The 85% benchmark does not address the reality of 100 million analog sets owned by voters who do not want to lose access to free-to-air video signals and/or who may not want to purchase new sets or analog-to-digital converters for existing sets. It is doubtful that the public policy process would force analog turn off after achieving the bare minimum 85% of households digital-capable. As discussed above, the only real solution that makes economic, market, and political sense is that where consumer demand has "tipped" and a DTV mass market has come into existence.

It should be noted that the broadcast industry supports the concept that ultimately its future must be digital. The combination of digital technology, the economics of information, and a new generation of wired and wireless networks will change forever the nature of the broadcasting business.

Digital networks are being deployed by local and long distance telephone companies, as well as by their competitors, including cable television companies, wireless communications companies, operators of satellite-based systems, and, potentially, broadcasters. These network companies are taking the risk that revenues from increased network usage and new applications will provide an adequate return on their investments. Because of the time lag between capital spending on new network technology and the revenues they are expected to generate, the network companies will occasionally halt or redirect their investment in technology.

But the overall trend is toward a new generation of networks available early in this decade. DTV provides broadcasters the opportunity to share in the rewards - - and risks - - of this massive transition to a digital technology platform. **However, a prolonged transition leaves broadcasters anchored simultaneously in both the analog and digital worlds, hemorrhaging capital with no clear return on their digital investment.**

At the station level, the minimum capital cost to transition to digital is one million dollars ($1,000,000) This provides the station with a digital transmitter and certain ancillary equipment associated with transmission. If the station also wants to modify its production capabilities to permit high definition digital production then the capital cost can be another $3 to $4 million. So for a capital cost of $1 to $5 million, each station can then at a minimum transmit digital programming and, at a maximum, produce digital programs.[37]

Given the lack of viewers who can receive over-the-air digital signals, there is no financial incentive for local broadcasters to invest in digital transmission capabilities.[38] The only incentive is the force of the FCC's mandate that they do so by a certain date (i.e., for private broadcasters not subject to earlier deadlines that date is May 1, 2002, and

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[37] To put this capital outlay into perspective, the typical annual capital expenditure for a station in markets 51 to 60 is $550,000 and in the above 100 markets $300,000. See the *Annual TV Financial Report (2000).*

[38] See *Completing the Transition*, p.vii and p.23.

for public broadcasting, May 1, 2003). Once a station has invested in its digital infrastructure, it must then operate for an indeterminate amount of time both analog and digital transmitters. **The longer this period of parallel operation, the more expensive it can get for a station. For example, the analog transmitter may need replacement, and the useful life of the replacement will exceed most likely the residual period during which the station must operate an analog program service. A transition that takes over 20 years could have a material adverse impact on the financial performance of stations, especially those in smaller markets.**

The local broadcast stations are disadvantaged by the process. They alone are commanded by the FCC to go to digital and to spend the associated capital. The financial model for stations is to assemble audiences for which advertisers pay. **Until and unless there is an audience that can view the digital programming, the capital and operating costs incurred by the station generate no return on investment and will affect adversely the station's financial performance.**

The effect of a prolonged (i.e., 20 years or more) transition will present the FCC with the undesirable choice between two public policy goals.

1. **The FCC has a clear mandate to maintain free-to-air television in the U.S. To the extent the digital transition places financial stress on certain station categories, then the FCC is putting at risk free-to-air for the purpose of the digital transition.**

2. **Policy makers want a transition to digital in order to recover spectrum for auction. This process will: (a) provide money to the U.S. Treasury; and (b) initiate the build out of advanced mobile communications networks. However, small broadcast stations and broadcast stations in small markets must by FCC order make the investment even though this "public good" provides no incentive for stations or their owners.**

3. **A prolonged market-driven transition will force the FCC to grant extensions so that small stations and stations in small markets can defer their digital investments and avoid premature investment in a digital system. The granting of such extensions will delay the transition to digital which is a public policy objective.**

4. **Should the FCC not grant such extensions, then the stations will be forced to fund the investment in digital infrastructure which will reduce in the short-term their return on investment. This in turn will put free-to-air broadcasting at risk as the stations come under financial pressures that will result in cost reduction efforts such as less local programming, reduced capital budgets, and possibly reduction of on-air time. Such cost reductions will put the goal of a robust free-to-air broadcast industry at risk.**

5. The only solution for the FCC to avoid sacrificing one public policy goal for the other, is a quick transition from analog to digital. Such a rapid transition will both: (a) justify a station's investment in digital infrastructure; and (b) maintain free-to-air television in the U.S.

C. A Slow Transition Puts Spectrum Availability for Next Generation Wireless Networks at Risk

The intent of the Congress, the FCC, and the Administration is to facilitate advanced mobile communications in the United States by ensuring that the spectrum is available for such services. In the U.S., the term "mobile" covers the cellular and special mobile radio (SMR) industries, as well as digital personal communications services (PCS). Cellular and PCS combined have over 114 million subscribers.[39] The mobile market for voice services is considered a mature business in which the marginal new subscriber pays less than $30 per month, and the cost per minute of digital usage has declined rapidly. Wireless Internet access is expected to be the next stage of evolution of the mobile industry.

Mobile services are a focus of keen anticipation in financial and government communities due to the expectation of high business and consumer demand for "broadband wireless" services. Spectrum auctions in Europe are said to predict demand for the spectrum to provide such offerings in the United States. Analysts' reports posit a huge revenue opportunity for the U.S. government (e.g., approximately $50 billion).

