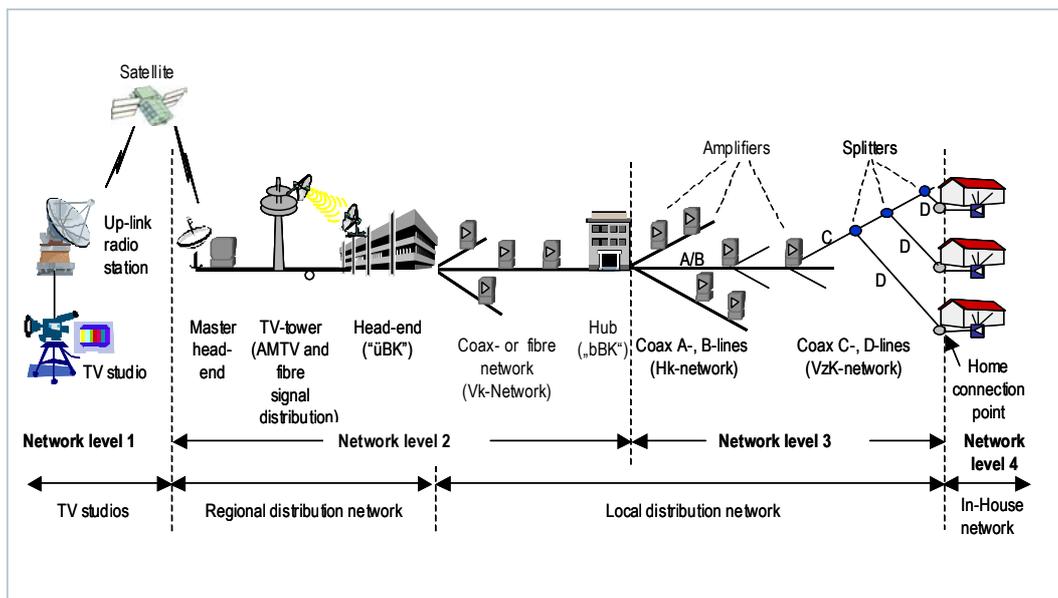


Broadband Cable in Germany 2005

Market Overview

Executive Summary

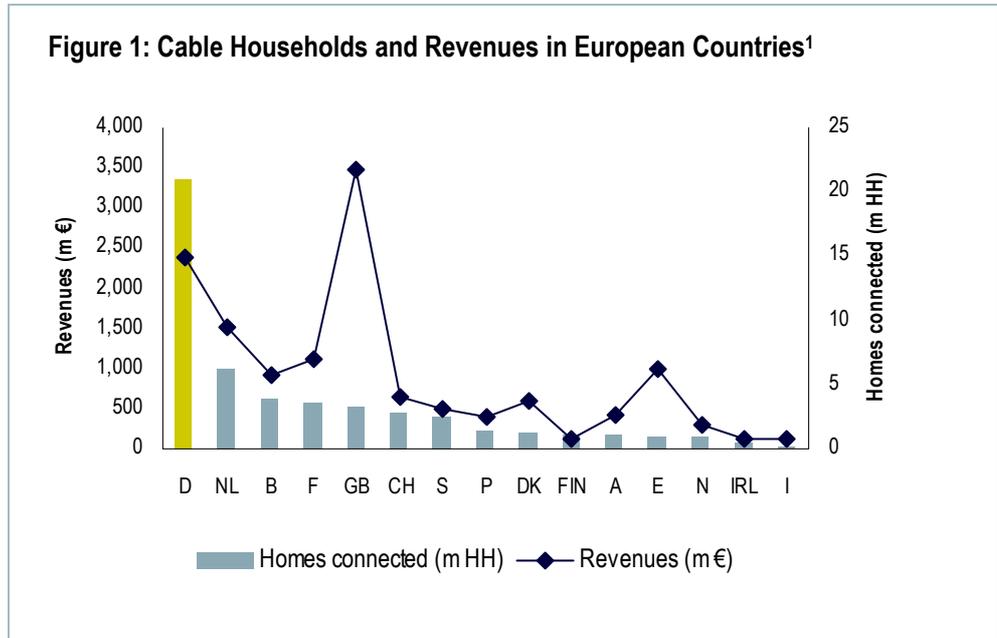
- The German cable market is characterized by a large customer base but relatively low revenues per subscriber. Reason is the low degree of diversification. New services such as Digital TV, Internet and telephony will however lead to a turnaround.
- The slow consolidation process reduces the current market fragmentation.
- The access market has a volume of 2.1 bn €. After a slight decline, the number of subscribers has stabilized in 2004.
- The introduction of KDG's „Kabel Digital Home“ offer has created a new impulse for both Digital TV as well as Pay TV services.
- Cable Internet and telephony offers are increasingly successful, upgrade level and marketable base are however still rather low.
- Main competitors for TV access are Satellite and increasingly DTT, in the future TV over DSL is expected to increase the competitive pressure.



1. Market volume: International comparison

German cable market offers attractive customer base...

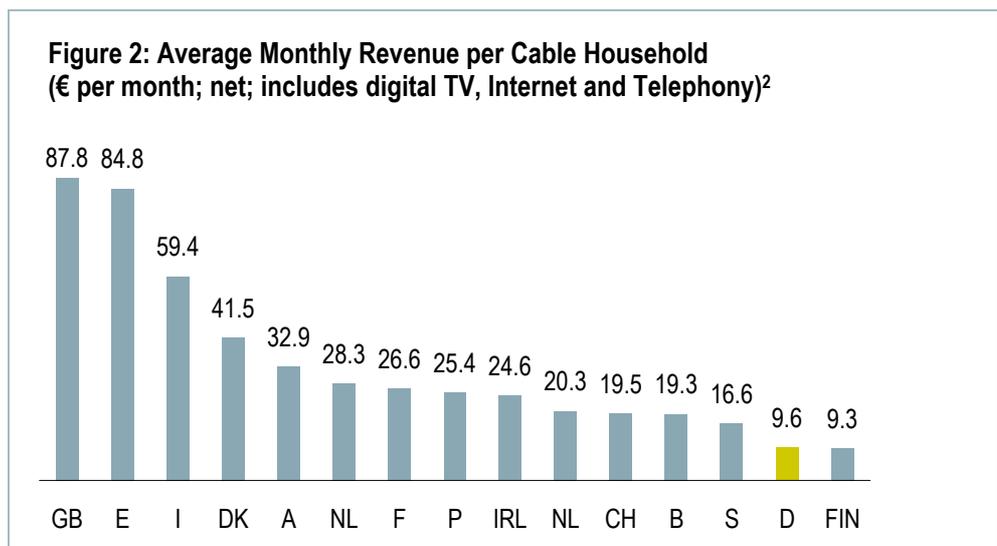
More than 70% of the nearly 38 million TV households in Germany are technically able to receive television signals over the cable TV network. Almost 21 million households are actually connected to the networks of the various cable operators. Consequently, the German cable TV market has not only more subscribers than any other market in Europe (see Figure 1), it also is the second-largest cable TV (CATV) market worldwide. Only the USA with its 73.5 million homes connected count more subscribers.



...but below-average revenues

However, the size of Germany's cable market is only partially reflected by its revenues. With 2.3bn € in annual revenues, Germany's cable TV market ranks second after Great Britain (3.5bn €) in Europe.

The discrepancy between the number of homes connected and the actual market size becomes even more evident by looking at the average revenue per cable household. Here, the German cable market ranks second to last in Europe.



¹ Advanced Television (2004); ANGA (2004); Germany: Solon analysis.

