

The European Broadband Market: Fact or Fiction?

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What Constitutes Broadband?

Definitions are many and varied

- **>2Mbps**
- **Capable of carrying video**

DSL Market

Service providers are focused on providing asymmetrical services to consumers, and symmetrical DSL to business customers

Now

- **Residential market dominated by ILECs**
- **Business market aggressively pursued by Data CLECs**

Over Next 12 Months

- **CLECs will focus more heavily on the residential market**
- **ILECs will focus more heavily on the business market**

Cable Modem Market

- **Cable Modem Service overwhelmingly consumer focused**
- **Shared bandwidth architecture makes speed a concern**
- **Non-bursty Internet applications will strain bandwidth**
- **New DOCSIS standard addresses security concerns**
- **Industry consolidation will accelerate deployment**

Plans for ADSL Offerings

Austria	Telekom Austria finished their ADSL trials in March 1999 - in October 1999 technology began to be made available to 25,000 subscribers in state capitals, expect to extend this to 100,000 subs by end-2000.
Belgium	Belgacom rolled out their ADSL service in October 1999. Easynet also offer an ADSL service in Belgium.
Denmark	Teledanmark began their ADSL service in July 1999 and aimed to cover the 4 largest cities by year-end 1999 (estimated 54% of pop) and 80% of population by year-end 2000.
France	France Telecom launched their ADSL service in November 1999 in 6 arondissements and 3 suburbs of Paris, currently in discussion with ART concerning extended roll out. Easynet launched a service in Paris, initially, in December 1999.
Germany	Deutsche Telekom launched their business service in April 1999 and their residential service in July 1999. Planned to have rolled out to 54 cities by year-end 1999.
Italy	Telecom Italia has been trialling their ADSL service since March 1999 in Rome, Milan, Turin, Padua, Bologna, Brescia and Trieste. Forecasts 200,000 installed ADSL lines by end-2000 and 1 million by end-2002. Service brand name Fast Internet to be offered by ISP Tin.
Netherlands	KPN are to launch their ADSL service, brand name Mxstream, in 2000, firstly in Amsterdam, Rotterdam and Utrecht. The service will initially be available in parts of the three cities, with rollout covering 180 towns and cities by end-2000.

Plans for ADSL Offerings

Norway	Telenor launched their ADSL service in June 1999 in Oslo, Baerum, and Tromso. Rollout to Stavanger, Bergen and Trondheim later in 1999.
Spain	<p>Telefonica began testing ADSL in 1992, and began offering a service in September 1999, brand name GigADSL. Launched in Barcelona and Madrid, to be rolled out to eight more cities by year-end 1999. Plan to have upgraded 500 exchanges servicing the whole country by the end of 2000 by which time they expect to have 25,000 users.</p> <p>Jazztel launched a trial service in October 1999, they have plans to launch commercially in Madrid and Barcelona. Will offer ADSL service to corporate customers and ISPs.</p>
Sweden	Telia began trials early 1998 & launched the service in June 1999 covering 22 cities, intend to launch access through national ATM in 70 cities
UK	<p>BT's wholesale ADSL service was made available in October 1999, their retail offer is expected to be available by Spring 2000 with full launch across 400 exchanges covering 6 million households.</p> <p>Kingston ADSL internet service for business customers - brand name Ultra. To launch residential TV-based service before year-end with bandwidth speeds of up to 4Mbps.</p> <p>NTL began ADSL trials for business customers in November 1999 - proposes speeds of up to 6 Mbps during trial.</p> <p>Telewest signed up for trials with BT in October 1999, to take place in areas within & outside their franchise areas.</p>

Cable Modem Trials and Commercial Services in Europe

Austria	UPC	Chello high speed internet service.
	Liwest Kabel	Internet access via cable modem.
Belgium	UPC	Chello high speed internet service
	Telenet	High speed Internet access, service brand name Pandora.
	Brutele	Internet access via cable modem in Brussels.
Denmark	Telia Stofa	Launched high speed internet access to residential and business customers-brand name StofaNet in October 1999. StofaNet passes more than 500,000 homes over the broadband cable infrastructure.
	Teledanmark	Following a 100 subscriber trial in May, high speed internet access via cable modem is to be made available to 800,000 residential subscribers.
France	France Telecom	High speed Internet access via cable modem, brand name Cable Wanadoo.
	NC Numericable	High speed Internet access through venture with AOL France.
	Lyonnaise Cable	Has been providing cable modems in 3 French cities since September 1997. High speed internet service, brand name CyberCable, available in Paris, where there are 30,000 subscribers
	UPC (Mediareseaux)	Launched Chello high speed internet service in July 1999.