According to a recent report of the U.S. Council of Economic Advisors:

> Broadband applications such as streaming audio and video are already becoming increasingly popular on the Internet... As these and other applications multiply, wireless devices will require 3G capabilities to access existing Internet materials, along with new Internet sites optimized for mobile access. The bandwidth provided by 3G facilitates secure mobile commerce, real-time videoconferencing, on-line gaming, and other, not-yet imagined applications... An appropriate allocation of commercial spectrum licenses [for 3G] and other policies that favor investment, have the potential to unleash a wave of innovation in 3G applications. The impact of these yet-to-be-developed applications is impossible to predict precisely, but history suggests that they may be profound.[40]

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[39] Estimated by the Cellular Telecommunications and Internet Association (CTIA) at *www.wow-com.com.*

[40] Council of Economic Advisors, *The Economic Impact of Third-Generation Wireless Technology*, (October 2000), p. 4.

In Europe, where auctions or other awards of 3G spectrum have occurred, the winners generally have been major wireless and/or telecommunications operators.[41] In the U.S., bidders for 3G spectrum likely will include AT&T Wireless, Verizon Wireless, and Sprint PCS. Given Deutsche Telekom's acquisition of Voicestream Wireless, it can be expected to bid for U.S. 3G spectrum as well.[42]

The Balanced Budget Act of 1997 established a statutory timetable for the transition, requiring the termination of analog broadcasting by December 31, 2006. In turn, spectrum associated with channels 60-69 and 52-59 was to be reallocated to other services, with most being subject to auction.[43]

The FCC currently has rulemakings pending for reallocating the channel 60-69 and 52-59 spectrum blocks. As the FCC explained the situation in its order proposing rules for the reallocation of the spectrum currently used by channel 52-59:

> While the end of the transition is targeted for 2006, and may extend beyond that date, the Commission must reallocate spectrum and assign commercial licenses in the encumbered television spectrum by September 30, 2002. Therefore, auction of this spectrum for new services will occur a number of years in advance of the end of the digital transition, during which period, the incumbent broadcasters may continue to operate in the band. New licensees may operate in the band prior to the end of the transition to the extent they do not cause interference to existing analog and digital broadcasters. ...
>
> *Pursuant to legislative mandates, the Commission is requiring that the broadcast television service convert from the existing analog television transmission system to a new digital television system that will allow broadcasters the flexibility to provide a variety of new services, including high definition television service, multicasting of multiple programs, data services and other enhancements.* Broadcasters have been provided a second channel to operate their DTV service during the transition from analog to digital service. At the end of this transition, analog service will cease and one of each broadcaster's two channels will be recovered. Because the DTV transmission system is more spectrally efficient than the analog system, less spectrum will be needed for broadcast television service after the transition. A portion of the TV spectrum, *i.e.*, Channels 52-69, is therefore being recovered for new uses. Spectrum currently allocated to Channels 2-51 will remain "core" television broadcast spectrum. Analog services on all TV

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[41] "3G" refers to third generation wireless networks and servers. The first generation was analog cellular; the second used digital technology and involved additional carriers (i.e., PCS operators) using additional frequencies.

[42] The Voicestream transaction closed May 31, 2001. Deutsche Telekom (DTAG) provides both television transmission infrastructure and mobile services in Germany. DTAG won 3G licenses in Germany and the U.K. and recently sponsored a major European conference on the potential for mobile reception of DTV.

[43] 1934 Act as amended, Section 309(j)(14).

Channels will cease operations at the end of the transition. Digital services on out-of-core stations will be relocated into the core spectrum (Channels 2-51).[44]

As mentioned previously, the Administration's Fiscal 2002 Budget, proposes to delay the auction of both channels 60-69 (until 2004) and channels 52-59 (until 2006).

Obviously, if the digital transition takes 20 years or more, then the public policy goal of making spectrum available while generating revenue for the Treasury will not be achieved:

1. **Potential bidders require a predictable transition in order to calculate he value of the spectrum so that they can formulate a bid strategy.**

2. **Potential bidders require a rapid transition in order to build out their networks and then generate the operating profits required to justify the cost of both the spectrum and the network.**

3. **If the transition is neither predictable nor rapid, advanced mobile communications will be delayed, foregone, or relegated to less optimal spectrum.**

[44] FCC 01-91, paragraphs 2 and 5, March 28, 2001, (footnotes omitted, emphasis added).

V. DIGITAL MUST-CARRY WILL ACCELERATE THE TRANSITION

A. Digital Must-Carry is Required

As shown in the prior chapter, the public policy justifications for intervention by the FCC include:

1. **It is bad public policy to force broadcasters to invest in station-based digital infrastructures to transmit programming that will not in the short-run be seen by any significant number of viewers. That process puts free-to-air broadcasting at risk.**

2. **It is bad public policy to allow a 20-year plus transition from digital to analog *while simultaneously claiming* that the existing analog spectrum is needed to build out advanced mobile networks which themselves are required to support the "anytime, anywhere" applications of the U.S. economy circa 2010-2012.**

Digital must-carry has the potential to accelerate the transition from analog-to-digital. Digital must-carry will:

1. **Create relatively rapid change in a consumer mass market environment that otherwise can be expected to take over two decades to achieve 85% penetration;**

2. **Trigger dual 'virtuous circles' as *both* programmers and consumer electronics companies define and exploit predictable market opportunities; and**

3. **Achieve an effective resolution of what otherwise has the potential to become a litigious, politically visible, and world class example of policy failure.**

B. Cable Operators Have an Economic Incentive Not to Carry Free-to-Air Broadcast Digital Channels

Cable operators will *not* carry all analog and digital free-to-air broadcast television channels during the transition unless required to do so. Rather, at best, they will only carry *some channels* in *some markets* on a voluntary basis and may resist carrying the enhanced or multiplexed digital signals that are likely to provide the greatest potential attraction to potential DTV purchasers.