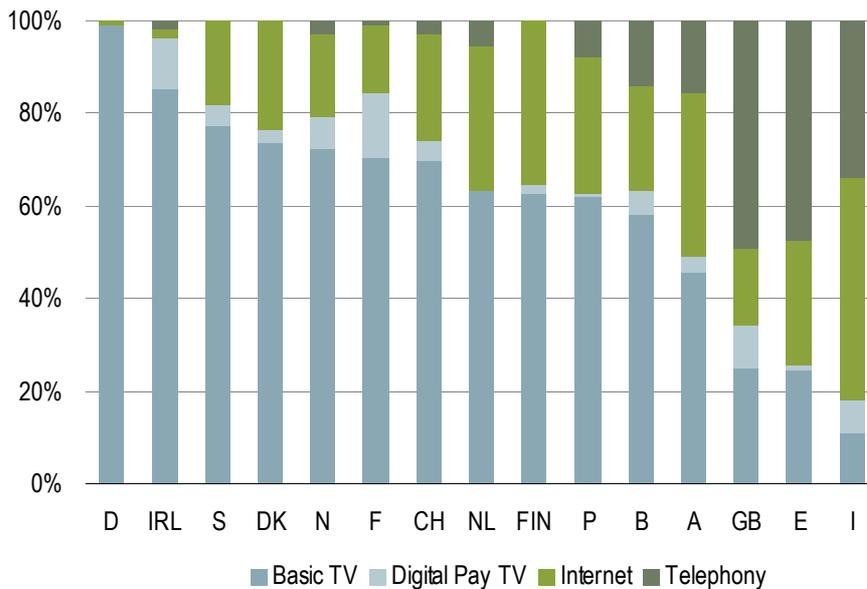
Unlike in most other European cable markets, German cable operators have so far failed to expand their product range into innovative new services. In most European markets only about 60% of cable revenues are generated from basic access fees, whereas in Germany still more than 90% of CATV revenues originate from this source.

German cable operators are poorly diversified

The German cable market has not kept pace with its European peers for several reasons:

- The considerable delays in divesting the large Level 3 (L3) operators Kabel Deutschland, ish, Kabel BW and iesy by Deutsche Telekom resulted in postponing investments necessary for future services, such as creating attractive Digital TV packages or upgrading the networks to provide bidirectional services and higher bandwidth.
- The complex, both structurally and regionally fragmented market structure in Germany has aggravated efforts to upgrade the cable networks even after the divestment from Deutsche Telekom. Consequently, large portions of the German cable networks do not fulfill the technical prerequisites for offering interactive services such as Internet or Telephony.
- Due to unclear demand forecasts, L3 operators have so far made only cautious attempts to enter the digital TV market.

Figure 3: Revenue Share of Different Services
(% of total cable revenues)³



Last year's development, however, points out a trend reversal, which will show positive effects in the upcoming years:

...but on the right track with regard to Digital TV and Internet

- With its successful introduction of a mid-tier Digital Pay TV program, Kabel Deutschland proved that considerable demand exists for high-quality, value-added TV programs, despite broad Free TV offerings and rather high TV licence fees ("GEZ fees") for German public broadcasting.
- Kabel BW's new marketing and investment strategy is an important first step in upgrading the cable network. Within one year, the company upgraded 700,000 L3 households and achieved an average penetration of 6%, in some regions up to 20%, of the marketable base of upgraded homes connected.

² Advanced Television (2004); Germany: Solon analysis, based on end customer revenues, excluding signal delivery fees of L4 and L3 operators.

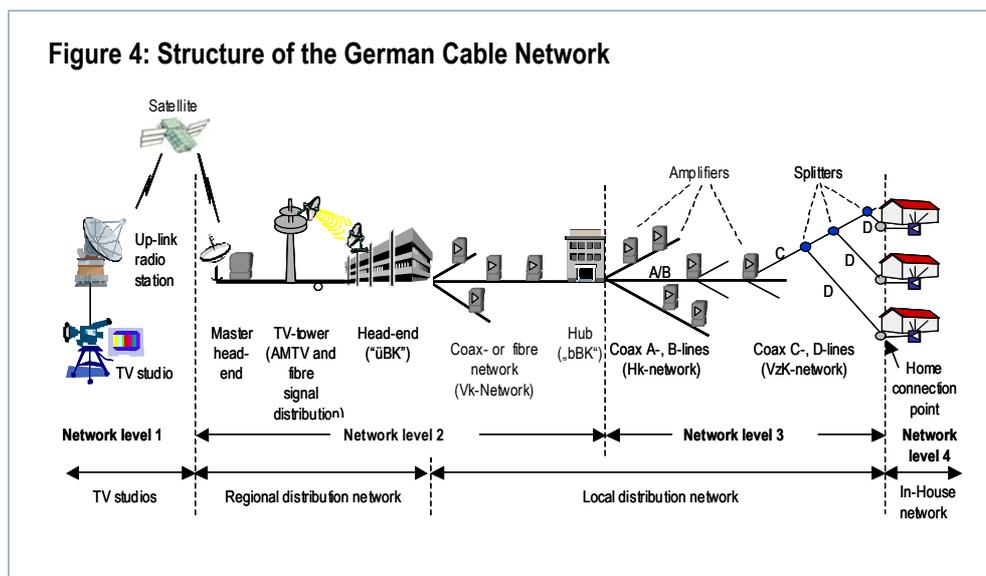
³ Advanced Television (2004); Solon calculations.

These developments are revealing first signs of a permanent transformation of the German cable market from a low-growth utility business into a diversified growth industry.

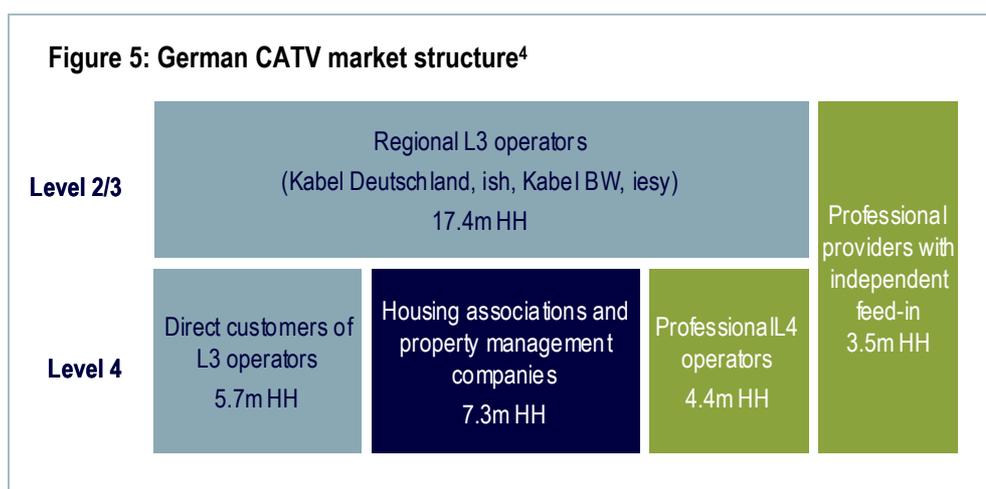
2. Network and market structure

The market structure is determined by the network structure

A key factor for understanding the German cable market is the separation of cable networks into four different levels. This separation determines both, market structure and value chain (see Figure 4).



Level 1 is served by TV broadcast companies like ARD/ZDF, Pro7Sat1 and the RTL Group. The term "cable operator" mainly refers to Level 2, 3 and 4. Whereas Levels 2 and 3 (L2 and L3) cover signal feed at the head-end, local distribution, and transfer point in the basement of a house or building, Level 4 (L4) covers the distribution of signals within a single building or building complex all the way to the TV socket in the individual residential unit.



L3 operators structured along federal states of Germany

Level 3 Operators

Level 3 is dominated by the "big four" L3 operators ish (NRW), Kabel BW (Baden-Württemberg), iesy (Hessen) and Kabel Deutschland (other federal states). These operators deliver TV signals to both direct end customers and to professional L4 operators. Nearly

⁴ Advanced Television (2004); ANGA (2004); Solon research; the range of estimates for operators with own signal feed-in varies widely, extending from 3.5m [ANGA (2004)] to 7m households [FRK (2004)].

17% of CATV households are served by the professional in-house network operators (also known as “L4 operators”), which have their own, independent signal feed.