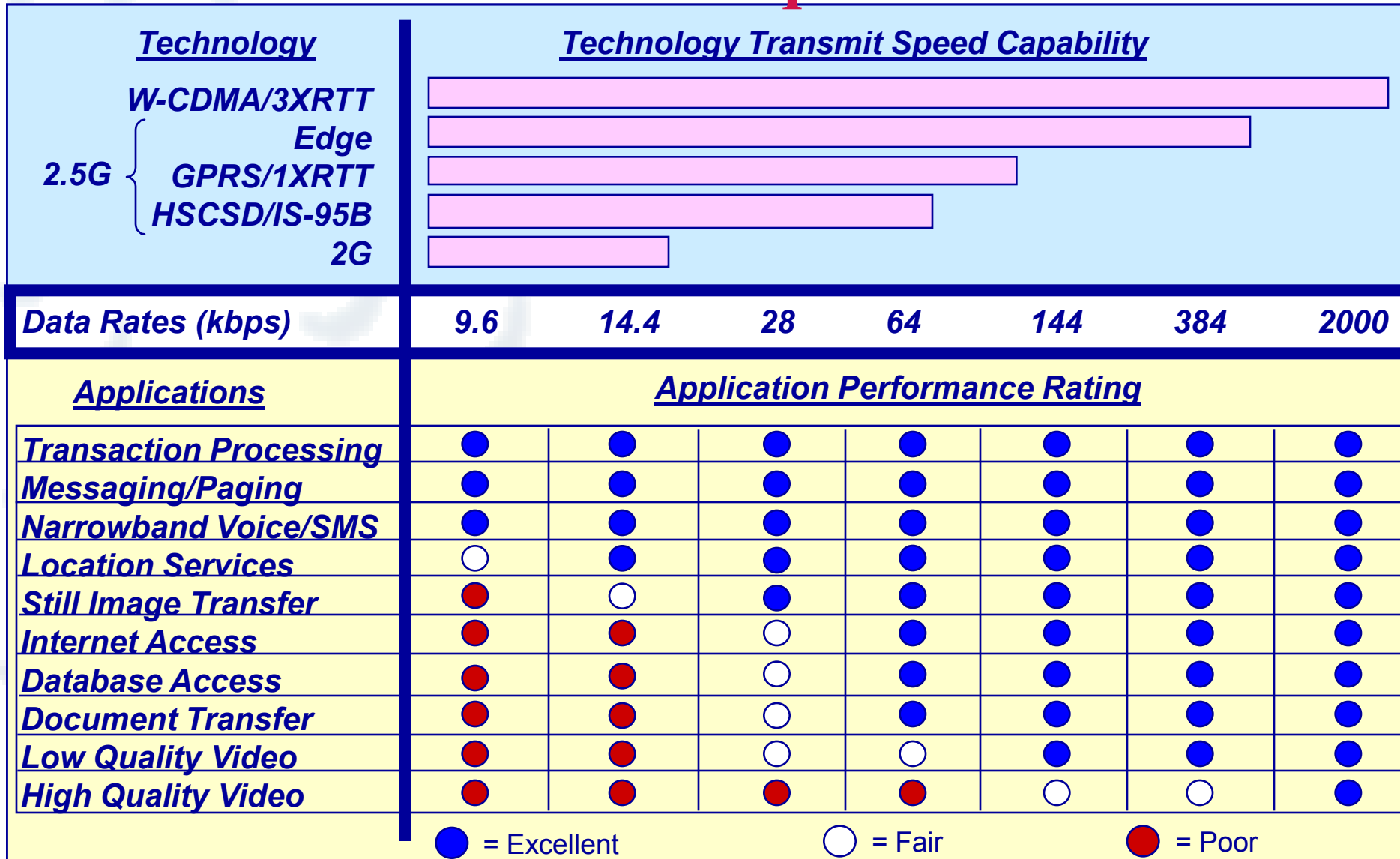
Cable Modem Trials and Commercial Services in Europe