In enacting the must-carry provisions of the 1992 Cable Act, Congress made several factual findings regarding the economic incentives of cable system operators to not carry broadcast television channels. These factual findings were set out in the Act:[45]

> (12) Broadcast television programming is supported by revenues generated from advertising broadcast over stations. Such programming is otherwise free to those who own television sets and do not require cable transmission to receive broadcast signals. There is a substantial governmental interest in promoting the continued availability of such free television programming, especially for viewers who are unable to afford other means of receiving programming.
>
> (13) As a result of the growth of cable television, there has been a marked shift in market share from broadcast television to cable television services.
>
> (14) Cable television systems and broadcast television stations increasingly compete for television advertising revenues. As the proportion of households subscribing to cable television increases, proportionately more advertising revenues will be reallocated from broadcast to cable television systems.
>
> (15) *A cable television system which carries the signal of a local television broadcaster is assisting the broadcaster to increase its viewership, and thereby attract additional advertising revenues that otherwise might be earned by the cable system operator. As a result, there is an economic incentive for cable systems to terminate the retransmission of the broadcast signal, refuse to carry new signals, or reposition a broadcast signal to a disadvantageous channel position.* There is a substantial likelihood that absent the reimposition of such a requirement, additional local broadcast signals will be deleted, repositioned, or not carried.

In *Turner II,*[46] the Supreme Court upheld these factual findings as supported by substantial evidence.[47] In addition, the Court affirmed the economic logic behind these findings: "Cable systems ... have more systemic reasons for seeking to disadvantage broadcast stations: Simply stated, cable has little interest in assisting, through carriage, a competing medium of communication."[48]

These incentives have been strengthened since approval of the 1992 Cable Act because of increased competition between cable operators and broadcasters regarding advertising. According to the FCC, the percentage of "television households" subscribing to cable increased from 59.3 percent in 1992 to 64.8 percent

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[45] Section 2(a), Public Law 102-385 (emphasis added).

[46] *Turner Broadcasting System v. FCC*, 520 U.S. 180 (1997).

[47] 520 U.S. at 200-206 (majority opinion), 520 at 228 (concurrence of Justice Breyer).

[48] 520 U.S. at 201.

in 1995 to 67.4 percent in June 2000.[49] Thus, cable has become an increasingly important means for broadcasters to reach the audience that justifies the advertising that supports free-to-air television.

As set out in Figure 6, cable operators have become increasingly strong competitors for advertising dollars in the existing must-carry environment.

Figure 6

Advertisers' Expenditures for Local Advertising with Broadcast Television and Cable Operators (1992-2000) ($ Millions)

Year	Local Broadcast Spot Ad Expenditures	Local Cable Spot Ad Expenditures	Cable %
1992	$8,079	$974	12%
1993	8,435	1,092	13
1994	9,464	1,250	13
1995	9,985	1,573	16
1996	10,944	1,966	18
1997	11,436	2,170	19
1998	12,169	2,547	21
1999	12,680	2,929	23
2000 (est.)	13,631	3,364	25

Source: Television Bureau of Advertising; Universal McCann

Thus, while local broadcast advertising has grown from 1992 to the present, local cable advertisers' expenditures have grown at a much faster rate. Indeed, the cable industry's advertising promotional organization, the Cable Television Advertising Bureau, promotes cable households as being far more valuable to advertisers than broadcast television-only households. For example the Bureau's web site offers the following answers to the question as to why advertisers should use cable:[50]

1. Product consumption is higher in cable households. Cable households are much more likely to make major purchases in key product categories than non-cable households.

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[49] *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming* (2001 Video Competition Report), FCC, Table B-1, p.97.

[50] Source: *www.cabletvadbureau.com/WhyCable*

2. Cable subscribers are "early adopters." Cable households are much more likely than non-cable homes to acquire new communications and entertainment technologies, including: online services, personal computers, software, cellular phones and large screen television.

3. Cable delivers on key demos. Cable delivers better "mainstream" demographics than non-cable homes. Cable households, for example, index significantly higher on $50,000+ HH incomes, college education, full-time employment, and home ownership.

4. Cable also delivers on upscale household characteristics. Cable television reaches a higher concentration of households with upscale characteristics. These include $75,000+ HH incomes, frequent flyers, owners of stocks and luxury cars and professional/managerial occupations, all of which index considerable higher in cable homes.

The added functionality of digital television, such as high definition and interactivity, likely will be most attractive to the early-adopter, upscale demographics that the cable industry regards as attractive to advertisers. **Therefore, the introduction of digital television by broadcasters will create a further economic incentive on the part of cable operators to avoid carriage of broadcast digital channels.**

Development of advanced programming by broadcast content providers and its transmission over free-to-air television *and its carriage by cable systems* would increase the attractiveness of broadcasting networks and local stations. This would undermine the cable industry's advertising logic expressed, for example, in the "Why Cable" marketing material quoted above. Carriage of enhanced free-to-air digital programming could also provide competition for a cable operator's additional "digital tier" revenue streams, plus any additional advertising or transactional fees associated with interactive services provided within those tiers. The National Cable Television Association (NCTA) described such enhanced services in a recent FCC filing:

> Enhanced television services offer viewers the ability to obtain data related to the television programming and advertising they are watching. Enhanced commercials enable customers to express an interest in a commercial, as it is playing, by pressing a button or remote control when an icon appears during the ad. Enhanced television can also offer the opportunity to play along with game shows, participate in opinion polls and surveys, and get up-to-the minute news and weather.
>
> The first enhanced television services are just beginning to be rolled out. For example, Wink – the leading enhanced programming company – is available on 29 cable systems covering 37 communities. ... Adelphia and Insight have

announced deals with Commerce.TV, which also provides an electronic mall and, in the future, will provide enhanced television and advertising.[51]

Development of free-to-air multiplexed programming options in a single broadcast DTV stream also would compete more generally with cable programming in households of cable subscribers. The different programming streams could target specific demographic groups, to the detriment of cable channels targeting viewers with similar demographics.