Level 4 Operators

The L4 segment is served by the four L3 operators, a few large L4 operators and a considerable number of small to mid-sized L4 operators (see Table 1).⁵

Table 1: Leading Cable Operators in Germany⁶

Cable operators	Level 3 / Level 4	Number of connected households in L3 ⁷	Number of direct customers
Kabel Deutschland	mainly L3	9,720,000	3,140,000
ish (NRW)	mainly L3	4,100,000	1,230,000
Kabel BW (BaWü)	mainly L3	2,310,000	720,000
lesy (Hessen)	mainly L3	1,240,000	550,000
TeleColumbus	mainly L4	15-20% of HH	2,600,000
EWT/ tss/ Bosch	(L3)/ L4	45-50% of HH	1,780,000
PrimaCom	(L3)/ L4	45-50% of HH	990,000

The L3 operators have direct access to 5.7m end customers. Another 7.3m households have a quasi-direct connection to the L3 operators: The intermediary is typically a housing association or property management company without an economic interest in the operation and marketing of cable networks. Upon approval by the building owners, the L3 operators are able to address these customers directly for purposes of marketing new products (such as Digital TV).

The segment of L4 operators is dominated by three large providers, together serving about 5.4 million cable households: TeleColumbus, EWT/Bosch and PrimaCom. Additional 2.5m households are served by smaller L4 operators. Unlike the networks of the L3 operators, the networks of the L4 operators are – with the exception of some regional agglomerations - spread out all over Germany.

The segment of L4 operators is currently exposed to increasing consolidation. Due to the acquisition of mostly smaller L4 operators the large L4 operators have reached an average annual growth rate of 4.5% over the last five years.⁸ This development has peaked in December 2004 with the acquisition of Bosch Breitbandnetze by EWT/ tss, a company merely half the size of the acquisition target. As a result of the acquisition of the Munich-based KMS, the Pepcom Group has entered the league of the largest L4 operators with now approx. 400,000 cable customers.

Unlike in most other European markets, where the cable networks of a given region are completely integrated, the German L3 and L4 networks are integrated only for the direct customers of the L3 companies and for the L4 operators with an independent signal feed (see Figure 5).

L4 and L3 operators compete with each other and with independent housing associations for residential customers and concessions.

Continued
L4 consolidation

⁵ Estimates range from approx. 4,000 to 5,000 L4 operators; only 430 companies currently hold the appropriate license from the German regulatory authority RegTP [WIK (2002), p. 46].

⁶ Advanced Television (2004), FRK (2004), Anga (2004), company data; Solon research.

⁷ With regard to the L4 operators, the percentage refers to the proportion of direct customers that are supplied with an independent signal feed.

⁸ Since their independence from Deutsche Telekom, the L3 operators are also participating in the market consolidation process by making smaller acquisitions.

Competition between L4 and L3 operators

Competition for residential customers begins when a housing association decides to award a new concession for CATV distribution to a cable operator. Reason for the new concession is either the expiration of an existing agreement or the decision of the housing association to give up handling the CATV distribution by itself (see also the section on Contract Structures).

Intense competition for concession agreements ...

Due to the general stagnation of the German cable market, the competition for concession agreements has intensified in recent years. Especially the large L4 operators like TeleColumbus and EWT/Bosch are sometimes fiercely competing for concession agreements. Furthermore, also L3 operators have entered the L4 market after the divestiture from Deutsche Telekom (Before, Deutsche Telekom was not allowed to compete with L4 operators).

The technical infrastructure is along with the pricing a key selling point, especially for larger concessions. Upgraded, bidirectional in-house networks supporting Internet and telephony as well as providing sufficient capacity for innovative TV offerings are increasingly becoming the market standard.

Especially smaller operators are not capable to keep up with the intensifying competition, as they frequently lack the financial resources to upgrade their networks and offer new services. Thus, more and more small providers are declared for sale and consequently the number of such providers will continue to decline in the coming years.

... at the same time cooperation concerning the provision of new services

Despite the competitive situation, the growing market acceptance of new services will also promote increased cooperation between L3 and L4 operators. When it comes to Digital TV, only the large cable operators have the necessary power to negotiate attractive content deals. Already today, all large L4 operators have entered into cooperation agreements on the purchase of digital foreign-language packages from the corresponding L3 providers. Furthermore, Kabel Deutschland has signed first reseller agreements for the German-language Digital TV program of Kabel Digital Home.

Similar developments can be expected for Internet and Telephony. Such offers will be locally operated, but not all the sub-networks of the L4 operators are large enough to economically operate their own Internet infrastructure including the necessary customer service.

Competition with housing associations

Driven by excessive valuations of cable companies in 1999 and 2000, some larger housing associations cancelled their contracts with cable operators in order to operate their in-house networks independently. Other housing associations pooled their cable networks (e.g., "Netzpool Berlin GmbH") in order to exploit size advantages.

Some housing associations, however, were disappointed with the results:

- Ongoing costs of network operation as well as required upgrade investments proved to be higher than expected.
- The demand for new services has so far been relatively low, especially compared to the high costs of providing and marketing new services.
- The decision-making processes within a group of companies with different interests proved to be complicated and time-consuming.

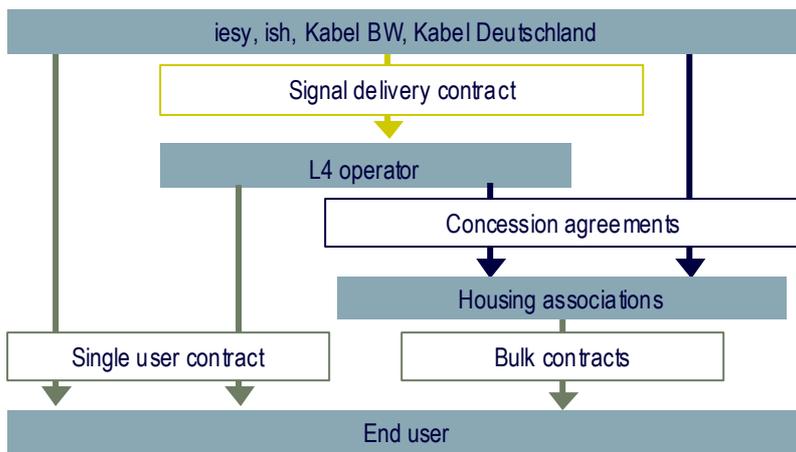
Therefore, most housing associations have returned to professional cable operators to operate their cable networks.

Contract structures

The complexity of the market is reflected in a complex structure of contractual and customer relationships (see Figure 6).

Complex structure of contractual relationships

Figure 6: Typical Contract Structures and Billing Relationships



The delivery of TV signals is governed by signal delivery agreements between L3 and L4 operators. These agreements are structured in accordance with standard Terms and Conditions, but they sometimes feature individual adjustments. Generally, the fees for signal delivery are based on standardized price lists, which feature volume discounts depending on the number of residential units connected at the home connection point.

Concession agreements are entered into between the housing association and the L4 or L3 operators. These agreements grant the exclusive right to operate cable networks in the residential buildings and are characterized by a wide variety of contractual arrangements. The building's internal cable network may be owned by the cable operator, alternatively the cable operators may only have a right to use the (existing) infrastructure for a definite period of time.

Individual user agreements guarantee direct relationships with the end customer. Such agreements may be concluded directly with the tenants based on a concession agreement. However, many housing associations prefer a collective billing system (bulk contracts) under which the cable fee is included in the common fees payable to the building owner. In this case, the cable operator has only an indirect relationship with the end customer.