Germany	o.tel.o	Internet access via cable modem.
	Telecolumbus	Involved in joint venture with Excite @Home to provide high speed cable internet service.
	PrimaCom	To deploy cable modems in their 214,000 home Leipzig network.
Netherlands	UPC (A2000 and Telekabel)	Chello high speed internet service.
	CasTel	Offer high speed internet access through @Home Netherlands.
	Casema	Internet service via cable modems.
	Palet Cablecom	Offer high speed internet access through @Home Netherlands.
Spain	Grupo Gallego de Cable	Internet access via cable modem.
	Ono (Cableuropa)	High speed Internet service rollout began December 1999 in Valencia.
Sweden	Tele2	Plans to offer it's 325,000 subscribers high speed internet access via the NetGame system.
	Telia Infomedia	Telia subscribers in all major Swedish cities will be able to purchase cable modems directly from NetGame.
	Stjarn TV	Chello high speed internet service.
UK	Cable & Wireless	To begin testing high speed internet service using cable modems early 2000.
	Telewest	Cable modem service to go pilot in Q1 2000 - full commercial rollout in 2000.
	NTL	Rolled-out cable modem service in May 1999 - requires subscribers to use NTL as ISP.

Should We Include Wireless?

- **Fixed wireless through services such as LMDS is mainly directed at the business market, for now at least**
- **Higher bandwidth for mobile handsets means that they will enter the broadband market and should become dominant Internet access devices**