C. The Existence of Only a Limited Number of Voluntary Digital Carriage Agreements Supports Must-Carry

One of the central facts used by the Supreme Court to uphold the must-carry provisions of the 1992 Cable Act was the existence of voluntary carriage agreements prior to the establishment of a mandatory cable carriage requirement. The existence of such a record established two significant facts: (1) carriage of *some* broadcasts stations was a benefit, not a burden, for cable operators; and (2) the burden of must-carry was reduced by the number of stations that would be carried voluntarily. The Supreme Court's opinion stated:

> This carriage [of pre-1992 channels] does not represent a significant First Amendment harm to either system operators or cable programmers because those stations were carried voluntarily.... The 5,880 channels occupied by added broadcasters represent the actual burden of the regulatory scheme. Apellants concede that most of those stations would be dropped in the absence of must-carry ... so the figure approximates the benefits of must-carry as well. Because the burden imposed by must-carry is congruent to the benefits its affords, we conclude must-carry is narrowly tailored to preserve a multiplicity of broadcast stations for the 40 percent of households without cable.[52]

However, the Supreme Court recognized that the economic incentives for cable operators to carry free-to-air channels is limited: "Substantial evidence on remand bears this out: With the exception of a handful of very popular broadcast stations (typically network affiliates), a cable system's choice between carrying a cable programmer or broadcast station has little or no effect on cable subscriptions, and subscribership thus typically does not bear on carriage decisions."[53]

The converse would also appear true: if a few popular channels are carried, cable subscribers will have only a limited incentive to seek out an alternate delivery channel (e.g., an over-the-air antenna and A/B switch) just to obtain the remaining non-carried stations. This dynamic was recognized by Congress in passing the Satellite Home Viewer Improvement Act (SHVIA) in 1999. The Act requires that, beginning in 2002, direct broadcast satellite (DBS) multichannel providers that offered some local broadcast

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[51] NCTA *Comments,* CS Docket 01-7, March 19, 2001, pp.11-12.

[52] 520 U.S. at 215.

[53] 520 U.S. at 202.

stations would have to offer all of them. DBS operators were interested in providing their subscribers with the option of receiving a limited set of local broadcast stations, primarily the local affiliates of the four largest networks. According to the Conference Committee report on the Act:

> Although the conferees expect that subscribers who receive no broadcast signals at all from their satellite service may install antennas *or subscribe to cable service in addition to satellite service,* the Conference Committee is less sanguine that subscribers who receive network signals and hundreds of other programming choices from their satellite carrier will take such trouble and expense to obtain over-the-air signals from independent broadcast stations.[54]

Thus, if a cable operator were to believe that a decision to carry *no* free-to-air digital channels would cause viewers to seek non-cable access alternatives, it might carry the most popular two or three commercial broadcast channels plus a digital non-commercial channel (not-an-advertising-threat) and forestall any potential loss of viewer control. **Furthermore, to the extent that cable operators do provide voluntary cable carriage to some digital broadcasters in some markets, the result will likely be that cable subscribers will have a reduced incentive to obtain non-carried free-to-air digital channels via other access methods, such as antennas and selector boxes.**

Digital carriage may result from negotiations addressing a broader set of business issues, such as when a network obtains carriage rights for the digital signal of its owned and operated stations as part of an agreement that includes access to cable-only channels distributed by the network's parent. In this regard, of the 1,663 broadcast stations in service on September 30, 2000, only 83 were owned and operated by one of the four major networks.[55] Therefore, negotiation of digital must-carry by the networks for their owned-and-operated stations does not even begin to address the preservation of free-to-air broadcasting in most markets by a diverse set of local broadcasters.

D. Mass Market Consumers Will Not Purchase and Install Antennas for Over-the-Air Reception

Antennas cannot be relied on as a source of signals for the larger television sets in "wired" homes that will be the predominant pool of potential DTV receivers during the first several years of the digital transition. This can be demonstrated from the existing record.

In enacting the must-carry provisions of the 1992 Cable Act, Congress made factual findings regarding the appropriateness of antennas and selector switches as an alternative to must-carry as a means for cable subscribers to access broadcast channels not carried by a cable system. These factual findings were set out in section 2(a) of the Act:

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[54] H. Rept. 106-464 at 102 (1999), (emphasis added).

[55] FCC *2001 Video Competition Report,* paragraph 98; Warren Communications, *2001 Television and Cable Factbook*, station edition, pp.A-1599 to A-1623.

(17) Consumers who subscribe to cable television often do so to obtain local broadcast signals which they otherwise would not be able to receive, or to obtain improved signals. Most subscribers to cable television systems do not or cannot maintain antennas to receive broadcast television services, do not have input selector switches to convert from a cable to antenna reception system, or cannot otherwise receive broadcast television services. ...