3. The CATV access market

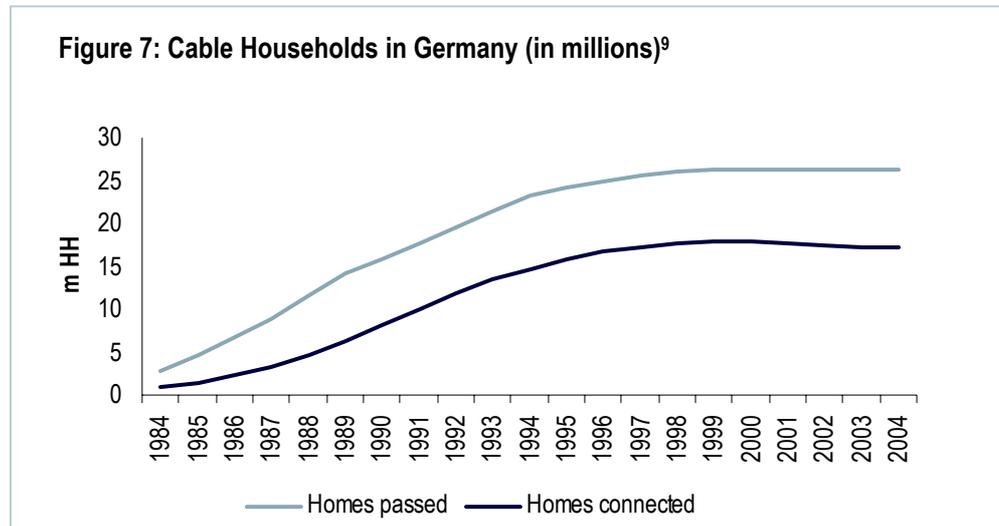
Until the late 1990s, the German CATV access market – measured in terms of homes passed and homes connected followed a trend of steady growth (see Figure 7). In the last few years, however, the number of cable subscriptions remained constant. In the years 2000 to 2002 the big cable operators even faced a slight decrease in cable subscribers.

Following a slight decrease, the number of L3 subscribers stabilized in 2004

In the future, the German CATV market will at best stagnate, even a slight decline in the number of cable households cannot be ruled out:

- The main growth potential of the cable access market - households using terrestrial TV reception - has been largely exhausted. In the medium term, the massive efforts to reactivate this medium by introducing digital terrestrial television (DVB-T) will lead to a stabilization or even a slight increase in the market share of terrestrial television.
- The satellite TV market continues to grow. Especially in the segment of relatively expensive individual connections, satellite TV has the potential to win market shares at the expense of cable TV connections.

- DSL operators are beginning to expand their offerings of interactive TV (mainly VoD at present) and are thereby increasing the competitive pressure on cable operators.
- Finally, the investment required to install new cable networks is relatively high. Regions without cable so far are characterized by low population densities, thus the proportion of costly underground construction is quite high.



Market volume of access market: 2.1bn € in 2004

Given an average monthly basic access revenue of 8.57 €¹⁰, the market volume of the access market amounts to approximately 2.1bn €.

4. TV market

The German TV market is characterized by a large Free TV offering and a small, but steadily growing Pay TV segment.

Analog TV

The standard offering of the German CATV operators consists of a bouquet of 32 to 35 analog TV channels, for which the end customer pays a monthly service charge of between 5 € and 20 €¹¹, depending on the cable operator and discount scale. The latest round of price increases by L3 operators, which took place from mid to end 2002, generated average price increases between 7% and 10%. For 2005, the price-raising scope is limited, especially due to the introduction of DVB-T. Therefore, only segment-specific price adjustments of limited extent can be expected this year.

Analog TV market consists exclusively of Free TV

Due to extensive “must-carry” regulations, the 32 to 35 analog cable channels are entirely allocated to public and private free-TV programs, at present. For years, the Free TV offering has been dominated by three big groups: ARD/ZDF, the RTL Group and Pro7Sat1 (see Figure 8).

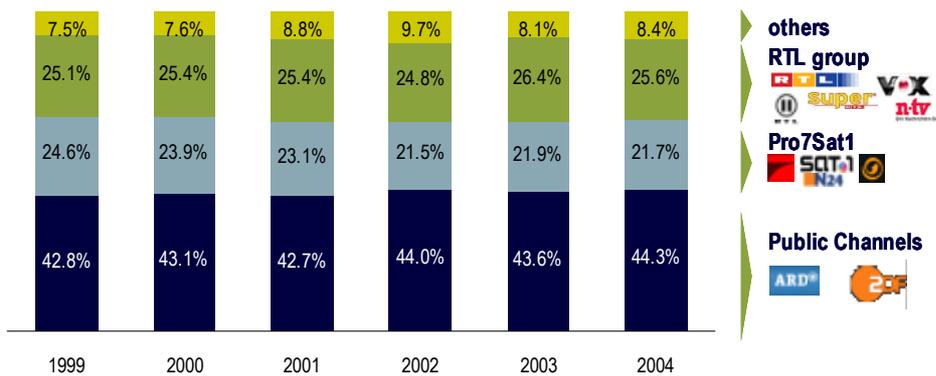
In exchange for their obligation to carry the Free TV programs, the German cable operators receive a modest signal delivery fee (see Figure 9) from the TV broadcast companies, which together with the basic service charges from the end customer cover the costs of providing this basic package.

⁹ RegTP (2002); as of 2001 Solon research; figures only refer to those households that are connected to the broadband cable infrastructure of the big L3 operators Kabel Deutschland, ish, Kabel BW and iesy.

¹⁰ Solon analysis, only basic service revenues with end customers, excluding Digital TV, Internet and Telephony, as well as signal delivery fees of the L4 operators.

¹¹ Solon analysis.

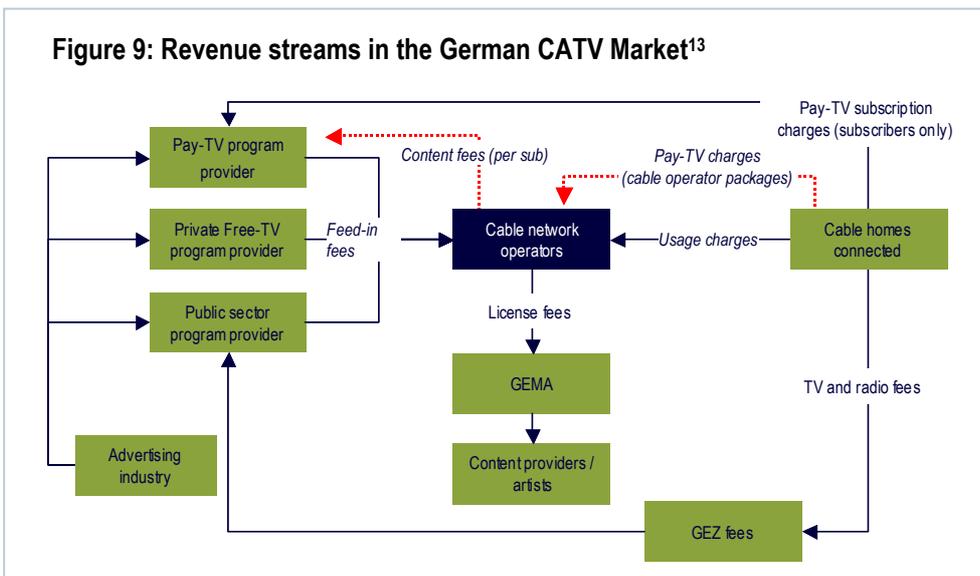
Figure 8: Viewer Market Shares in Free TV¹²



Digital and Pay TV offerings

Most of the German cable networks have not been upgraded, yet. Thus, Digital TV is being transmitted in the so-called “Hyperband”, using the frequency spectrum between 302 and 446 MHz. Currently, a total of 12 digital channels is available in the hyperband, another three channels are being used for analog transmission. Using available compression technologies, 10 to 12 programs can be transmitted on each of the digital channels. Thus, the hyperband has room for up to 144 programs. Additional capacities could be made available by using newer compression technologies or by upgrading the networks to 606 or even 862 MHz. At the same time, innovative new services such as HDTV require more capacity than conventional TV programs.

Figure 9: Revenue streams in the German CATV Market¹³



The 12 digital channels of the hyperband are split among the different providers as follows:

- Three channels are reserved for the digital bouquet of the public TV stations;
- Five channels have been allocated to Premiere under a long-term contract;
- In principle, the cable operators are free to decide on the use of the remaining four channels.

Without further technical investments, the cable operators have only four digital channels at their disposal

¹² AGF/GfK Fernsehforschung

¹³ Black arrow: Current revenue streams; red, dotted arrow: additional revenue streams once the cable network operators offer their own pay TV bouquets; Solon analysis.

