 31, 2006, regardless of whether 85% of households have the capability to receive digital signals;
- require cable operators, by July 1, 2005, to adhere to nationally accepted DTV/cable interoperability standards;
- eliminate FCC rules prohibiting cable operators from continuing to deploy set-top boxes with integrated security features;
- require all DTV products manufactured after January 1, 2006 to recognize a “broadcast flag” that would prevent unauthorized copying and distribution of digital content;
- prohibit, after July 1, 2005, the manufacture of DTV products with analog outputs;
- require consumer electronics manufacturers to meet the FCC’s phase-in plan for mandatory digital tuners;
- require network affiliates to pass through a network’s entire digital signal without degradation; and
- require labels that inform consumers if televisions are not capable of displaying digital or copy-protected content.

At the request of Representative Edward Markey, Ranking Minority Member of the House Subcommittee on Telecommunications and the Internet, the General Accounting Office (GAO) prepared a report on the digital transition entitled, *Additional Federal Efforts Could Help Advance Digital Television Transition*. Released in November 2002, the GAO report found that few consumers own digital television equipment, that many consumers are unaware of the DTV transition, and that cable and satellite carriage of DTV signals is limited. Concluding that it is unlikely that 85% of households will be able to receive DTV signals by December 2006, GAO recommended that the FCC: explore options to raise public awareness about the DTV transition; examine the costs and benefits of mandating that all new televisions be digital cable-ready; and examine the advantages and disadvantages of setting a fixed date for transferring must-carry rights from broadcasters’ analog signals to digital signals.¹⁶

¹⁶ General Accounting Office, *Additional Federal Efforts Could Help Advance Digital Television Transition*, GAO-03-7, November 2002, 52 p. Available at: [<http://www.gao.gov/new.items/d037.pdf>]

Table 2. Recent FCC Proceedings Related to Digital Television

In the matter of:	Type of Action	FCC and Docket Number
Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television (DTV tuners)	Second Report and Order and Second Memorandum Opinion and Order	FCC-02-230 ¹⁷ MM Docket No. 00-39 August 8, 2002
Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television	Memorandum Opinion and Order on Reconsideration	FCC-01-330 ¹⁸ MM Docket No. 00-39 November 15, 2001
Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television (includes FNPRM on digital tuners)	Report and Order and Further Notice of Proposed Rule Making (FNPRM)	FCC-01-24 ¹⁹ MM Docket No. 00-39 January 19, 2001
Carriage of Digital Television Broadcast Signals	First Report and Order and FNPRM	FCC-01-22 ²⁰ CS Docket No. 98-120 January 23, 2001
Commercial Availability of Navigation Devices	FNPRM and Declaratory Ruling	FCC-00-341 ²¹ CS Docket No. 97-80 September 18, 2000
Compatibility Between Cable Systems and Consumer Electronics Equipment	Report and Order	FCC-00-342 ²² PP Docket No. 00-67 September 15, 2000
Nondiscrimination in the Distribution of Interactive Television Services Over Cable	Notice of Inquiry	FCC-01-15 ²³ CS Docket No. 01-7 January 18, 2001
Remedial Steps for Failure to Comply With Digital Television Construction Schedule	Notice of Proposed Rulemaking	FCC-02-150 MM Docket No. 02-113 May 16, 2002 ²⁴
Digital Broadcast Copy Protection	Notice of Proposed Rulemaking	FCC-02-231 ²⁵ MB Docket No. 02-230

¹⁷ [http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-230A1.pdf]

¹⁸ [http://www.fcc.gov/Bureaus/Mass_Media/Orders/2001/fcc01330.pdf]

¹⁹ [http://www.fcc.gov/Bureaus/Mass_Media/Orders/2001/fcc01024.pdf]

²⁰ [<http://www.fcc.gov/Bureaus/Cable/Orders/2001/fcc01022.pdf>]

²¹ [http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-00-341A1.pdf]

²² [<http://www.fcc.gov/Bureaus/OPP/Orders/2000/fcc00342.pdf>]

²³ [<http://www.fcc.gov/Bureaus/Cable/Notices/2001/fcc01015.pdf>]

²⁴ [http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-150A1.pdf]

²⁵ [http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-231A1.pdf]

Status of the DTV Buildout

The nationwide buildout of digital television is a complex and multifaceted enterprise. A successful buildout requires: the development by content providers of compelling digital programming; the delivery of digital signals to consumers by broadcast television stations, as well as cable and satellite television systems; and the widespread purchase and adoption by consumers of digital television equipment.

Creation of Digital Programming. Digital programming is created with digital cameras and other digital production equipment. Digital content tends to favor more “visual” types of programming – such as sports events or movies – which take full advantage of the high-definition viewing experience. Currently, the amount of available digital programming is limited, but gradually becoming more widespread. Among broadcast networks, CBS produces the largest amount, with digital high-definition broadcasts available in all of its prime time scripted entertainment series, as well as many of its national sports broadcasts. ABC is offering HDTV broadcasts in nearly all of its prime time schedule and in some of its sports broadcasts. PBS has also been active, producing digital programming as well as offering multicasts over digital channels in some local markets. NBC and FOX are starting to offer digital programming as well (although not necessarily in high definition), and a number of local television stations have begun offering their evening news in a high definition format. Among cable networks, HBO currently offers the most amount of digital programming. Other cable networks producing digital programming include Showtime, A&E, Discovery, and Madison Square Garden.²⁶

Two factors generally inhibit content providers from accelerating the production of digital programming. First, because relatively few households have digital televisions, networks have a diminished incentive to invest the money to produce digital content. Much digital programming is being produced by networks in sponsorship/partnership with consumer electronics companies who manufacture digital televisions. Second, content providers (e.g. networks and movie studios) are reluctant to provide digital programming until a digital copyright standard is in place (see discussion below, under “Issues”).

Delivery of Digital Signals. Currently, there are three ways digital programming is being delivered to consumers. Digital signals are: 1) broadcast over the airwaves; 2) transmitted over a few channels provided by satellite television systems; and 3) provided via digital cable service in a limited number of markets.

Broadcasting. According to the National Association of Broadcasters (NAB), as of April 16, 2003, there were 821 stations (both commercial and public) broadcasting digital signals in 187 markets.²⁷ This represents over 50% of the nation’s approximately 1600 television stations. On the other hand, the 187 markets currently receiving digital transmissions cover about 97.5% of U.S. TV households. Television stations must construct new facilities and purchase new equipment in

²⁶ Cable & Telecommunications Overview, 2001, June 2001, National Cable Television Association.