(18) Cable television systems often are the single most efficient distribution system for television programming. A Government mandate for a substantial societal investment in alternative distribution systems for cable subscribers, such as the `A/B' input selector antenna system, is not an enduring or feasible method of distribution and is not in the public interest.[56]

In *Turner II,* the Supreme Court affirmed the factual predicate for these findings, citing evidence that, even after technical improvements mandated by the FCC, "only 11.7 percent of cable connected television sets were attached to an antenna and had an A/B switch. ... Of the small number of households possessing the switch, an even smaller number (only 38 percent) had ever used it."[57]

Marketplace events since *Turner II,* have reinforced the conclusions reached by Congress in 1992. It is apparent that television set manufacturers have determined that the economically rationally approach to phase-in digital reception capability is to start with the largest (and most expensive) sets and work downward. This is because (1) the more expensive the set, the lower, in percentage terms, the added cost of digital capability; and (2) the larger the set, the more valuable are capabilities that make use of digital reception, such as high definition and 16:9 displays.[58]

However, market research shows that owners of larger sets are more likely to be cable households, not over-the-air only households. Furthermore, available statistics and market research show that:

1. **There are 68 million cable households.**[59]

2. **Cable households have larger sets, and these larger sets tend to be wired to the cable system.**[60]

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[56] Public Law 102-385.

[57] *Turner Broadcasting v. FCC*, 520 U.S. 186, 220-21 (1997).

[58] See *Comments* of Thompson Multimedia, MM Docket 00-39, (April 6, 2001), pages 6-7; *ibid.,* Motorola, April 5, 2001, pages 4-5 and Footnote 6.

[59] FCC, *2001 Video CompetitionReport*, p.4. See also Section II.A., "The Cable Industry."

[60] Analysis of data from *The Home Technology Monitor*, Primary Market Research (Fall 2000).

3. **Broadcast-only sets in cable households are not the primary set and, therefore, the cable subscriber has little or no incentive to hook the primary set to an antenna for digital reception.**

4. **Therefore, free-to-air digital broadcasts will not be accessible to cable households unless carried over the cable system.**

Implementation of the "may carry" provisions of the SHVIA in 1999 provides a market test of viewer behavior regarding dual use of over-the-air reception and another access method. Under SHVIA, beginning in late 1999, satellite operators were given the ability to broadcast selected local stations into their local markets without copyright concerns. In response Echostar (DISH) and DirectTV began to offer local programming to an increasing number of markets. The package usually consists of the ABC, CBS, Fox, and NBC affiliates; a national PBS feed is also available. For DirecTV, the local-into-local package costs $5.99 per month; DISH charges $4.99.[61]

By definition, DBS subscribers are already taking the initiative to install an exterior (satellite) antenna and run coax cabling to one or more rooms in their homes. The addition of a rooftop antenna, at the same time, would seem a merely incremental task. However, large numbers of DBS subscribers are apparently forgoing the alternative of over-the-air reception in favor of purchasing the local-into-local package.

For example, approximately 60% of DirecTV's new customers (who have all undertaken to have satellite dishes installed) are willing to pay $6 per month for local channels (where offered) to avoid the necessity of over-the-air reception.[62] This result logically may be either because of the perception of poor over-the-air reception in subscribers' neighborhoods, or because subscribers do not wish to have to continually interact with an A/B switch.

Cable subscriber reluctance to install over-the-air antennas just to receive digital programming may be even greater than that of DBS subscribers, since they may be advised that an antenna would only be necessary for a "transitional period" until analog shut-off and cable carriage of only a broadcaster's digital signal. Finally, as the Supreme Court found in the case of analog must-carry and Congress believed in the case of satellite carriage, access to a limited number of digital broadcast stations over cable will likely eliminate the remaining incentive for users to invest in over-the-air reception capabilities.

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[61] As of March 6, 2001. Sky Report, at *www.skyreport.com/skyreport/local.htm.*

[62] Statement of Eddy Hartenstein, Corporate Senior Executive Vice President, Hughes Electronics Corporation, before the Senate Committee on the Judiciary, Subcommittee on Antitrust, Business Rights, and Competition (April 4, 2001), p.1.

E. Digital Must-Carry Will Serve as a Catalyst and Trigger Mutually Beneficial Actions in Both Receiver Manufacturing and Programming

There are two potential "virtuous circles:" receiver manufacturing and programming. As mentioned previously, there is a chicken-egg circularity that occurs when the question of which comes first, programming or sets, is raised. The two in tandem can create a "vicious circle" in which the lack of one dooms the other or a "virtuous circle" where the two reinforce each other so as to increase the total of both to the mutual benefit of the stakeholders, including consumers, advertisers, broadcasters, and consumer electronics companies. **To the extent digital must-carry can avoid or reverse the vicious set-program circle then that alone would go a long way toward accelerating the digital-to-analog transition.**

1. Receiver Manufacturing

The economics of the consumer electronics and broadcasting industries are very different. One sells a durable product and the other sells time (i.e., access to an audience at a given moment that has assembled to watch a specific program). A $4,000 digital set sold today is $4,000 in revenue to the manufacturer and its distributors, even if its potential HDTV capabilities are used little or not at all. **In contrast, an HDTV broadcast of a sporting event today is of no direct financial value to a broadcaster if there is no incremental advertising revenue because there is no measurable audience to watch it.**

As discussed previously, the early market for receivers consists of technophiles and videophiles. They are purchasing "high end" sets. Like all first generation electronic devices (e.g., personal computers or color televisions) "these will be the most expensive ever."[63] The purchase motivation will be driven not by programming, but by the thrill of early adoption.

In the normal course of events - - which is the model of the consumer electronic manufacturers - - there would be a slow evolution. As more programming became available, more consumers would buy sets. Over time, the price of sets would fall and, given the expected elasticity of demand, more sets would be purchased leading to more programming on the supply side and then, in reaction, more demand for sets leading to a larger and larger audience. This is the baseline scenario which can easily take, as previously discussed, 20 years or more.