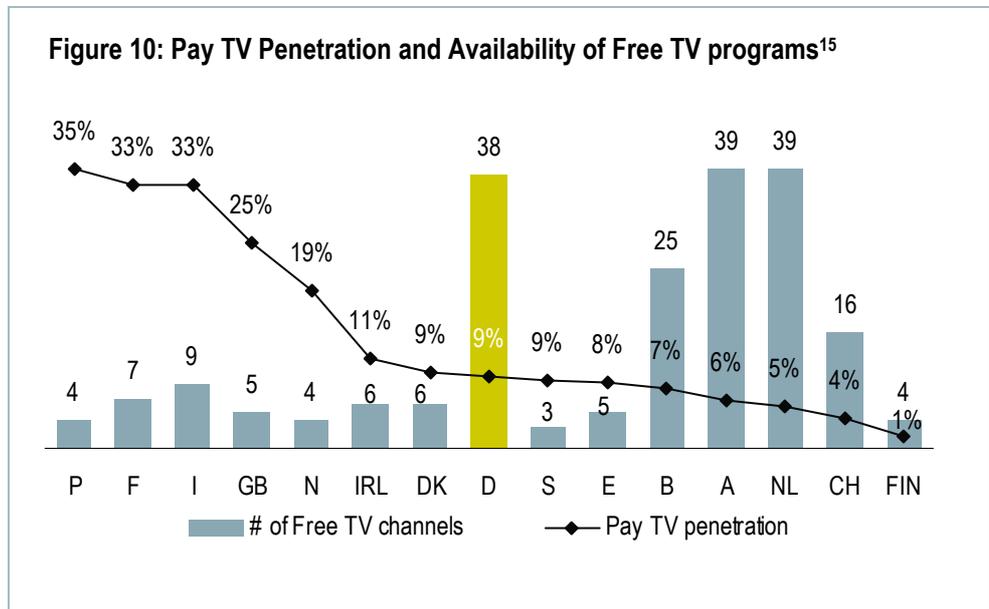
In the past, users of Digital cable TV in Germany were mainly Premiere subscribers. Consequently, in Germany Digital TV is often considered synonymous with Pay TV. Additionally, the digital programs of public TV stations could not attract a large audience as only few households possess the necessary set top box.

For a long time, cable operators were reluctant to offer their own digital bouquets. Until recently, it was widely believed that the German TV market would not offer attractive market prospects for additional Digital and Pay TV programs because of the large Free TV offering and the high level of public broadcasting subscription fees (“GEZ”) (see Figure 10)

However, at the latest since 2004 the perception of Digital TV and even Pay TV has begun to change. There are various reasons for this change in attitude:

New impulses for Digital TV since 2004

- The two largest players in the German cable industry, Kabel Deutschland and ish, have introduced their own digital bouquets, which are clearly differentiated from the Premiere service (average monthly fee of 23.80 €) through the wide variety of content offered and the low to mid-range pricing (4 € to 9 € per month). In particular, the market introduction of Kabel Digital Home¹⁴ in October 2004 provided a lasting growth boost to the Digital Pay TV market. Thus, within only three months, nearly 70,000 subscribers were acquired.
- Attractive new programs (including National Geographic, Playboy, Disney) have only recently become available in the German market; in total, 25 new digital programs have been introduced.
- The introduction of Digital Terrestrial TV generated extensive publicity for Digital TV.
- The growing number of high-resolution TV sets (LCD and plasma screens, beamers) is raising awareness regarding transmission quality.



The introduction of digital programs by Pro7Sat1 and RTL can be expected to stimulate the market further

In the coming years, further stimulation can be expected due to the introduction of digital offerings by the big broadcasting groups RTL and Pro7Sat1. As they finance their programs by means of advertising revenues the private TV stations so far remained reluctant to

¹⁴ Program offering of Kabel Deutschland: 31 TV channels, including Disney, History Channel, National Geographic and Playboy, for 9 € per month.

¹⁵ Advanced Television (2004), Solon research.

venture into the world of Digital TV. Moreover, they even chose not to simulcast¹⁶ their programs in Digital TV.

Due to lacking advertising revenues and the small digital audience, the costs of processing digital content could not be refinanced up until now. Additionally, the large number of niche channels has prompted industry players to worry about an erosion of their market shares. But the successful introduction of Kabel Digital Home has induced a change in these attitudes. Both Pro7Sat1 and RTL have announced the production own digital niche programs. Furthermore, discussions about a possible simulcast of both TV groups' Free TV offerings are continuing. Thus, it is reasonable to expect these plans to be realized in 2005.

The growing movements towards Digital TV and especially Pay TV will alter the business models in the TV distribution business permanently. Cable operators will continue to collect subscription fees from end customers for their Pay TV packages (see Figure 9), but will pass on a portion of these revenues to the participating TV channels. The proportion of revenue transferred will depend on the popularity of each channel.

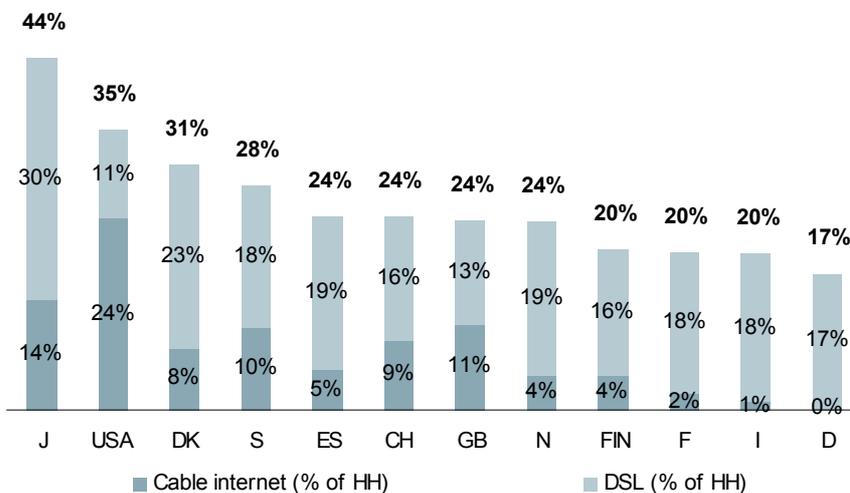
5. Internet and Telephony

Due to its potentially unlimited bandwidth, the cable network is well-suited for transmitting interactive broadband services such as Internet, Telephony and video-on-demand (VoD).

Germany is currently lagging behind most other comparable countries with respect to both, Internet penetration in general and broadband penetration in particular (see Figure 11). Among other factors, especially the backlogged demand causes experts to project strong growth for the German Internet and broadband market in the coming years (see Figure 12).

Cable Internet is in its infancy in Germany

Figure 11: Broadband Penetration in International comparison (2004)¹⁷



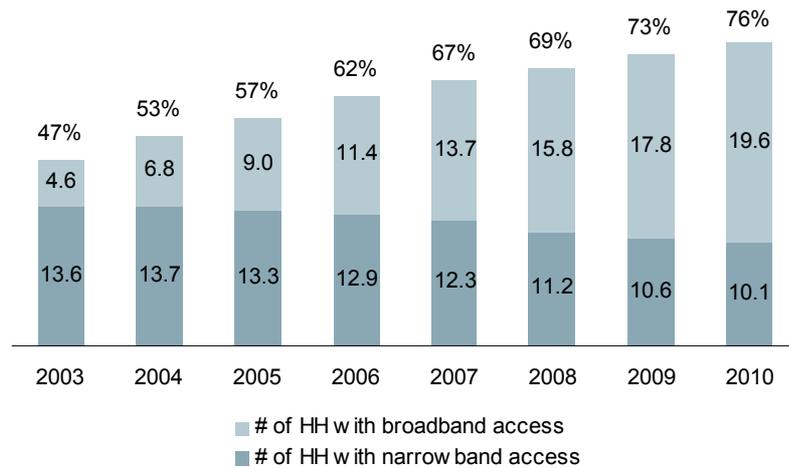
Upgrading of the existing cable networks in order to allow bidirectional traffic and greater bandwidth is prerequisite for an Internet offer. The currently prevalent upgrading standard requires the replacement of all amplifiers in L3. Depending on the network structure, capital expenditures from 20 € to 30 € per home passed can arise, regardless of the attainable household penetration.