²⁷ For latest statistics, see: [<http://www.nab.org/newsroom/issues/digitaltv/dtvstations.asp>]

order to transmit digital signals. According to NAB, costs range from \$8-10 million to fully convert a station to digital operation.²⁸ As of March 12, 2003, the FCC has granted a construction permit or license to 1578 stations, about 93% of the total number of DTV allotments.²⁹

Approximately three-quarters of the 1,240 full-power commercial stations did not meet the May 1, 2002 conversion deadline. A total of 843 commercial stations have requested from the FCC an extension of the May 2002 deadline in order to complete construction of their DTV facilities. So far, 772 have been granted and 71 have been admonished. Of those stations admonished, 54 have commenced DTV operation as of January 7, 2003. Of those stations granted extensions, 601 filed requests for second extensions. Of this number, 457 extension requests have been granted, 64 have been dismissed, and the rest remain pending.³⁰

Satellite. There are two direct broadcast satellite (DBS) television services available in the United States: Echostar's DISH Network and Hughes' DirecTV. Both offer a few channels of HDTV programming. To date, DirecTV has a channel of HBO, Showtime, and HDNet (sports, movies, concerts) in HDTV format. The DISH Network currently has three existing HDTV offerings: HBO, Showtime, and Discovery HD. Neither service offers local digital broadcast channels in any market.³¹ Satellite TV customers need added equipment (a slightly bigger satellite dish and either a set-top box or built-in satellite HDTV reception capability) in order to receive high-definition programming on their digital televisions.

Cable. With some exceptions, most cable franchises do not currently offer high-definition (digital) programming to subscribers.³² Cable companies have been reluctant to carry channels of digital programming (thereby displacing some existing channel offerings) until more consumers have the digital television equipment necessary to view digital programming (see discussion of "must carry" below). Also there are copyright, standards, and interoperability issues between the cable system and DTV sets that must be resolved (see "copyright and standards" below).

²⁸ Testimony of Ben Tucker, Chairman of NAB Television Board, in: U.S. Congress, House, "Digital Television: A Private Sector Perspective on the Transition," Hearing Before the Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet, March 15, 2001, 107th Cong., 1st Sess., p. 72.

²⁹ NPRM, *Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, p. 5.

³⁰ See: [<http://www.fcc.gov/mb/video/files/dtvsum.html>]

³¹ GAO, *Additional Federal Efforts Could Help Advance Digital Television Transition*, p. 23.

³² Many cable (and both DBS commercial services) are "digital." However, "digital cable" generally refers to technology which converts analog programming to a digital signal which is transmitted to the consumer and then converted back to analog form for television viewing. "Digital cable" allows cable companies to provide more channels, as well as high speed (broadband) Internet service. However, the "digital" signals transmitted over cable systems use different digital standards than the DTV standard used by broadcasters and current DTV sets; therefore current digital cable services currently cannot be directly received by DTV sets.

The reluctance of cable companies to carry digital programming is beginning to change, however, as cable providers in several markets have announced plans to carry digital or high-definition channels. On May 1, 2002, the nation's top ten cable companies pledged to implement FCC Chairman Powell's voluntary plan, which calls on cable operators to carry digital signals of up to five broadcast or other digital programming services by January 1, 2003.³³

Consumer Purchase of DTV Products. DTV products are now available from several manufacturers that offer varying features and technical characteristics. Currently, most consumers who purchase DTV products are purchasing digital television monitors, available at prices ranging from about \$1000 to \$3500, depending on screen size and other features. Digital monitors are primarily being used by consumers to watch DVDs,³⁴ regular analog television, and digital programming over a satellite television system. A digital monitor must be coupled with a set-top digital receiver or tuner (costing \$500 to \$600) in order to receive digital broadcast signals.³⁵ An integrated DTV, which contains a built-in digital tuner, is sold at prices ranging from \$3000 to \$12,000.³⁶ Over the past two years, prices for DTV monitors and receivers have dropped by 50%. As the market for DTVs expands, prices are expected to decrease further.³⁷

According to the Consumer Electronics Association (CEA), DTV sales (from suppliers to retail outlets) totaled 2.5 million units in 2002, about a 73% increase over the amount sold in 2001. The 2002 sales bring the total number of DTV products sold since 1998 to just under 5 million. Of this number, approximately 575,000 integrated sets and set-top decoders (digital tuners) have been sold. CEA estimates that 11.5% of DTV monitors and sets sold since introduction are capable of receiving, decoding, and displaying a digital signal either on their own or partnered with a set-top box. While growth has occurred, the penetration of DTVs into the American home remains small, with between 4 and 5% of the 110 million American households having DTVs (mostly monitors), and less than 1% having the ability to

³³ McConnell, Bill, "Cable Takes the High-Def High Road," *Broadcasting & Cable*, May 6, 2002, pp. 54-60.

³⁴ Commercially available DVD technology does not yet support digital programming. However, current DVDs viewed over a DTV provide a significantly higher quality picture than DVDs viewed over regular analog televisions.

³⁵ Many consumers are asking whether their current analog TV sets will become obsolete with the advent of DTV. Consumers can continue to use analog TV sets until the broadcasters return the analog TV licenses to the FCC, after which, a set-top digital converter box could be used to enable the analog TV set to receive the DTV signal. Digital converters, however, will only enable the display of pictures comparable in quality to existing sets. They will not provide HDTV-quality images, or other new services that may come with DTV.

³⁶ "Super-size Your Set," *Consumer Reports*, March 2001, p. 16.

³⁷ Testimony of David Arlin, Thomson Multimedia Inc. on behalf of the Consumer Electronics Association, in: U.S. Congress, House, "Digital Television: A Private Sector Perspective on the Transition," Hearing Before the Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet, March 15, 2001, 107th Cong., 1st Sess., p. 47.

receive digital signals. The CEA predicts continuing expansion of DTV sales, with projections of over 30 million DTVs sold to retailers between 2001 and 2006.³⁸

Policy Issues

While the nation's transition to digital television is proceeding, industry analysts believe that widespread adoption of DTVs by consumers will not be achieved by 2006, and that television stations will continue to broadcast both analog and digital signals past the 2006 deadline. The key issue for Congress and the FCC is: what steps, if any, should be taken by government to further facilitate a timely, efficient, and equitable transition to digital television? To address this question, Congress and the FCC must confront a highly complex policy landscape, involving different industries, technologies, and interests, including: content providers, commercial and noncommercial television broadcasters, cable and satellite television providers, consumer electronics manufacturers and retailers, and consumers.

Currently the three critical components of the digital transition – programming and content, delivery of a digital signal, and consumer purchase of DTVs – appear to be lagging and hindered by what many describe as a “chicken or egg” dynamic. Most consumers are reluctant to buy DTVs until there is more high quality digital programming to watch. Content providers have a diminished incentive to create digital programming until a larger number of consumers are capable of receiving digital television service. And television service providers (especially cable and satellite) have little incentive to provide digital programming until more consumers have DTVs and content providers supply more digital programming.

Broadcasters are currently under a statutory mandate to convert, with the expectation that the presence of digital broadcast signals will provide sufficient market incentives for other stakeholders to go digital. Much of the policy debate revolves around the question of whether this strategy will yield a timely, efficient, and equitable digital transition. If not, should conversion deadlines be extended, or should additional government mandates – such as digital “must carry” or digital tuners – be placed on other stakeholders in order to accelerate the pace of the transition? Conversely, would further government intervention in the digital transition produce undesirable market distortions? The following discusses a number of specific policy issues related to the transition to digital television.