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[63] CBO, *Completing the Transition*, p.ix.

It is thus not surprising that much of today's high definition programming is supported by set manufacturers, not broadcasters.[64] For example, Panasonic has underwritten the conversion of 17 CBS prime time shows to HDTV during the 2000-01 season.[65] Not surprising also is the manufacturers' apparent desire to transfer the cost of digital programming back to television programmers and broadcasters. Thus, manufacturers complain in a variety of forums that lack of compelling content is a key obstacle to increased digital set sales and that broadcasters and other programmers should do more to create and transmit such content.[66]

But it is the absence of such advertiser-supported broadcast digital content that is the most compelling evidence of the impact of the lack of an audience on digital content production. According to the Consumer Electronics Association (CEA), 15 DTV decoders are currently being sold for every 100 DTV-capable sets.[67] Since about one million DTV sets or monitors have been sold,[68] **the result is that not more than 150,000 of America's 260-270 million television sets would appear to be able to receive broadcast DTV programming, a less than one tenth of a percent penetration rate.**

Since advertising revenues are dependent on a program's ratings (in conjunction with the demographics of its audience), the expectation that an ad that runs on a digital broadcast will not have a meaningful audience provides no incentive for an advertiser to fund digital programming. Obviously, over time, an increasing number of homes will gain the ability to receive broadcast digital channels, but as long as viewership remains *de minmis,* so will expected incremental revenues from digital programming. Therefore, no advertising means no programming which leads to no demand for digital receivers (i.e., a vicious circle).

The critical issue is where is the leverage that can reverse a vicious circle and transform it into a virtuous circle. Assured access to a mass market audience is such a leverage point. Reliable audience access will stimulate the advertising-programming interaction that will

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64 This process can be characterized as 'supply push' as opposed to 'demand pull' that is driven by consumers.

65 "Panasonic to Sponsor Launch of Regularly Scheduled HDTV News Broadcasts," Panasonic Press Release (January 24, 2001).

66 See statement of Richard Lewis, Zenith Electronics Corp., before the Senate Committee on Commerce, Science, and Transportation (March 1, 2001), pp.4-5; see also statement of David Arland, Thomson Multimedia, to the House Committee on Energy and Commerce (March 15, 2001).

67 CEA, "Cable, Content, Copy Protection Are Keys to DTV Transition, Says CEA," Press Release, (April 23, 2001).

68 CEA, "*One-Millionth DTV Product Sold,*" Press Release, (May 2, 2001).

create the demand for sets which in turn will move set prices down the curve into mass market territory. Digital must-carry provide the means to leverage the audience variable in the programming-set equation.

2. Programming

The issue for broadcasters and programming producers is when to undertake the investment necessary to support digital/HDTV/interactive programming. This business calculus, particularly in the current economic climate, is dependent on broadcasters'/programmers' perception as to the timeframe in which digital programming will generate advertising revenue. In turn, the advertising revenue estimate is dependent on the likely viewing audience, taking into consideration that free-to-air television is a mass-market business.

The economics of programming are driven by the size of the potential audience. Digital must-carry will provide the assurance of mass market audience access which in turn should trigger advertising support of program production throughout the complex programming supply chain. That in turn should have a beneficial impact on receiver manufacturing.

The marketplace is already demonstrating the importance of *access* to digital content as a driver of set penetration. DVDs store their content, usually movies, in digital form. Digital televisions, particularly those that can display programming in an enhanced format, such as the "480 progressive" format and/or have a 16:9 display, can reproduce DVDs with a higher quality than that of analog sets. The result is the increasing sale of DTV sets (most of which do not have the capability of receiving over-the-air DTV broadcasts).

Programming that makes use of a DTV's non-broadcast capabilities is readily available through consumers' ability readily to purchase or rent DVDs from the increasingly large stock of available titles. The significance of this access to programming was made clear through recent testimony to Congress by a representative of the Consumer Electronics Association:

> The question that should be asked ... is, "why is consumer demand for digital-ready displays disproportionately greater than it is for DTV receivers or far less expensive DTV converter boxes?"
>
> The answer is simple: readily available content.
>
> Consumers purchasing HDTV monitors know that when they bring their monitor home they can immediately begin to enjoy the

> display's higher quality picture through *abundant* amounts of programming available on DVD. In fact, it does not take a great leap of logic to predict that consumers who are willing to purchase a high-end digital display just to enjoy the *better* picture quality afforded by DVDs, will be the same consumers who will seek to add a DTV tuner to their display device to receive the best picture quality once greater amounts of HDTV are available.[69]

However, unless broadcasters can assure advertisers access to a mass market DTV audience, advertiser support for production of HDTV and other digital programming will be diminished and the demand for sets capable of reception of broadcast DTV will be concomitantly reduced.

F. Digital Must-Carry Constitutes the Catalyst for the Acceleration of the Transition From Analog-to-Digital

The center piece, but not the only component, of an accelerated transition scenario, is digital must-carry. Figure 7 summarizes the key components of an accelerated scenario. Critical characteristics include:

1. **Digital must-carry adopted successfully by the FCC.**

2. **DTV stakeholders reach agreement on key issues (such as all channel receivers and cable set top box-set interoperability).**

The result is that analog turn off could occur in the 2010-2012 period, far earlier than the baseline scenario without assured mass market access as described in Chapter III of this report.[70]

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[69] Testimony of David Arland, Thomson Multimedia, before the House Energy and Commerce Committee (March 15, 2001), p. 4 (emphasis in original).

[70] An example from the history of television would seem to validate the concept of an accelerated transition. In the case of UHF programming, after UHF reception was mandated, the penetration of TV households went from 10% to 86% in ten years.