Biggest obstacle to date: Lack of network upgrade

¹⁶ Simulcast: Simultaneous broadcast on analog and digital channels.

¹⁷ Bitkom (2005).

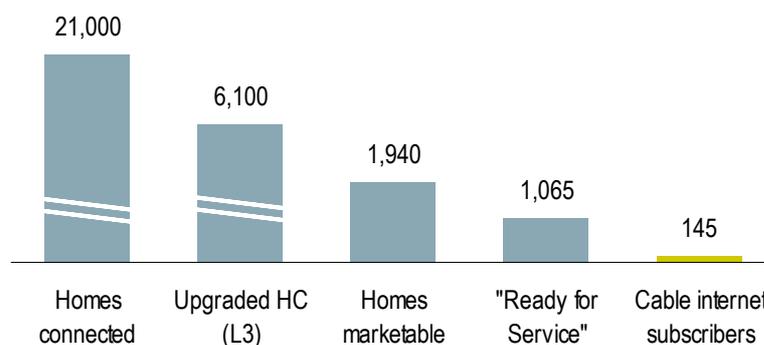
Figure 12: Internet Penetration in Germany until 2010
(% of all households)¹⁸



Upgrading the networks within the building entails replacing the amplifier and in some cases also converting the networks from a tree structure (all apartments connected to one cable) to a star structure.¹⁹ The costs for upgrading L4 vary between 150 € and 300 € per household, depending on whether only the amplifier has to be replaced or a new line needs to be laid as well.

By using the new Internet telephone technology (VoIP), cable operators with upgraded networks can offer Telephony at a relatively small additional set-up cost. Thus, the long-awaited transition to “triple play” (TV, Internet and Telephony) would become a reality. At the same time, the cable operators would gain access to the telephony market, which generated revenues of approximately 22bn € in 2003, making it nearly ten times bigger than the cable access subscriptions market itself.

Figure 13: Degree of Network Upgrade, Marketable Base and Cable Internet Customers (in thousands)²⁰



While many European cable operators were quick to take advantage of the opportunities posed by broadband Internet, German cable operators have been slow to upgrade their networks. At the end of 2004, 25% of homes passed were served by an upgraded network and only 15% of those were in fact “ready for service.”²¹ Due to the complex structure of customer relationships and the gap between homes passed and homes connected, the

¹⁸ Goldman Sachs (2004), Jupiter Research (2004).

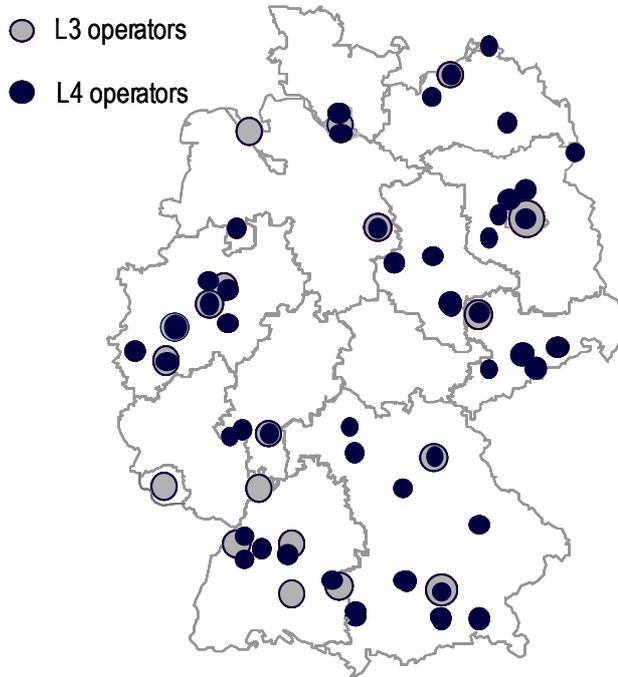
¹⁹ Although the L3 operators typically seek to upgrade the entire in-house network of larger properties, for smaller properties they have adopted the practice of connecting only individual customers with a single “ray of the star”, which essentially entails installing a limited parallel infrastructure.

²⁰ Goldman Sachs (2004), RegTP (2005), Solon research.

²¹ “Ready for service”: upgraded up to and including L4 and connected to the Internet platform.

different cable operators can market Internet and partly Telephony services only to 1.9m cable households at present. An average penetration of 7% of the marketable base has been achieved, representing approximately 145,000 cable Internet customers (see Figure 13).

Figure 14: Overview of Cities/Regions with Cable Internet Offerings in Germany²²



Besides the blockade of L3 operators as a result of the protracted divestment process, the main reasons for the slow paced upgrade of the cable networks have been the separation of L3 and L4 and the regional fragmentation of L4 operators. The outcome is a patchwork quilt of small upgraded regions served by around 35 cable operators offering Internet service (see Figure 14).

However, comparable to Digital TV, cable Internet in Germany is on the cusp of expansion. Already in 2004, the number of cable Internet customers doubled compared to the previous year.²³ Thanks to the innovative marketing and network modernization strategy it pursued in 2004, Kabel BW, more than any other operator, proved that cable Internet has good prospects in Germany, despite the dominant market position of DSL. In some of the regions with upgraded networks, Kabel BW gained a market share of up to 25% of broadband connections and achieved an average penetration of 6% of marketable²⁴ households within just one year – a penetration rate other operators needed three to four years to achieve.

Kabel BW's success can be credited to four key factors:

- Attractive flat rates for Internet service including the telephone line rental which were competitive with even the most aggressive DSL operators and made the customers independent from Deutsche Telekom.
- Low- and mid-speed offers: By offering different flat rates for low- and mid-speed access (64 kBit/s, 128 kBit/s, 256 kBit/s and 512 kBit/s), Kabel BW was able to reach those Internet users that do not need high speeds but appreciate the convenience of a flat rate. Consequently, Kabel BW picked up customers in the so

²² Teltarif.de, Solon research, with no claim of being exhaustive; the different network upgrade regions are sometimes served by the same cable network operators.

²³ RegTP (2005).

²⁴ Upgraded homes connected for which Kabel BW holds the marketing rights.

far unserved area between ISDN and DSL and thereby participated (like other cable operators) in the growth of the entire Internet market, and not only the broadband market.

- Aggressive marketing: By pursuing a city-wide upgrading approach, Kabel BW was able to launch broader-based marketing campaigns, including billboard advertising, promotions and point-of-sale actions. The previous practice of upgrading the network only for individual apartment buildings or neighborhoods, limited cable operators to direct marketing actions, such as sending sales representatives or mailing promotional materials to potential customers.
- Demand-based upgrading of in-house networks: In L4, Kabel BW only modernized the connections for actual Internet customers, instead of the entire building network. This policy resulted in a substantial reduction of the initial investment and the respective marketing risk.

As other cable operators are increasingly adapting the successful network upgrade and marketing strategy of Kabel BW and as the networks are upgraded in additional cities (Kabel Deutschland alone plans to modernize its network in 10 additional cities in 2005), the cable Internet market is bound to undergo a growth spurt in 2005 and beyond.

6. Competition by alternative technologies

Technologies competing with Cable TV reception are Satellite TV and (the increasingly digital) Terrestrial TV. Although the German market is currently dominated by cable TV reception, Satellite TV has gained a substantial market share of almost 39%, representing 14.2 million households. Analog terrestrial reception has steadily lost market share in the last few years, but the growing prominence of Digital Terrestrial TV can be expected to stop this trend. Following a slight decrease in subscribers in 2000/2001, the market share of cable TV reception has stabilized again over the last two years (see Figure 15).²⁵

The major competitors for interactive services in general and for cable Internet in particular are the various DSL providers. Despite high advertising expenditures, other broadband Internet platforms such as satellite and power line have not gained significant acceptance by the market over the last few years.