Digital “Must Carry” Debate. Responding to the debate between the broadcast and cable industries over whether cable TV providers should be required to transmit DTV programming, in July 1998 the FCC initiated a proceeding on the matter.³⁹ Under the “must carry” provisions of the Cable Television Consumer Protection and Competition Act of 1992, cable TV providers are required to transmit local analog programs to their customers. This decision was based on the reasoning

³⁸ Consumer Electronics Association, Press Release, “CEA Releases Final 2001 DTV Sales Figures,” January 17, 2002, available at: [http://ce.org/market_overview/market_overview_newsroom.asp?area=21]

³⁹ *FCC Notice of Proposed Rule Making on Carriage of Transmissions of Digital Television Broadcast Stations*, CS Docket No. 98-120, released July 10, 1998.

that since cable TV has a predominant position in the market, “without mandatory carriage provisions, the economic viability of local broadcast television and its ability to produce quality local programming would be jeopardized.”⁴⁰

The broadcasters (primarily the smaller networks and independent stations, represented by the Association of Local Television Stations, but also the National Association of Broadcasters) believe that the same principles and conclusions of the 1992 Act should apply to DTV services, leading to mandatory carriage of the DTV programming by cable operators. Broadcasters argue that because most Americans (about 65%) receive their TV via cable, the carriage of DTV programming by cable providers is essential for consumers to purchase DTV receivers.

The cable companies (led by the National Cable Television Association, NCTA) oppose any “must carry” requirements for cable operator carriage of DTV programming, arguing that it would be an unlawful taking of their property, and that they should be able to decide what content they provide on their own networks. NCTA points out that, unlike the broadcasters who were given free spectrum licenses for DTV, cable operators must build their own infrastructure to be able to transmit DTV signals. Cable operators say they will carry broadcasters’ DTV programming as soon as consumer demand warrants it. Cable television services provide a finite number of channels to consumers, and any mandate to provide DTV programming would require cable companies to remove other non-broadcast channels. Many cable operators are investing in the upgrades needed to provide DTV, although the video transmission standards adopted by cable operators may not be the same as those used by the broadcasters. This could mean that different home equipment may be necessary for cable services than for over-the-air TV reception. In addition, HDTV programming will require cable operators to build a more robust transmission (i.e., greater bandwidth) capability than is required by SDTV, and some cable operators may want to offer SDTV but not HDTV services. The cable industry also contends that mandating carriage of all DTV broadcast transmissions will financially devastate many smaller cable operators.

On January 22, 2001, the FCC announced its adoption of rules for cable carriage of digital TV signals. Most notably, the FCC ruling does **not** require cable systems to simultaneously carry both the analog and digital signals (“dual carriage”) of local TV stations. The FCC tentatively concluded that “such a requirement appears to burden cable operators’ First Amendment interests more than is necessary to further a substantial governmental interest.”⁴¹ A Further Notice of Proposed Rulemaking (FNPRM) will continue to collect public comment and investigate this issue.⁴²

While not approving a dual carriage mandate, the FCC did rule that a digital-only TV station, whether commercial or non-commercial, can immediately assert its

⁴⁰ *Ibid.*, p. 5. Satellite television is also subject to must carry requirements. See CRS Report RS20425, *Satellite Television: Provisions of the Satellite Home Viewer Improvement Act and the Launching Our Communities Access to Local Television Act, and Continuing Issues*, by Marcia S. Smith.

⁴¹ See: [http://www.fcc.gov/Bureaus/Cable/News_Releases/2001/nrcb0103.html]

⁴² *Federal Register*, March 26, 2001 (Volume 66, Number 58), pp. 16523-16532.

right to carriage on a local cable system. Additionally, a TV station that returns its analog spectrum and converts to digital operations must be carried by local cable systems. Cable systems must carry “primary video,” defined as a “single programming stream and other program-related content.” The FNPRM will define the scope of “program-related content.”

The House Energy & Commerce Committees staff discussion draft would prohibit any obligation of cable operators to simultaneously carry both the analog and digital signals of the same broadcast (i.e. “dual must-carry”). However, the draft bill contains a blank section 7 (marked “to be supplied”) which will address the applicability of must-carry requirements to digital multi casting. Digital multi casting refers to the ability of broadcasters to divide their 6 MHz of digital spectrum into separate and discrete streams of content. Thus, for example, a broadcaster could transmit alternate channels of programming, data, or interactive services in addition to its primary video broadcast. At issue is whether cable operators should be required to carry any or all multicasted channels transmitted by broadcasters as part of their 6 MHz digital allotment.

Mandating Digital Tuners. Currently, less than one percent of American households have purchased DTVs equipped or accompanied with digital tuners that can receive digital broadcast signals. Some groups (for example, broadcasters) advocate a government mandate that would require new televisions to contain built-in digital tuners.

A study conducted by Arthur D. Little (and commissioned by the National Association of Broadcasters and the Association of Maximum Service Television) estimates that DTV set penetration would reach 75.5% by 2006, if the FCC were to mandate that all new sets sold after January 1, 2004 have DTV reception capability. Supporters of a mandate argue that requiring digital tuners would ensure a quicker penetration of DTVs into American households, thereby giving digital content providers and distributors greater incentive to produce and transmit digital content.

Consumer electronics manufacturers and many consumer advocates oppose a digital tuner mandate, arguing that it would raise prices of television sets beyond the means of many consumers.⁴³ Opponents also dispute whether a digital tuner mandate would effectively hasten the DTV transition, since most households currently receive their primary television service via cable or satellite and therefore may not require an over-the-air digital reception capability. Finally, they argue that a digital tuner mandate would constitute an inappropriate, unnecessary, and counterproductive government intervention into an increasingly dynamic digital television marketplace.

On August 8, 2002, the FCC adopted a phase-in plan requiring most new television sets to contain digital tuners by 2007. Specifically, the FCC’s Second Report and Order and Second Memorandum Opinion and Order (FCC 02-230) requires all television sets with screen sizes of at least 13 inches, and all television

⁴³ Estimated at an initial cost of \$200 per set (see: April 6, 2001 Comments of the CEA to the FCC, MM Docket No. 00-39). This figure is disputed by broadcasters (see: May 7, 2001 Comments of NAB/MSTV/ALTV to the FCC, MM Docket No. 00-39).

receiving equipment (such as video cassette recorders and DVD players/recorders to include DTV reception capability according to the following schedule:

Receivers with screen sizes 36 inches and above -- 50% of a responsible party's units must include DTV tuners effective July 1, 2004; 100% of such units must include DTV tuners effective July 1, 2005.

Receivers with screen sizes 25 to 35 inches -- 50% of a responsible party's units must include DTV tuners effective July 1, 2005; 100% of such units must include DTV tuners effective July 1, 2006.

Receivers with screen sizes 13 to 24 inches -- 100% of all such units must include DTV tuners effective July 1, 2007.

TV Interface Devices VCRs and DVD players/recorders, etc. that receive broadcast television signals -- 100% of all such units must include DTV tuners effective July 1, 2007.

The FCC's phase-in plan is strongly opposed by the Consumer Electronics Association (CEA), consumer groups, and antitax groups. The CEA, citing the "scant percentage of households relying on over-the-air television reception" argues that the mandate is a "multi-billion dollar TV tax on American consumers," and calls instead for an FCC mandate on cable-DTV compatibility standards.⁴⁴ This position is countered by the National Association of Broadcasters, who argue that the mandate is necessary to hasten the DTV transition and ensure the survival of free over-the-air broadcasting, which NAB says is currently received by roughly one third of all TV sets in use. NAB also argues that some consumer electronics companies, such as Zenith and Thomson, support phased-in integration of digital tuners.⁴⁵ The House Energy & Commerce Committee's staff discussion draft would affirm the FCC's phase-in plan for digital tuners. Conversely, the TV Consumer Choice Act of 2003 (H.R. 426), introduced by Rep. James Sensenbrenner on January 28, 2003, would prohibit the FCC from requiring digital television tuners.