Figure 7

Broadcast DTV Accelerated Rollout Scenario

Legislation & Regulation	Consumer Electronics & Set-Top Technology	Programming/Content
1. The FCC adopts DTV as a critical issue. 2. FCC resolves cable must-carry (i.e., cable must-carry free-to-air DTV signals up to capacity limits). 3. Proactive FCC mandates all channel receivers as of date certain (e.g., Jan 1, 2004) for sets 13" and larger. 4. FCC resolves all set top box technical issues, including copy protection. 5. Congress recognizes difficulty of shutting off analog in 2006 but makes it a policy priority to achieve turn off no later than Dec. 31, 2010; FCC instructed to facilitate so as to move ahead with next generation wireless networks. 6. Government continues pressure for auctions; channels 60-69 auctions occur no sooner than the schedule set out in the 2002 Budget; similar process with channels 52-59.	1. CE industry reaffirms commitment to U.S. free-to-air DTV; R&D funds committed to improve digital reception; fourth generation chips in sets as of mid-2002. 2. Set prices decline as volume increases consistent with prior CE industry practice. 3. CE industry supports DTV tuners-receivers as one price of moving DTV forward in the U.S. 4. Cable set top boxes available with DTV pass through capabilities. 5. Low-cost digital-to-analog converters available at retail stores in late 2004 for unwired sets.	1. Broadcasters sell advertisers on DTV's audience access; advertising revenues increase. 2. Networks make available significant HDTV programming, particularly sports and movies, as well as other enhanced programming. 3. Local broadcasters use multiplex capabilities to transmit local content (e.g., news and high school sports with channel choice by county). 4. Consumers increase demand for DTV; market pull *begins* to replace supply push circa 2004-05.

G. It is Reasonable to Use Digital Must-Carry to Accelerate the Digital-to-Analog Conversion

In summary the argument for digital must-carry is as follows:

1. **The baseline scenario for the DTV transition without assured mass market access will take over 20 years.**

2. **Non-intervention by the FCC puts simultaneously at risk multiple public policy goals including: (a) free-to-air television as it has developed in this country and been sanctioned by Congress, the Supreme Court, and the FCC; (b) advanced mobile communications applications for businesses and consumers; and (c) spectrum auction revenues for the government.**

3. **If it is not acceptable to abandon such goals (i.e., free-to-air television, advanced mobile communications, and auction revenue), then the FCC should identify and take action on the full range of initiatives that can perform the acceleration function.**[71]

4. **In our judgement digital must-carry is the most effective policy initiative for purposes of transition acceleration. Digital must-carry provides assured audience access that, in turn, will lead to advertiser support for free-to-air digital programming.**

5. **Such programming can trigger mutually reinforcing consumer demand for both: (1) digital receivers; and (2) more digital programming (i.e., dual 'virtuous circles').**

6. **The core issue remains not if the transition will occur but when. If a 2020 and beyond transition is not acceptable, then intervention in the form of digital must-carry is mandatory.**

[71] See Figure 7 for the full set of factors that, if triggered, could accelerate the transition.

Appendix A

BIBLIOGRAPHY

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GOVERNMENT REPORTS AND HEARINGS

Court Decisions and Statutes

Balanced Budget Act of 1997, Public Law 105-33

Cable Television Consumer Protection and Competition Act of 1992, Public Law 102-385

Satellite Home Viewer Improvement Act of 1999, Public Law 106-113-Appendix I

Telecommunications Act of 1996, Public Law 104-104

Turner Broadcasting System v. FCC, 512 U.S. 622 (1994)

Turner Broadcasting System v. FCC, 520 U. S. 180 (1997)

Turner Broadcasting System v. FCC, 910 F. Supp. 734 (D. D. C. 1995)

Agency Decisions

Federal Communications Commission, *Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, Fifth Report and Order,* MM Docket 87-268, 12 FCC Rcd. 12809 (1997)

Federal Communications Commission, *Carriage of Digital Television Broadcast Signals, Final Rule,* CS Docket 98-120, 66 Federal Register 16533, March 26, 2001

Federal Communications Commission, *Carriage of Digital Television Broadcast Signals, Proposed Rule and Final Rule,* CS Docket 98-120,66 Federal Register 16524, March 26, 2001

Federal Communications Commission, *Compatibility Between Cable Systems and Consumer Electronic Equipment, Report and Order,* PP Docket 00-67, September 15, 2000

Federal Communications Commission, *Implementation of the Satellite Home Viewer Improvement Act of 1999, Report and Order,* CS Docket 00-96, FCC 00-417, November 30, 2000

Federal Communications Commission, *Non-Discrimination in the Distribution of Interactive Television Services Over Cable, Notice of Inquiry,* CS Docket 01-7, FCC 01-15, January 18, 2001

Federal Communications Commission, *Reallocation and Service Rules for the 698-746 Mhz Spectrum Band (Television Channels 52-59), Notice of Proposed Rulemaking,* GN Docket 01-74, FCC 01-91, March 28, 2001

Federal Communications Commission, *Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television, Report and Order and Further Notice of Proposed Rulemaking*, MM Docket 00-39, FCC 01-24, January 19, 2001

Agency Reports

Conference Committee on the Satellite Home Viewer Improvement Act of 1999, *Conference Report,* H. Rept. 106-464 (1999)

Congressional Budget Office, *Completing the Transition to Digital Television* (September 1999)

Council of Economic Advisors, *Economic Impact of Third-Generation Wireless Technology* (October 2000)

Federal Communications Commission, *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming,* FCC 01-1, (January 8, 2001)

Independent Television Commission (U. K.), *2000 Annual Report* (2001)