Satellite reception

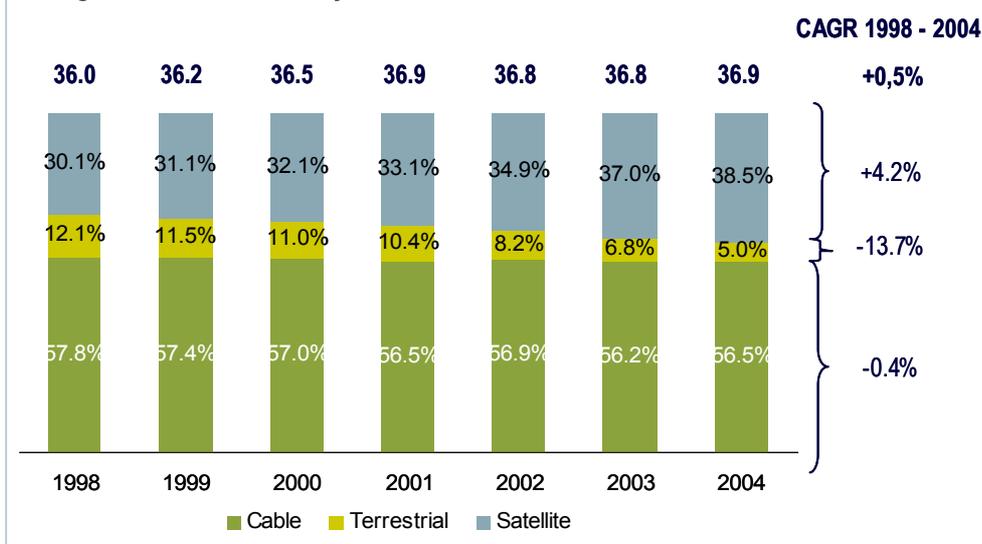
Particularly in the segment of smaller properties (single and double-family homes), satellite reception is currently the strongest alternative to cable. In the past, both satellite and cable reception grew at the expense of terrestrial television (see Figure 15). But this customer potential is gradually being exhausted. More and more, satellite and cable reception are competing directly.

The end customer benefits from satellite reception primarily in the form of a larger selection of available programs. Furthermore, satellite is often less expensive as well: The reception of Free TV programs via satellite requires a one-time investment only,²⁶ whereas cable subscription is charged on a monthly basis. Detailed calculations on the cost advantages of satellite reception depend on a variety of factors, including the number of residential units connected to a satellite reception network and the number of TV sets used in such units, as well as the possibility of receiving Pay TV programs.

Satellite TV is CATV's
strongest competitor

²⁵ The latest reception statistics of Infratest (SES/Astra [2005]) for the end of 2004 indicate a much higher market share for satellite reception (42.7%) and a sustained erosion of the cable TV market share from 55.6% at the end of 2003 to 53.5% at the end of 2004. However, this trend is not supported by the market information available to Solon

Figure 15: TV in Germany: Alternative Infrastructures as % of TV Households²⁷



Despite these advantages, there are also significant reasons why consumers would not want to switch to satellite reception. Unlike cable, for example, satellite reception requires continuous technical maintenance and – at least for larger appartement blocks - also entails legal problems. Market interviews suggest that many housing associations in particular have little inclination to switch to satellite reception due to these problems.

The main obstacle to switching to satellite reception is rooted in legal considerations. The current jurisdiction does not entitle residents of multi-dwelling buildings with access to a cable connection to install an individual satellite dish without the consent of the housing association. Exceptions are made if the tenant can prove a special interest in satellite reception, i.e. foreign residents without access to programs in their native languages via cable network. Despite a recommendation by the EU Commission in 2001 that upholds the right to freely receive programs via satellite, experts do not expect any significant changes in the legal situation in Germany.

Apart from the current legal status, German cable operators will have no choice but to differentiate their offerings more distinctly from satellite offerings by introducing innovative, interactive products such as VoD, Internet and Telephony. These products offer sustainable protection against the loss of market shares to satellite providers because satellite reception has no direct feedback channel.

Digital Terrestrial TV

Acting on a recommendation by the *Digital Broadcast Initiative* (known by its German acronym IDR), the federal government of Germany has decided that TV signals will be switched from analog to digital transmission. This conversion is to be completed by the 2010.²⁸

Under the current spectrum allocation regime Digital Terrestrial TV (DVB-T) allows to broadcast up to 24 digital programs.²⁹ The introduction of DVB-T will take place in three phases. In the first phase, the technical feasibility was tested in regional pilot projects. The second phase, the roll-out of DVB-T in densely populated areas, is currently in progress

Disadvantages of satellite reception include high cost of installation and ongoing maintenance needs

DVB-T: Limited threat to cable reception in the mediumterm future

²⁶ A satellite dish or satellite reception network and one satellite receiver per connected TV set for small systems without conversion of the TV signals

²⁷ Federal Statistical Office (2004), Solon.

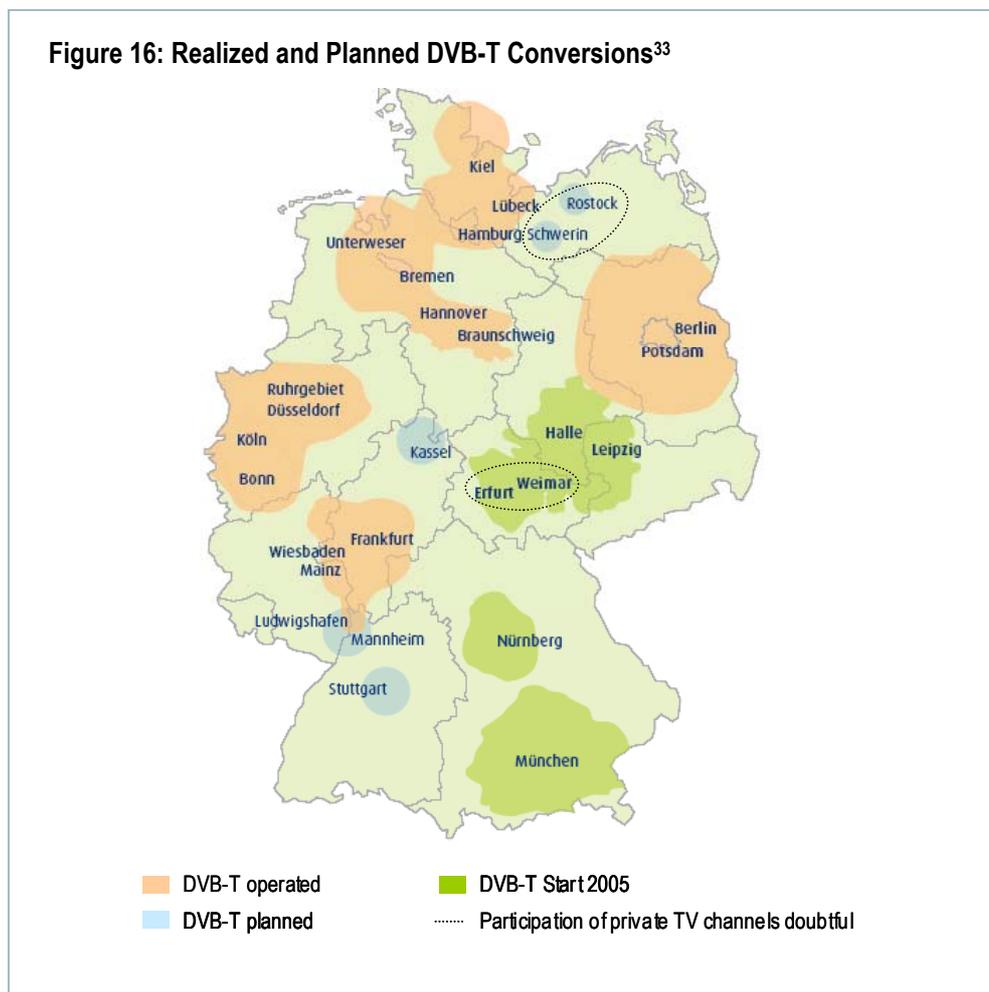
²⁸ Deutsche TV Plattform (2003).

²⁹ "Portable indoor": signal reception with a TV antenna inside buildings; "Portable outdoor": signal reception with TV antenna outside buildings; "Stationary": signal reception with roof antenna.