Meanwhile, the recent agreement between the consumer electronics and cable industries on a cable-DTV interoperability standard could impact the CEA's view of the digital tuner mandate. If the agreement is approved by the FCC, the circuitry enabling "plug and play" compatibility between digital televisions and cable systems could be modified to receive digital over-the-air signals at an incremental cost. Under this scenario, it is possible the CEA could reassess its opposition to the digital tuner mandate.⁴⁶

Copyright Protection Technology. Many content providers (e.g. movie studios and broadcast networks) are reluctant to provide high quality digital content to DTV owners until they are assured that interoperability standards and technology

⁴⁴ Consumer Electronics Association, *Americans Should Not Be Forced to Buy DTV Over-the-Air Tuners Says CEA*, Press release, August 8, 2002, available at: [http://www.ce.org/press_room/press_release_detail.asp?id=10012]

⁴⁵ National Association of Broadcasters, *Fact Vs. Myth: The DTV Tuner Integration Debate*, available at: [<http://www.nab.org/Newsroom/Issues/digitaltv/REBUTTAL080702.pdf>]

⁴⁶ Clark, Drew, "Electronics Group Shows Flexibility on Digital TV Issue," *National Journal's Technology Daily*, January 27, 2003.

licensing agreements are in place to prevent consumers from making unauthorized copies and Internet transmissions of digital content. In 1998, five consumer electronics manufacturing companies – Hitachi, Intel, Matsushita, Sony, and Toshiba – formed an entity called the Digital Transmission Licensing Administrator (DTLA, also known as “5C”) to license a jointly developed Digital Transmission Content Protection (DTCP) technology. DTCP is designed to protect audiovisual and audio content against unauthorized interception or retransmission in the digital home environment.

On July 17, 2001, two major studios – Warner Bros. and Sony Pictures Entertainment – announced a licensing agreement to adopt DTCP. The agreement is designed to permit the studios to protect prerecorded media, pay-per-view, and video-on-demand transmissions against unauthorized copying, and to protect all content against unauthorized Internet retransmission, while assuring consumers’ ability to continue customary home recording of broadcast and subscription programming.⁴⁷

Broadcast Flag. While DTCP protects content delivered to the home via cable or satellite, the technology does not protect over-the-air broadcast content. Other major studios have been reluctant to sign licensing agreements with DTLA until broadcast content can also be protected. Additionally, broadcast networks (ABC, CBS, and Fox) have opposed the 5C standard, arguing that the technology’s inability to encrypt over-the-air broadcasts will cause high quality content to migrate toward cable and satellite exclusively. A week after the 5C agreement with Sony Pictures and Warner Bros. was announced, the five other major studios (Disney, Paramount, Fox, Universal, and MGM) submitted a proposal to DTLA which would require digital broadcast content to be encrypted with a “broadcast flag” preventing Internet distribution or retransmission of digital content broadcast over-the-air. On June 3, 2002, a group of engineers from the motion picture and technology industries⁴⁸ released a detailed “broadcast flag” proposal. While the proposal is strongly supported by the content industry, the technology industry remains divided, with some companies supporting and others opposing this particular proposal. Some consumer groups have also expressed opposition.

Those supporting a broadcast flag (such as the Motion Picture Association of America and other content providers) argue that the protections against piracy offered by a broadcast flag are crucial to ensure that content providers to make high-value programming available over the digital airwaves. Supporters also argue that a broadcast flag will not prevent consumers from making physical copies of DTV programs, or from distributing such copies within a person’s home digital network. Opponents of a broadcast flag (many consumer electronics and high tech companies, as well as consumer groups) assert that because electronic devices will have to be meet certain specifications in order to process the broadcast flag, the innovation and

⁴⁷ DTLA Press Release, “DTLA, Sony Pictures Entertainment and Warner Bros. Announce First Studio Licenses for Digital Home Network Technology,” July 17, 2001, see: [http://www.dtcp.com/data/press/DTCP_PRESS_010717.pdf]

⁴⁸ The Broadcast Protection Discussion Group (BPDG), a subgroup of the Copy Protection Technical Working Group (CPTWG).

functionality of consumer electronics equipment will be adversely affected. Additionally, they argue, because the broadcast flag would effectively ban any retransmission not approved by content providers, legitimate consumer rights (e.g. “Fair Use”) would be compromised .

At the behest of House Committee on Energy & Commerce Chairman Tauzin, continuing negotiations between the interested parties are ongoing. However, agreement on the use and implementation of a “broadcast flag” has not been reached among industry groups. On August 9, 2002, the FCC issued a notice of proposed rulemaking (FCC 02-231, MB Docket 02-230) in the matter of digital broadcast copy protection. Noting that the lack of digital broadcast copy protection is a significant impediment to the DTV transition, the FCC solicited public comment on whether the FCC can and should mandate the use of a copy protection mechanism for digital broadcast television. The comment period closed on February 18, 2003; over 6000 comments were received, most from individual citizens. FCC staff is reviewing comments and will develop recommendations for FCC consideration.

The House Energy & Commerce Committee staff discussion draft would direct the FCC to require that, by January 1, 2006, all digital devices capable of receiving a digital signal shall recognize the use of a broadcast flag in order to prevent the unauthorized redistribution of digitally broadcast content to the public over the Internet. The draft language would require content protection regulations while also protecting, to the maximum extent possible, “the full functionality to consumers of equipment manufactured before January 1, 2006.” Additionally, the use of a broadcast flag for news and public affairs programs would be prohibited.

On March 6, 2003, the House Judiciary Committee, Subcommittee on Courts, the Internet, and Intellectual Property, held a hearing on “Copyright Piracy Prevention and the Broadcast Flag.”

Analog Hole. Another copyright protection issue of concern to content providers is what’s commonly referred to as the “analog hole.” In the foreseeable future, many consumers will continue to use analog televisions. In order to display the content carried by digital signals, analog televisions will be equipped with a digital tuner (a set-top box) which converts the signal from digital to analog. At this point, the digital signal, even if content protected, is converted into an unprotected analog form which could then be easily converted into a similarly unprotected digital form subject to the unauthorized copying and Internet transmission the content providers are seeking to prevent. Accepted copyright protection technologies to “plug” the “analog hole” have not yet been developed, and will likely require further technology development and negotiation involving the content providers and consumer electronics manufacturers. The House Energy & Commerce Committee staff discussion draft would address the “analog hole” issue by providing for the termination of the manufacture of equipment that has analog outputs by July 1, 2005. Some testimony at the September 25 hearing criticized this draft provision, arguing that it would ban the manufacture of digital/audio converter boxes, thus making

existing analog televisions, VCRs, and other equipment unusable after the digital transition.⁴⁹

Cable/DTV Interoperability Standards. Interoperability standards between digital televisions and cable systems are necessary in order for consumers to be able to watch digital programming over their cable systems. Currently, interoperability is achieved via the proprietary set-top box leased to the subscriber by the local cable company. Given the absence of a national interoperability standard, consumers are, at present, unable to purchase DTV products from consumer electronics stores which can be directly connected to cable systems without the use of a set-top box. Two separate entities – the consumer electronics industry (including manufacturers and retailers) and the cable system operators – have embarked on an often contentious process of determining the specific technical details of how DTV devices might achieve nation-wide compatibility and interoperability with cable systems.