Potential Applications and Bandwidth Requirements



Broadband Market Reality in Europe

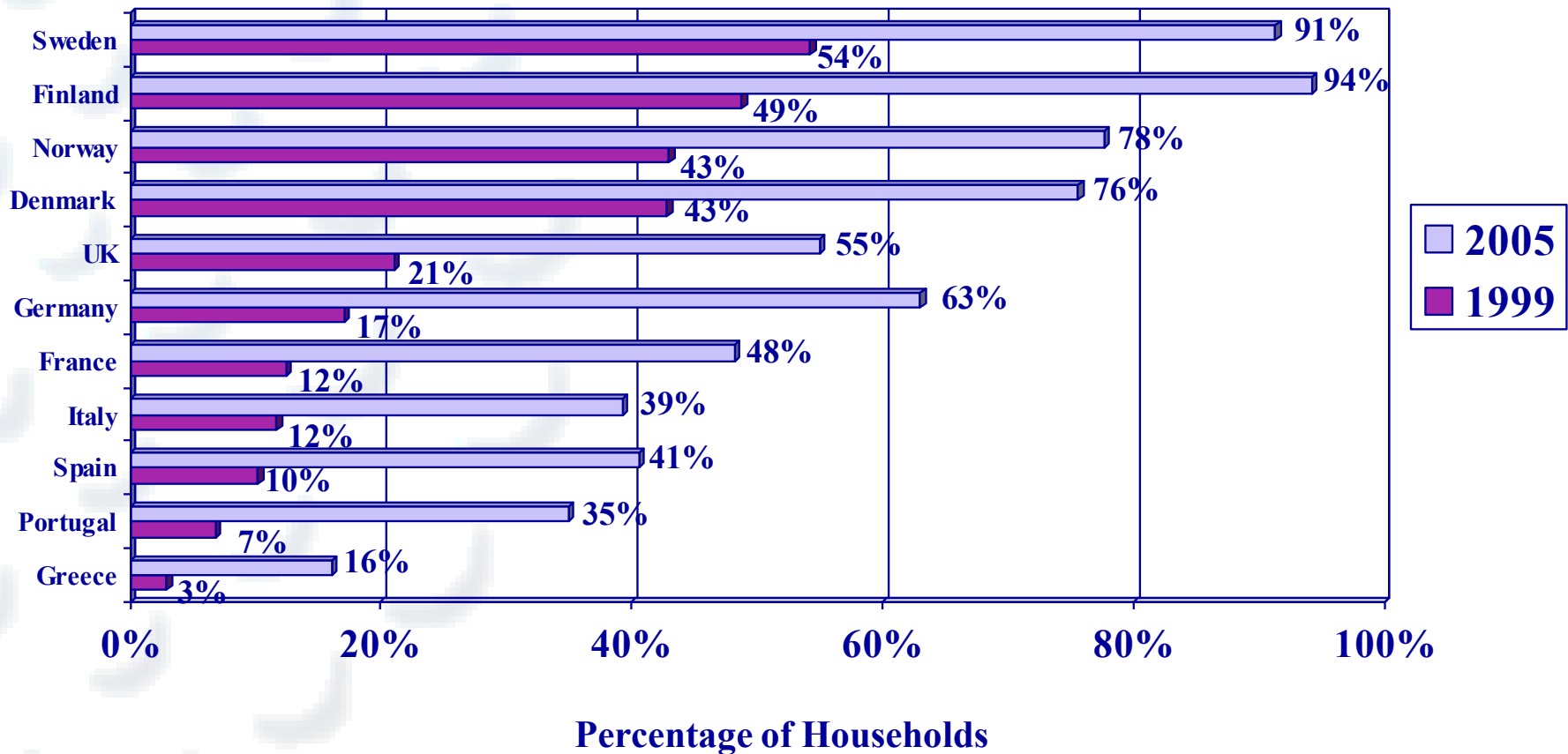
Residential Broadband

- **Slow migration from Dial-up to Broadband**
- **Emerging Applications drive Broadband adoption**
- **Home Networking Emerging**
- **Broadband will move from Early Adopter Market to Early Majority Market**
- **Competition for unified services fueling push into voice and video**
- **Consumers prefer Telcos**

Business Access

- **DSL emerging**
- **Cable Modem still a non-factor**
- **Fast Internet Access the prime application**
- **VoDSL emergence imminent**
- **Web Hosting, VPNs key applications**
- **SDSL, IDSL, ADSL all used**
- **HDSL2, SHDSL gaining momentum**