Office of Management and Budget, *The Budget for Fiscal Year 2002* (April 2001)

Comments in Agency Proceedings

Federal Communications Commission, Carriage of the Transmission of Digital Television Broadcast Stations, CS Docket 98-120

- *Comments* of the National Association of Broadcasters, October 13, 1998
-
- *Reply Comments* of the National Association of Broadcasters, December 22, 1998
- *Reply Comments* of the National Cable Television Association, December 22, 1998
- *Petition for Reconsideration and Clarification,* NAB, MSTV/ALTV, April 25, 2001
- *Petition for Reconsideration,* National Cable Television Association, April 25, 2001

Federal Communications Commission, Compatibility Between Cable Systems and Consumer Electronic Equipment, Report and Order, PP Docket 00-67

- Letter from Daniel Brenner, National Cable Television Association to FCC Chairman Michael Powell, February 28, 2001, submitted as an *ex parte* filing in PP Docket 00-67

Federal Communications Commission, Nondiscrimination in the Distribution of Interactive Television Services Over Cable, CS Docket 01-7

- *Comments* of the National Association of Broadcasters, March 19, 2001
- *Comments* of the National Cable Television Association, March 19, 2001

Federal Communications Commission, Review of the Commissions Rules and Policies Affecting the Conversion to Digital Television, MM Docket 00-39

- *Comments* of the Consumer Electronics Association, April 6, 2001
- *Comments* of MSTV/NAB/ALTV, April 6, 2001
- *Comments* of Thomson Multimedia, Inc., April 6, 2001

Hearing Statements

House Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet: Digital Television: A Private Sector Perspective on the Transition, March 15, 2001

- Statement of Chris Cookson, Warner Brothers
- Statement of Martin Franks, CBS
- Statement of David Orland, Thomsom Multimedia
- Statement of Ben Tucker on behalf of the National Association of Broadcasters
- Statement of Michael Willner on behalf of the National Cable Television Association

Senate Committee on Commerce, Science, and Transportation, Hearing on the Digital Television Transition, March 1, 2001

- Statement of Joseph S. Kraemer, LECG, invited as an independent expert
- Statement of Richard M. Lewis on behalf of Zenith Electronics Corp.
- Statement of Ben Tucker on behalf of the National Association of Broadcasters
- Statement of Michael Willner on behalf of the National Cable Television Association

Senate Committee on the Judiciary, Subcommittee on Antitrust, Business Rights, and Competition, Hearing on Cable and Video: Competitive Choices, April 4, 2001.

- Statement of Eddy W. Hartenstein, DirecTV
- Statement of Robert Sachs, National Cable Television Association

INTERNET WEB SITES

Cable Television Advertising Bureau

- Why Cable? *www.cabletvadbureau.com/WhyCable/*

Sky Report

- Local Coverage- *www.skyreport.com/skyreport/local.htm*

Television Bureau of Advertising

- TV Basics *www.tvb.org/tvfacts/tvbasics*
- TV Trends *www.tvb.org/tvfacts/trends*

OTHER DOCUMENTS

BIA Research, Inc., *State of the Television Industry* (2000)

Brown, Les, *Encyclopedia of Television,* Third Edition (1992)

Consumer Electronics Ass'n, "Cable, Content, Copy Protection Are Keys to DTV Transition," Press Release, (April 23, 2001)

Consumer Electronics Ass'n, "One-Millionth DTV Product Sold," Press Release, (May 2, 2001)

Consumer Electronics Assn'n, "Unit Sales to Dealers of Selected Video Products, December 2000," (February 7, 2001)

Cable Advertising Bureau, *Cable TV Facts 2001*

"FCC Auction of Wireless Licenses Raises Record $17 Billion So Far," *Wall Street Journal Interactive Edition* (January 25, 2001)

Head, W., Sterling, C. *et. al. Broadcasting in America,* Eighth Ed. (1998)

Institut de l'audiovisuel et des telecommunications en europe (IDATE), *Development of Digital Television in the European Union, Final Report* (June 2000) (Prepared for the European Commission, DG XIII)

Kraemer, J., "Telephony, Television & the Internet: Convergence Trends and Realities," presentation to the Board of the Canadian Broadcasting Corporation (May 2000)

Kraemer, J. and Levine, R., *Digital Television in a Digital Economy* (1998)

Kraemer, J. and May, R., "Local Exchange Competition," Progress & Freedom Foundation (2000)

Lichty, L., and Topping, M., *American Broadcasting: A Source Book on the History of Radio and Television* (1975)

Moore, G., *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers* (1991)

Moore, G., *Inside the Tornado* (1995)

Museum of Broadcast Communications *Encyclopedia of Television,* Vol. 1 (1997)

National Cable Television Association, "First Amendment Suggests Market Approach to Digital Television Transition," Press Release, April 18, 2001

National Cable Television Association, *Cable Television Overview 2000*

Owen, B. and Wildman, S, *Video Economics* (1992)

Panasonic, "Panasonic to Sponsor Launch of First Regularly-Scheduled HDTV News Broadcasts," Press Release, January 24, 2001

Sachs, R., Address to The Media Institute, April 16, 2001, NCTA Release

Statistical Research, Inc., "Analysis of Data from *The Home Technology Monitor,* Fall 2000 Survey," prepared for LECG, April 2001

Sterling, C. and Kittross, J., *Stay Tuned, A Concise History of American Broadcasting,* Second Edition (1990)

Universal McCann, "U. S. Advertising Volume 2000-2001 (2001)

Walker, J, and Ferguson, D., *The Broadcast Television Industry* (1998)

Warren Communications, *2001 Television and Cable Factbook*