Section 304 of the Telecommunications Act of 1996 directed the FCC to adopt regulations to assure the commercial consumer availability of “navigation devices” (i.e. set-top boxes, remote control units) without jeopardizing the rights of a cable provider to protect its signal from theft. Currently, proprietary set-top boxes are “integrated” with two overall functions: security and navigation (i.e. allowing the subscriber to flip from channel to channel). A 1998 order adopted by the FCC (FCC 98-116) requires the cable operators to separate the security functions from non-security functions and to make available (by July 1, 2000) modular security components to the consumer electronics industry.⁵⁰ Allowing time for transition, the FCC would prohibit the sale or lease of new “integrated” boxes as of January 1, 2005.

On February 22, 2000, the Consumer Electronics Association (CEA) and the National Cable Television Association (NCTA) announced a voluntary agreement on a set of technical requirements that permit the direct connection of digital television receivers to cable television systems. In January 2002, CableLabs (a research organization of the cable industry) published specifications for the OpenCable Applications Platform (OCAP), which would serve as a uniform interoperability cable/DTV standard. However, consumer electronics manufacturers and retailers and the cable industry sharply disagree over the pace and specific technical details (including copy protection requirements) of how interoperability should be implemented.

⁴⁹ Testimony of Gene Kimmelman, Senior Director of Public Policy, Consumers Union, before the House Subcommittee on Telecommunications and the Internet, September 25, 2002.

⁵⁰ Also referred to as a Point of Deployment or “POD” module, this would consist of a smart card that could be inserted into the consumer electronics device to provide the security required by the cable operator. A “national security interface” is required to ensure that POD modules from all the different local cable operators would satisfactorily operate in every device. To manufacture a “POD reliant” device, the manufacturer must sign a POD-Host Interface License Agreement (“PHILA”).

Disagreement over DTV/cable interoperability continues was prominently aired during the September 25, 2002 House Energy & Commerce Committee hearings on the digital transition. NCTA argued that proprietary set-top boxes already allow a seamless DTV/cable interoperability, that there are, therefore, no compatibility problems between DTVs and cable systems, and that consumers' inability to purchase cable-ready DTVs or set-top boxes from consumer electronics stores is not a critical component of the digital transition. However, regardless of digital transition issues, the cable industry said it supports the retail availability of cable-ready DTV products because it is in its own business interest to do so.⁵¹ NCTA added that it has developed the required interoperability standards, and is further advocating a "DVI connector" on all integrated DTV sets, which would allow consumers to upgrade and receive advanced interactive services from their cable or satellite provider.⁵²

An opposing view was expressed at the hearings by consumer electronics manufacturers and retailers. A spokesperson for the Consumer Electronics Retailers Coalition (CERC) argued that interoperability standards will be ineffective unless and until the cable industry's own proprietary equipment relies on and supports those same standards. Without that reliance and support, they argued, interoperable DTV devices manufactured by the consumer electronics industry cannot be competitive (in terms of cost or functionality) with the cable industry's proprietary equipment.⁵³ Additionally, testimony from a consumer electronics manufacturer stated opposition to a mandated and ungradable connector on all DTVs, arguing that this equipment is likely not needed on small and mid-size televisions, and that making such connectors compatible with future digital technologies is a "daunting, if not impossible, task."⁵⁴

The FCC will address the cable-DTV interoperability issue in a forthcoming Second Report and Order in conjunction with its ongoing proceeding on Commercial Availability of Navigation Devices (CS Docket No. 97-80). As part of this proceeding, the cable and consumer electronics industries conducted extensive negotiations over interoperability standards for possible adoption by the FCC. On December 19, 2002, the cable and consumer electronics industries announced they had reached an agreement on a cable compatibility standard for an integrated, unidirectional digital cable television receiver.

⁵¹ Subscribers of satellite TV ("DBS," the primary competitor to cable) can use the same equipment anywhere in the country. This "portability" gives DBS a marketing advantage over cable.

⁵² Testimony of Michael Wilner, Vice Chairman and CEO, Insight Communications, and Chairman, NCTA, before the House Subcommittee on Telecommunications and the Internet, September 25, 2002.

⁵³ Testimony of Alan McCullough, Chairman, President & CEO, Circuit City Stores, Inc., representing CERC, before the House Subcommittee on Telecommunications and the Internet, September 25, 2002.

⁵⁴ Testimony of Richard M. Lewis, Chief Technology Officer, Zenith Electronics Corporation, before the House Subcommittee on Telecommunications and the Internet, September 25, 2002.

The two industry groups filed a Memorandum of Understanding (MOU) with the FCC, outlining the agreement. According to the MOU, the industries will continue to negotiate a “bidirectional” standard that would enable consumers to receive advanced services (such as video on demand) without the need for an external navigation device. On January 7, 2003, the FCC issued a Further Notice of Proposed Rulemaking (FCC 03-3) which seeks comment on the MOU and proposed FCC rules which would be necessary to implement the industry agreement. Opposition to the agreement’s “encoding rules” has been expressed by several organizations, including the Motion Picture Association of America, makers of personal video recording technology (TiVo), and consumer groups.

Digital Conversion of Public Broadcasting Stations. The FCC has set a deadline of May 1, 2003 for public television stations to convert to digital. Public television consists of 176 licensees operating 357 stations nationwide. According to the Association of America’s Public Television Stations (APTS), as of April 2003, 121 public television stations were offering digital broadcast services, covering 63% of all U.S. households.⁵⁵ As of March 12, 2003, 192 stations have requested an extension of the May 1, 2003 deadline.

Raising money for the digital conversion is a challenge for many public television stations, especially those in small markets. According to APTS, the total nationwide cost of conversion is \$1.7 billion. State governments and local communities have provided most of the funding to date, about \$771 million, while the federal government has provided \$158 million.⁵⁶ Public broadcasters are seeking a substantial federal contribution (\$699 million over five years) for digital conversion. This funding would be used to pay for the new equipment and physical infrastructure required for digital conversion (e.g. transmitters, translators, and production equipment). Public stations are seeking this funding from the Public Telecommunications Facilities Program (PTFP), a grant program administered by the National Telecommunications and Information Administration (NTIA) at the Department of Commerce.

The PTFP, which has provided matching grants for public broadcasting equipment for over 35 years, has already begun funding digital conversion, awarding \$15.7 million for 44 television projects in FY1999, \$18 million for digital television transition for 31 projects in FY2000, and \$35 million for 52 digital conversion projects in FY2001. Funding for digital conversion represented 83% of the total FY2001 PTFP grant awards (which includes funding other equipment needs not related to digital conversion).