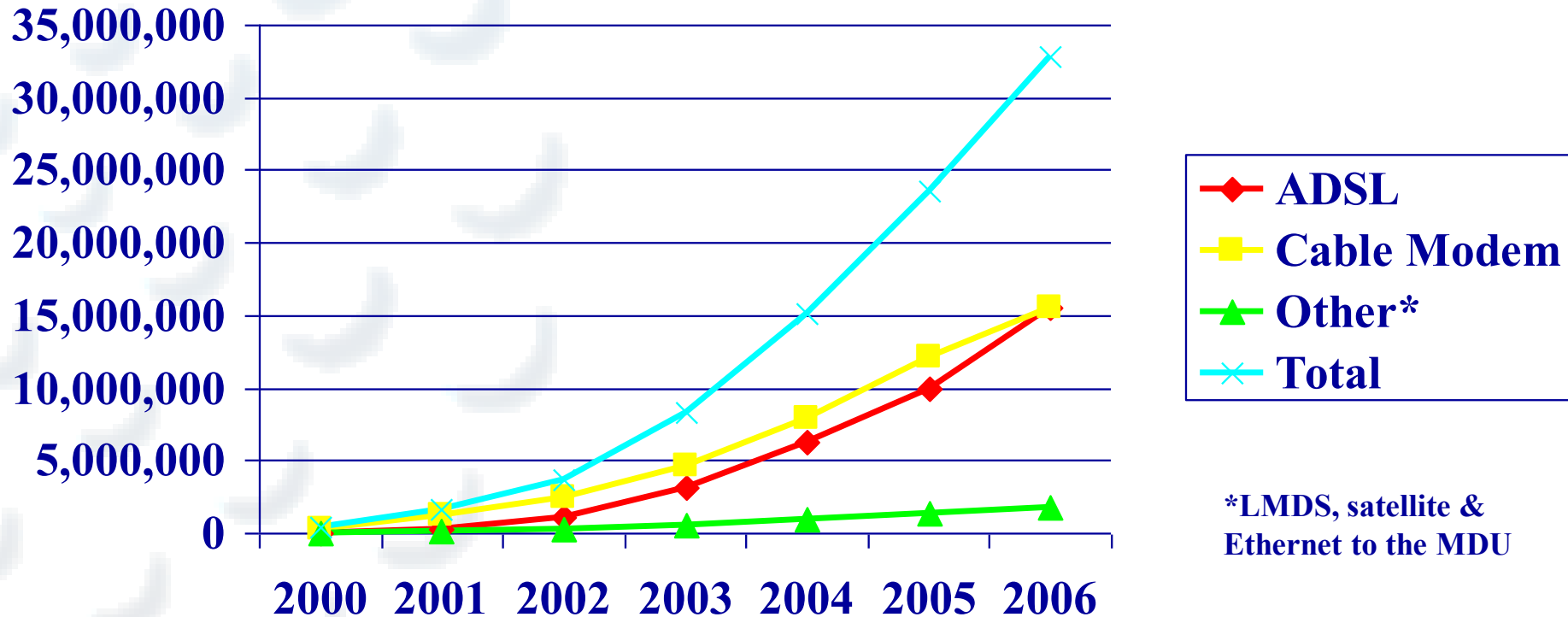
European Internet Penetration Forecasts



Bandwidth Intensive Content

Internet Application	Need for Broadband	Percent of On-liners Using in Last Two Months
• E-mail	➔ • No	• 98%
• Web Surfing/Searching	➔ • No	• 86%
• Chat	➔ • No	• 45%
• Web Cast of Live Event	➔ • Maybe	• 17%
• Internet Telephone Calls	➔ • Yes	• 7%
• Video Conferencing	➔ • Yes	• 3%

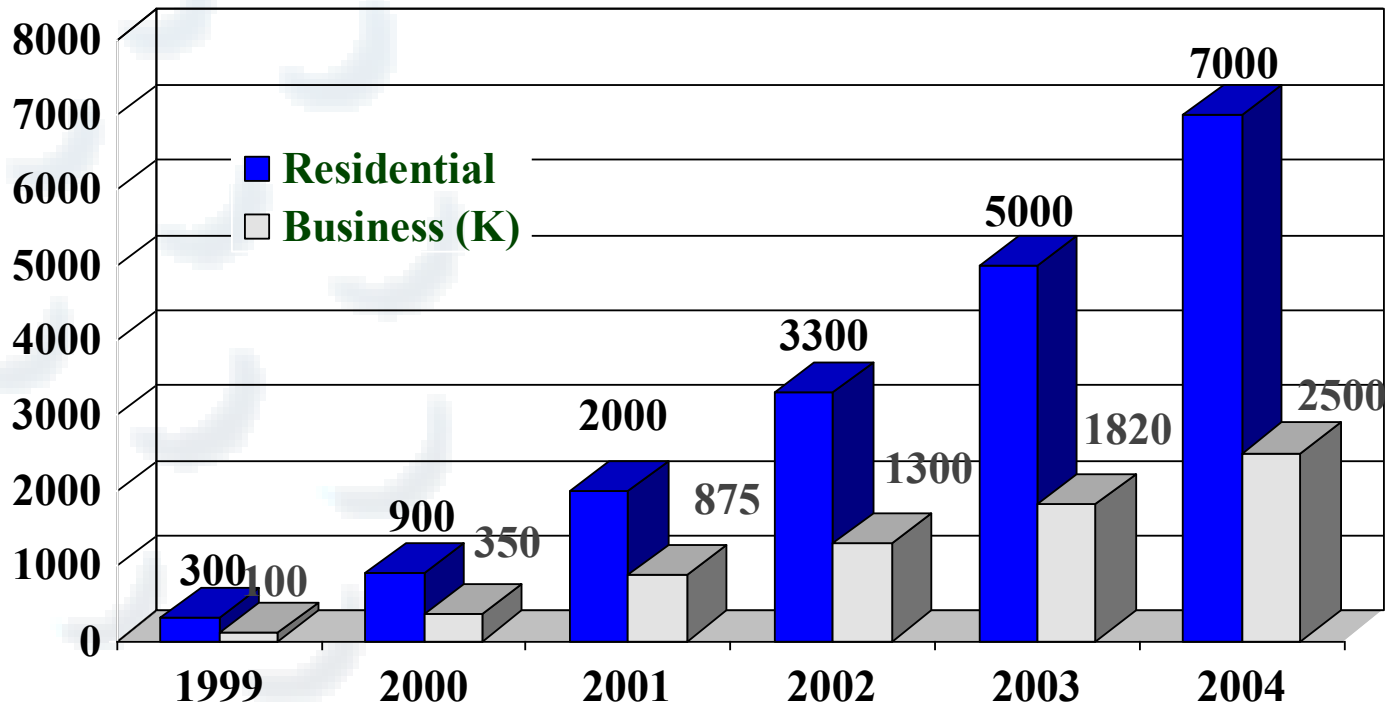
European Broadband Internet Access Penetration