(see Figure 16). A schedule for the third phase of the roll-out, the nationwide introduction (possibly with limited channel selection), has not yet been established.³⁰

The first complete switch-over from analog to Digital Terrestrial TV was conducted in Berlin/Potsdam in August 2003. In 2004, DVB-T was introduced in parts of North Rhine-Westphalia, in the northern regions (Lower Saxony, Bremen, Hamburg) and the Rhine-Main region. Bavaria and Saxony/Saxony-Anhalt/Thuringia will start the switch-over in 2005.³¹ By the end of 2004, 39 million inhabitants were in the position to receive DVB-T. 1.7 million set-top boxes and TV cards for PCs and laptops have been sold since the introduction in 2003.³²

To receive Digital Terrestrial TV, the end customer needs a digital set-top box for every TV set. The cost of a set-top box currently ranges from 69 € for entry-level products to more than 500 € for high-end devices. Housing associations and cable operators in Berlin have been using this argument to attract new cable customers when switching to digital reception.



Unlike satellite TV, which has less reason to fear the migration of its customers to digital terrestrial TV,³⁴ cable TV reception faces a bigger threat:

- DVB-T offers nearly as many programs (up to 24) as the currently dominating analog cable (up to 35), especially as some regional broadcast authorities ensure that TV programs which can be submitted terrestrially are granted a “must-carry” status in the analog cable offerings.

³⁰ Requirement: “Stationary” reception for 95% of the population.

³¹ In central Germany, the launch was delayed from May to November 2005 due to various problems.

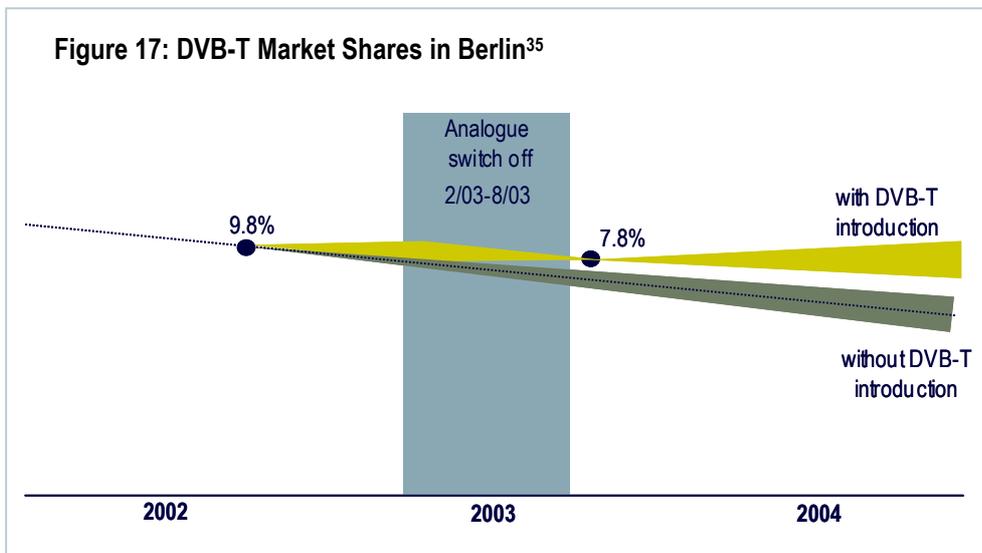
³² RegTP (2005).

- Depending on the chosen set-top box, the initial investment is low compared to high monthly charges, especially for direct customers in smaller residential properties or households with only one TV set.
- Mobile reception is possible.

Nonetheless, the advantages of DVB-T are decisive for only a few specific situations, namely individual customers in the broadcast region with portable indoor reception and only one TV set.

For the majority of end customers, however, the value-added of DVB-T will be limited:

- Outside the portable indoor region, it will be necessary to install roof antennas.
- Every TV set needs its own set-top box.
- Due to the very high compression rate, the signal quality of DVB-T is not suitable for high-resolution TV sets (LCD and plasma screens, beamers). Furthermore, fast-action sequences are likely to be distorted.
- Limited capacities pose restrictions on HDTV and VoD offers.
- The attractiveness of program offering is partially limited. Due to the low Terrestrial TV penetration rate, private TV stations have shown little interest in this technology. In most regions, subsidies were needed to motivate the RTL Group and Pro7Sat1 to participate in digital broadcasting. In Thuringia/Saxony/Saxony-Anhalt, DVB-T will even start without the private TV stations.
- Finally, many cable customers, especially in metropolitan areas, have little influence on the TV reception mode, because their cable subscription is usually included in their rent. Moreover, their cable TV fees are relatively low as a result of the tremendous economies of scale.



All in all, the attractiveness of DVB-T as an alternative to cable TV will be limited for most end customers. Thus, no significant migration of cable customers towards DVB-T was observed in the regions where the switch-over was first performed. Furthermore, the erosion of the market share of terrestrial TV has not yet been stopped, despite the success in selling set-top-boxes (see Figure 15). In fact, many cable and satellite households are using DVB-T for their second and third TV set but are keeping their former access technologies for their primary TV sets.

³³ www.ueberall-tv.de.

³⁴ One-time investment in satellite equipment has already been made, the program offering via satellite is larger – therefore no incentive to change.

³⁵ARD/ZDF (2003); Solon analysis

Over the long term, innovative TV services will prevent customers from migrating to DVB-T

Also in the long term, DVB-T should not be expected to strengthen its market position relative to CATV (see also Figure 15); instead, the market share of terrestrial TV can be expected to stabilize. This is especially valid if cable operators continue their efforts to create and market new, digital TV offerings (HDTV, VoD), which in turn have to attract the acceptance of the customers. While DVB-T is partially comparable with standard analog cable TV, it will not be able to compete with innovative TV products.

Competition within the Internet market: DSL

At the end of 2004 approx. 6.9 million broadband access lines existed in Germany, 97% of them via DSL, the remaining via cable.³⁶

Unlike cable Internet, the DSL market is broken down into the connection and the service market. At present, the DSL connection market is still dominated by Deutsche Telekom, holding a market share of 83%.³⁷ The only competitors are a few national providers (Arcor, Versatel) and city carriers (such as Hansenet and NetCologne), which offer their own DSL and telephone lines using the unbundled local loop of Deutsche Telekom. However, competition mainly occurs in the major metropolitan areas. Hansenet, a subsidiary of Telecom Italia, captured 50% of the broadband market in Hamburg with its brand "Alice", while increasing the overall broadband penetration in this city to 35% (as compared to the German national average of less than 15%). This success shall now be repeated in the cities of Munich, Berlin, Frankfurt and Stuttgart.

The Internet service market is characterized by intense competition already today. In this segment, Deutsche Telekom/T-Online has already lost more than 50% market share to providers like 1&1 and Freenet.

To differentiate from other competitors low-cost volume rates, attractive DSL and telephone line packages, and increasingly also attractive broadband content are key issues. Thus, T-Online, Arcor and Hansenet/Alice offer their own VoD programs and game platforms, although so far these products have not been used frequently. Having entered the market at a later time, providers like Hansenet/Alice have the advantage of utilizing a more advanced DSL generation (DSL 2+), which allows substantially higher bandwidths.

As they begin to embrace convergent TV features (VoD, interactive TV, etc.) the DSL operators are moving closer to the triple-play scenario. Most probably, such services will focus on individualized on-demand products rather than on classical TV offerings.

For VoD offers, therefore, DSL will certainly remain the dominant infrastructure, yet depending on the upgrade level of the cable network. In the realm of TV distribution, however, the cable networks will continue to be the basic medium.

DSL will dominate the German VoD market, at least in the medium-term, but will play a minor role in classical TV distribution

³⁶ RegTP (2005)

³⁷ RegTP (2005); This figure does not contain the 246,000 DSL connections offered by competitors under resale arrangements with Deutsche Telekom.

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Solon is the leading consultancy for the European cable TV industry. Services range from consulting on M&A projects to the development and implementation of corporate strategies. Clients include: cable operators, telecommunication and media companies, as well as banks and private equity funds.

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