For FY2002, the Administration requested \$43.46 million for PTFP (approximately the same as appropriated for FY2001). The FY2002 Commerce-State-Judiciary Appropriations (CJS) Act (P.L. 107-77/H.R. 2500/S. 1216) matched

⁵⁵ For the latest count, see: [http://www.aptv.org/html/digital/dtv/ptv_digitalstations.htm]

⁵⁶ Testimony of Mr. John Lawson, President and CEO, Association of Public Television Stations, before the House Subcommittee on Telecommunications and the Internet, July 10, 2002.

the Administration's request of \$43.46 million.⁵⁷ On November 20, 2001, NTIA published in the Federal Register a notice soliciting applications for FY2002 funding.⁵⁸ On September 30, 2002, NTIA announced 52 awards totaling \$36 million in PTFP grants to assist 97 public broadcasting stations across the country in their digital conversion efforts. For FY2003, the Administration requested \$43.58 million for PTFP, virtually the same level appropriated by the FY2002 CJS Act. In the 108th Congress, the FY2003 Omnibus Appropriations (P.L. 108-7) provides \$43.5 million to the PTFP. For FY2004, the Administration proposes to suspend all grants under the PTFP. As an alternative, the Administration is proposing to make \$80 million available for the digital transition from the Corporation for Public Broadcasting's already enacted FY2004 funding.

Whereas PTFP grants go for equipment, federal funds from the Corporation for Public Broadcasting (CPB) are supporting the development and distribution of digital content. For FY2001, the Labor-HHS-Education Appropriation Act (P.L. 106-554) appropriated \$20 million to CPB for investment in DTV programming and distribution, but required congressional authorization before it could be released. The FY2001 Supplemental Appropriations Act (H.R. 2216, P.L. 107-20, signed July 24, 2001) contained language authorizing release of those funds to CPB. For FY2002, the Administration requested an additional \$20 million for CPB for the purposes of digital conversion. Both House and Senate versions of the FY2002 Labor-HHS-Education appropriation bills (H.R. 3061, H.Rept. 107-229/S. 1536, S.Rept. 107-84) sought to provide \$25 million to CPB for digital conversion. The House bill would provide the funding pending authorization legislation. The Labor-HHS conference report (H.Rept. 107-342) provided \$25 million for equipment and facilities to enable public broadcasters to meet the statutory deadline for digital conversion as proposed by the Senate. The conference agreement did not provide these funds contingent upon authorization as proposed by the House. The bill was signed into law (P.L. 107-116) on January 10, 2002.

For FY2003, the 108th Congress, the FY2003 Omnibus Appropriations (P.L. 108-7) provides \$48.7 million to CPB for digital conversion. The Administration's FY2004 budget proposal requests that \$80 million of CPB's already enacted FY2004 appropriation be allocated to digital conversion.

Reclaiming the Analog TV Spectrum. The goal of the FCC and Congress has always been to complete the transition to DTV as quickly as possible, so that NTSC (analog) spectrum can be reclaimed and reallocated for other purposes. Some of the NTSC spectrum will be auctioned for commercial wireless services, and some of it will be used for new public safety services (the FCC has already designated some of the analog TV spectrum for public safety use).⁵⁹

⁵⁷ For FY2002, PTFP received an additional \$8.25 million through the Emergency Supplemental, P.L. 107-117 (bringing the total FY2002 PTFP appropriation to \$51.7 million).

⁵⁸ See: [http://www.ntia.doc.gov/ptfp/pdfForms/pffp_noa_2002.pdf]

⁵⁹ See: CRS Report RL31375, *Meeting Public Safety Spectrum Needs*, by Linda K. Moore.

The current target date for broadcasters to return analog spectrum is December 31, 2006. However, the Balanced Budget Act of 1997 allows a station to delay the return of the analog spectrum if 15% of the television households in its market do not subscribe to a multi-channel digital service and do not have digital television sets or converters. Given the slower-than-expected pace that digital televisions have been introduced into American homes, few observers believe that the goal of digital televisions in 85% of American homes by 2006 will be reached.⁶⁰ Thus, some observers are concerned that if digital television does not sufficiently penetrate American homes in the near future, the analog spectrum will not be reclaimed, and broadcasters will keep both analog and digital television spectrum licenses indefinitely, thereby preventing spectrum from being available for commercial wireless services and public safety applications (for example, police and firefighter radio communications).

Some have urged Congress to require broadcasters to return the analog spectrum on “a date certain.” Under this approach, spectrum would be freed up for other uses. Legislation in the 108th Congress (H.R. 1425, the Homeland Emergency Operations Response Act introduced by Rep. Harmon on March 25, 2003) would prohibit any delay in reassigning the 24 MHz for public safety purposes, and require those frequencies to be operational by January 1, 2007. The Spectrum Commons and Digital Dividends Act of 2003 (H.R. 1396), introduced by Rep. Markey on March 20, 2003, requires the FCC to ensure that any rules necessary to effectuate the timely transition to digital television are promulgated and completed prior to making available 700 MHz bands to commercial wireless services. Finally, the September 25, 2002 House Energy & Commerce Committees staff discussion draft seeks to ensure the availability of analog television spectrum for other uses by removing from the Communications Act the paragraph which allows a station to delay the return of the analog spectrum if 15% of the television households in its market do not subscribe to a multi-channel digital service and do not have digital television sets or converters. Therefore, under this draft provision, all analog spectrum would be returned by December 31, 2006.

The Bush Administration, in its FY2004 budget request, is proposing an analog spectrum lease fees as an incentive for broadcasters to surrender their analog spectrum. Under this proposal, the FCC would establish an annual lease fee of \$500 million which commercial broadcasters would begin paying in 2007. While similar fees were proposed by the previous two Administrations, Congress has neither implemented nor endorsed this approach.

Low Power TV. Low Power Television (LPTV) was created by the FCC in 1982 to serve rural areas and individual communities within larger urban areas. LPTV stations may not exceed 3 kilowatts for VHF channels or 150 kilowatts for UHF channels, and must not cause interference in the reception of full service television stations. Currently, there are 2119 LPTV stations in the United States. Concerns have arisen that many LPTV stations will lose their licenses in the

⁶⁰ Historically, consumer electronics products take many years to be adopted. Since its introduction in 1953, color television took roughly 25 years to enter 85% of American homes. The video cassette recorder (VCR) took 15 years to reach 85% of homes.

transition to DTV. While the FCC's February 1998 modification to its table of allotments for DTV licensees did provide for some LPTV licensees to be relocated to new frequencies, many would still lose their licenses under FCC digital transition plans. To provide some relief for LPTV licensees, the Community Broadcasters Protection Act of 1999 was enacted as part of the Intellectual Property and Communications Omnibus Reform Act of 1999 (P.L. 106-113). This law established a "class A" status to qualifying LPTV licensees, giving them a measure of protection from full-power TV stations in the transition to DTV. The Act directs that class A licensees be accorded primary status as television broadcasters, prescribes the criteria LPTV stations must meet to be eligible for class A status, and outlines the interference protection class A stations must provide to other television stations. To implement the Act, in April 2000, the FCC established rules for class A LPTV licensees, to facilitate the acquisition of capital for LPTV stations to continue to provide free, over-the-air programming to their communities.⁶¹

In accordance with the 1992 Cable Act (47 USC 534), cable television providers are required to transmit to their audiences the locally-generated programming of all full-power TV broadcasters that request carriage, a provision known as "must-carry." Under the 1992 Act, some LPTV stations are entitled to "must-carry" status if they meet certain criteria.⁶² The FCC's April 2000 ruling did not address the question of whether class A licensees should be entitled to the "must-carry" provision, as are full-power broadcast TV stations. A petition filed with the FCC argued that class A licenses should be granted the same "must-carry" status as full-power broadcasters. The FCC subsequently ruled that class A stations do not have the same must carry rights as full service television stations.⁶³ The Local Voices on TV Act of 2003 (H.R. 1626, introduced April 3, 2003 by Representative Peterson of Minnesota) would provide cable carriage rights for qualified class A television stations.