*LMDS, satellite & Ethernet to the MDU



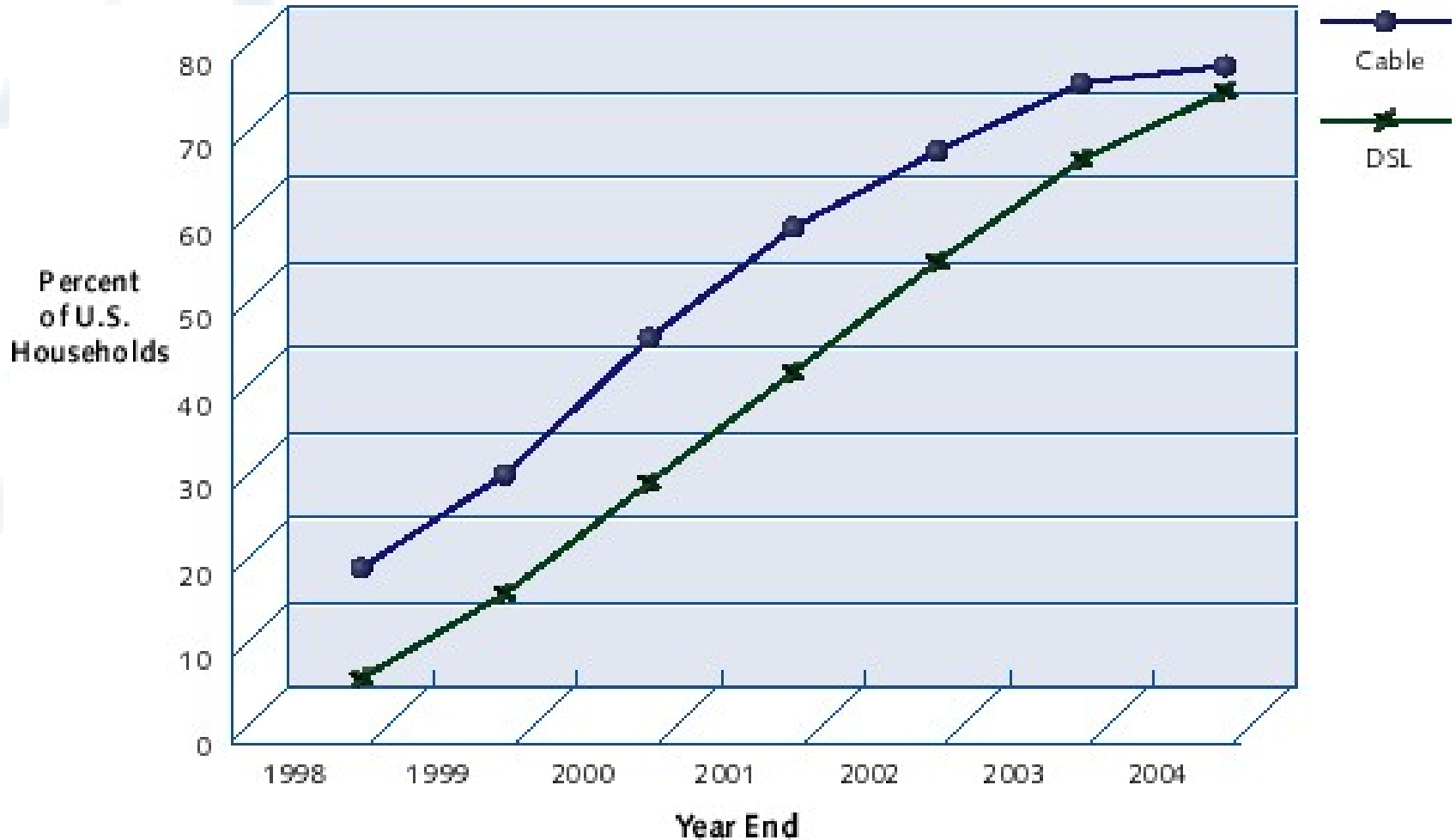
US DSL Subscriber Forecast



*December 1999 Forecast



Broadband Availability

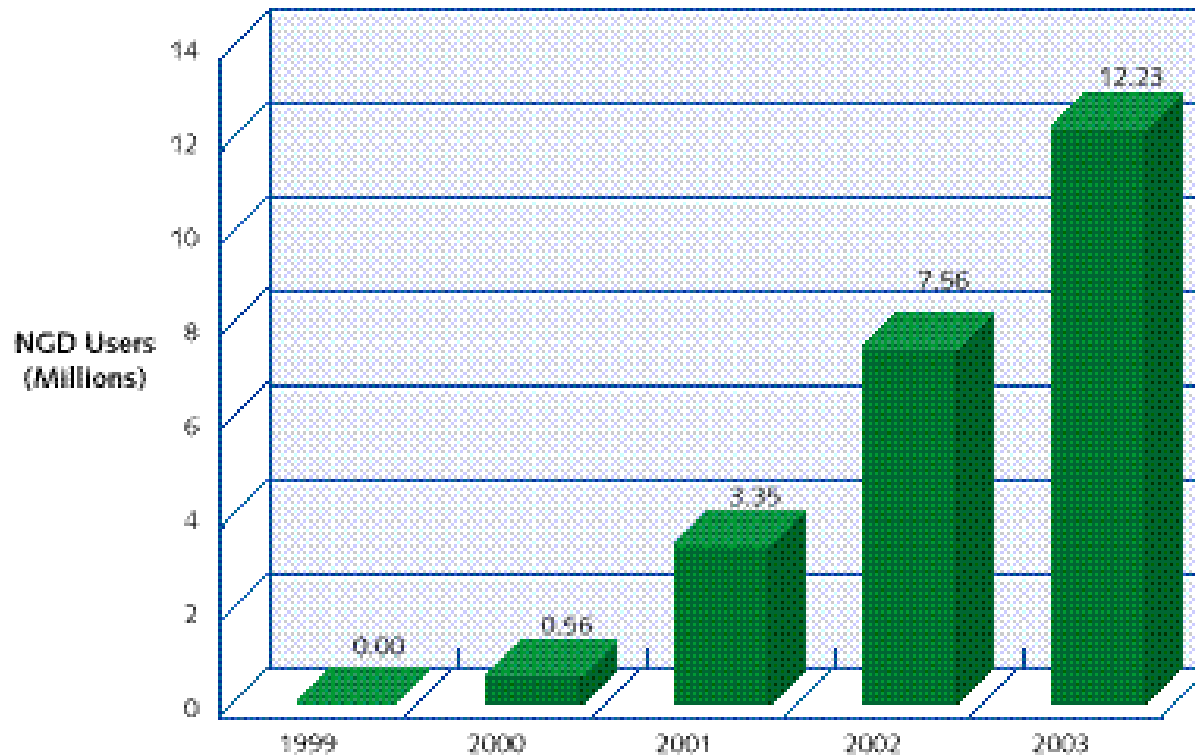


- Broadband still has limited availability

Next Generation Data Forecasts

NGD Subscriber Forecast for Europe

Source: *the Yankee Group Europe, 1999*



Source: *the Yankee Group, 2000*

Conclusions

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Questions