Fees for Ancillary or Supplemental Services. The Telecommunications Act (P.L. 104-104) states that if a DTV licensee offers ancillary or supplemental services for which they receive a subscription fee or other compensation, the FCC "shall establish a program to assess and collect from the licensee...an annual fee or other schedule or method of payment ..." The Act further states that the collection of fees "shall be designed (i) to recover for the public a portion of the value of the public spectrum resource made available for such commercial use, and (ii) to avoid unjust enrichment through the method employed to permit such uses of that

⁶¹ *FCC Report and Order in the Matter of Establishment of Class A Television Service*, MM Docket No. 00-10, FCC 00-115, released April 4, 2000.

⁶² Those criteria (47 USC 534) include (among other requirements) that the community of license of the LPTV station has a population not exceeding 35,000, that there is no full-power TV station licensed to any community within the county or other political subdivision (of a state) served by the cable system, and that the LPTV station provides the only news coverage in its community of license.

⁶³ *FCC Memorandum Opinion and Order on Reconsideration in the Matter of Establishment of Class A Television Service*, MM Docket No. 00-10, FCC 01-123, released April 13, 2001.

resource.”⁶⁴ Congress is overseeing the FCC’s actions regarding implementation of this law. Public interest groups have also maintained pressure on the FCC to establish a fee program, arguing that broadcasters should compensate the American people for the use of the DTV spectrum, and that fees should be required out of fairness to those who paid for spectrum at FCC auctions (such as licensees for personal communications services).

In November 1998, the FCC adopted rules to require broadcasters to pay 5% of their gross revenues from ancillary or supplementary uses of DTV spectrum for which they charge subscription fees or other specified compensation.⁶⁵ These include subscription video, software distribution, data transmissions, teletext, interactive materials, aural messages, paging services, and audio signals. Home shopping channels and “infomercials” are not subject to fees because the FCC did not consider them new services. The FCC has initiated a separate proceeding to determine how much non-commercial stations can use the DTV spectrum for revenue-generating services, and whether they should have to pay spectrum fees. Some consumer groups say that the FCC’s spectrum fees are not heavy enough on commercial broadcasters, arguing that most revenue will come from home shopping and infomercials. They also warn that public broadcasters should not be over-regulated, arguing that too heavy a burden placed on public broadcasters could impair their long-term viability.

On October 11, 2002, the FCC ruled that noncommercial stations are required to use their entire digital capacity primarily for nonprofit, noncommercial, educational broadcast services. However, the FCC also ruled that the statutory prohibition against advertising on noncommercial broadcasts does not apply to any ancillary or supplementary services presented on an excess DTV channels that does not constitute broadcasting. The FCC further ruled that public stations must pay a fee of five percent of gross revenues generated by ancillary or supplementary services provided on their DTV service.⁶⁶

Public Interest Obligations of DTV Broadcasters. In March 1997, President Clinton established an Advisory Committee on Public Interest Obligations of DTV Broadcasters, to make recommendations on how DTV licensees should compensate the public for their licenses. Committee members were selected from government, the broadcasting industry, academia, and consumer interest organizations. After a series of public meetings in 1997 and 1998, the Committee submitted a set of recommendations to Vice President Gore in December 1998. The recommendations consist of mostly voluntary actions by broadcasters, including providing five minutes per night of air time for candidate-centered discourse in the

⁶⁴ The Budget Resolution of 1997 (H.Con.Res.84) included a provision requiring broadcasters to pay a spectrum usage fee of \$2 billion over five years. Broadcasters strongly opposed that provision, however, and it was not included in the Budget Act of 1997.

⁶⁵ *FCC Report and Order on Fees for Ancillary or Supplementary Use of Digital Television Spectrum*, MM Docket No. 97-247, released November 19, 1998.

⁶⁶ *FCC Report and Order in the Matter of Ancillary or Supplementary Use of Digital Television Capacity by Noncommercial Licensees*, MM Docket no. 98-203, FCC 01-306, released October 17, 2001.

30 days prior to an election. Some panel members wanted to recommend mandating the free air time as well as other Committee proposals. The White House referred the report to the FCC, which on December 15, 1999, opened a Notice of Inquiry (NOI) proceeding to solicit public comment on public interest obligations of TV broadcasters as they transition to DTV.

After reviewing public comment, the FCC, in September 2000, issued the *DTV Public Interest Form* Notice of Proposed Rulemaking (NPRM) which sought to require television broadcasters (both digital and analog) to disclose on a quarterly standardized form how they are serving the public interest. Also in September 2000, the FCC issued the *Children's DTV Public Interest* NPRM, which focused on the obligation of broadcasters to provide educational and informational programming for children, and the requirement that licensees limit advertising in children's programs. The FCC has not yet issued any decisions in those proceedings. Given the significant amount of time that has passed, the Second Periodic Review of FCC rules and policies affecting DTV conversion, issued on August 9, 2002, has asked for further comment on the public interest obligation issue.⁶⁷

Tower Siting. One obstacle to the broadcasters' ability to offer DTV services is the opposition from state and local communities over the building of new signal transmission towers.⁶⁸ In most cases, DTV antennas can be built on top of existing towers used for analog TV broadcasting. If new towers are required, however, they must be constructed before the stations can transmit DTV signals. In August 1997, the FCC released an NPRM (FCC 97-182) to consider the preemption of state and local zoning restrictions on the siting, placement, and construction of DTV broadcasting facilities. In its January 18, 2001 Report and Order, the FCC concluded that "while some stations are facing problems with tower availability and/or local zoning issues, such problems do not seem to be widespread at this time."⁶⁹ The FCC will continue to monitor the situation and intends to work with the involved parties as problems arise.

Activities in the 107th and 108th Congress

During the 107th Congress, Congressional committees keenly monitored the pace and progress of the digital transition. On March 1, 2001, the Senate Committee on Commerce, Science, and Transportation held a hearing on the transition to digital television.⁷⁰ The House Energy and Commerce Committee, Subcommittee on Telecommunications and the Internet, held a hearing on March 15, 2001 entitled,

⁶⁷ NPRM, *Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, p. 39-42.

⁶⁸ For more information on DTV tower siting, see: [<http://www.fcc.gov/mmb/prd/dtv/>]

⁶⁹ *FCC Report and Order and Further Notice of Proposed Rulemaking In the Matter of Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MM Docket No. 00-39, FCC 01-24, p. 37.

⁷⁰ See: [<http://commerce.senate.gov/issues/telco.htm#Hearings>]

“Digital Television: A Private Sector Perspective on the Transition,”⁷¹ and on September 25, 2002 entitled, “H.R. __, Regarding the Transition to Digital Television.”⁷² Meanwhile, a number of bills were introduced into the 107th Congress, and subsequently into the 108th Congress, relating in some way to digital television (see Appendix).

On April 4, 2002, FCC Chairman Michael Powell submitted, to the Chairmen of the House Energy and Commerce Committee and the Senate Commerce, Science, and Transportation, a proposal for voluntary industry actions to speed the digital television transition. The proposal, which is purely voluntary, is intended (in Commissioner Powell’s words) “to provide an immediate spur to the transition by giving consumers a reason to invest in digital technology *today*, while we continue to work on resolving the longer-term issues.”⁷³ Specifically, the proposal calls on industry to do the following:

- *Broadcast networks* – provide high-definition or other value added DTV programming during at least 50% of their prime-time schedule, beginning with the 2002-2003 season.
- *Broadcast licensees* – affiliates of top four networks in markets 1-100 broadcast a digital signal by January 1, 2003.
- *Cable* – systems with 750 MHz or higher carry digital signals of up to five broadcast or other digital programming services by January 1, 2003.
- *Direct Broadcast Satellite* – carry signals of up to five digital programming services by January 1, 2003.
- *Equipment Manufacturers and Retailers* – include over-the-air broadcast tuners in new broadcast television receivers according to a specified timetable.

If industry can voluntarily meet some or all of the above goals, the pressure for Congressional action in the face of looming deadlines may lessen. However, if industry cannot take the voluntary steps necessary to accelerate the digital transition, Congress and the FCC may take action in the 108th Congress to ensure a smoother and more timely nationwide adoption of digital television. July 19, 2002 letters from the leadership of the House Energy & Commerce Committee and the Senate Commerce, Science and Transportation Committee to FCC Chairman Powell raised the prospect of new DTV legislation. The House Energy and Commerce Committee held a hearing on September 25, 2002 to hear testimony on the Committee’s staff

⁷¹ See: [<http://energycommerce.house.gov/107/hearings/03152001Hearing108/hearing.htm>]

⁷² See: [<http://energycommerce.house.gov/107/hearings/09252002Hearing719/hearing.htm>]

⁷³ For proposal and cover letters to Committees, see: [http://www.fcc.gov/commissioners/powell/mkp_proposal_to_speed_dtv_transition.pdf]

discussion draft of a comprehensive DTV bill⁷⁴ which would encompass a variety of issues, including: DTV tuners, DTV cable carriage limitations, DTV set-top-box compatibility, pass through of high definition programming by broadcast network affiliates, and content protection for digital video programming. Legislation is likely in the 108th Congress that will address those issues. Meanwhile, the FCC, having already issued proceedings on digital tuners and broadcast copy protection in August 2002, is expected to issue proceedings on additional DTV issues, including cable and satellite TV carriage of digital signals and cable-DTV compatibility.

⁷⁴ See: [<http://energycommerce.house.gov/107/drafts/dtvstaff.htm>]

Appendix – Legislation in the 107th and 108th Congress Related to Digital Television

107th Congress

H.R. 3397 (Harmon)

Homeland Emergency Operations Response Act. Prohibits any delay in reassigning 24 MHz in the upper 700 MHz band (currently occupied by television broadcasters) for public safety purposes, and requires those frequencies to be operational by January 1, 2007. Introduced December 4, 2001; referred to Committee on Energy & Commerce.

H.R. 3448 (Tauzin)/P.L. 107-188

Public Health Security and Bioterrorism Response Act of 2001. Section 531 requires the FCC to allot a digital channel to any requesting full-power television station that had an application pending for an analog television station construction permit as of October 24, 1991, and which had its application granted after April 3, 1997. Passed by House December 12, 2001; passed by Senate December 20, 2001. Conference report (H.Rept. 107-481) approved by House and Senate on May 22 and May 23, respectively. Signed into law, June 12, 2002.

H.R. 4560 (Tauzin)/P.L. 107-195

Auction Reform Act of 2002. Repeals statutory deadlines for spectrum auctions of the 700 MHz band currently occupied by television broadcasters. Directs FCC to indefinitely postpone scheduled June 2002 auctions of 700 MHz band. Introduced April 24, 2002; referred to Committee on Energy & Commerce. Reported by Committee (H.Rept. 107-443) May 7, 2002. Passed House on May 7, 2002, passed Senate on June 18, 2002. Signed into law, June 19, 2002.

H.R. 4641 (Markey)

Wireless Technology Investment and Digital Dividends Act of 2002. Requires FCC to ensure that any rules necessary to effectuate the timely transition to digital television are promulgated and completed prior to making available the bands of frequencies at 747-762 and 777-792 MHz for advanced commercial mobile services or other competitive wireless services. Also provides increased funding to assist digital conversion of public television stations. Introduced May 2, 2002; referred to Committee on Energy & Commerce.

S. 2048 (Hollings)

Consumer Broadband and Digital Television Promotion Act. Providing for private sector development of technological copyright protection measures to be implemented and enforced by federal regulations to protect digital content and promote broadband as well as the transition to digital television. Introduced March 21, 2002; referred to Committee on Commerce, Science, and Transportation.

S. 2448 (Hollings)

Broadband Telecommunications Act of 2002. Title IV provides grants to public broadcaster through the Department of Commerce for facility upgrades to transmit digital television and to develop educational and public interest digital programming.

Introduced May 2, 2002; referred to Committee on Commerce, Science and Transportation.

S. 2454 (Ensign)

Auction Reform Act of 2002. Repeals statutory deadlines for spectrum auctions of the 700 MHz band currently occupied by television broadcasters. Directs FCC to indefinitely postpone scheduled June 2002 auctions of 700 MHz band. Introduced May 2, 2002; referred to Committee on Commerce, Science, and Transportation.

S. 2481 (Stevens)

Auction Timing Completion Act. Requires auction of 700 MHz spectrum in compliance with existing statutory deadlines and gives the FCC discretion to set the auction date for all other spectrum auctions in the future. Introduced May 8, 2002; referred to Committee on Commerce, Science, and Transportation.

108th Congress

H.R. 426 (Sensenbrenner)

TV Consumer Choice Act of 2003. Prohibits the FCC from requiring digital tuners in television receivers. Introduced February 3, 2003; referred to Committee on Energy and Commerce.

H.R. 1396 (Markey)

Spectrum Commons and Digital Dividends Act of 2003. Requires FCC to ensure that any rules necessary to effectuate the timely transition to digital television are promulgated and completed prior to making available the bands of frequencies at 747-762 and 777-792 MHz for advanced commercial mobile services or other competitive wireless services. Also provides increased funding to assist digital conversion of public television stations. Introduced March 20, 2003; referred to Committee on Energy & Commerce.

H.R. 1425 (Harmon)

Homeland Emergency Operations Response Act. Prohibits any delay in reassigning 24 MHz in the upper 700 MHz band (currently occupied by television broadcasters) for public safety purposes, and requires those frequencies to be operational by January 1, 2007. Introduced March 23, 2003; referred to Committee on Energy & Commerce.

H.R. 1626 (Peterson)

Local Voices on TV Act of 2003. Provides cable carriage rights for qualified class A television stations. Introduced April 3, 2003; referred to Committee on Energy & Commerce.