

# What's hot in wireless

**Roger Hay**  
roger@rogerhay.ca

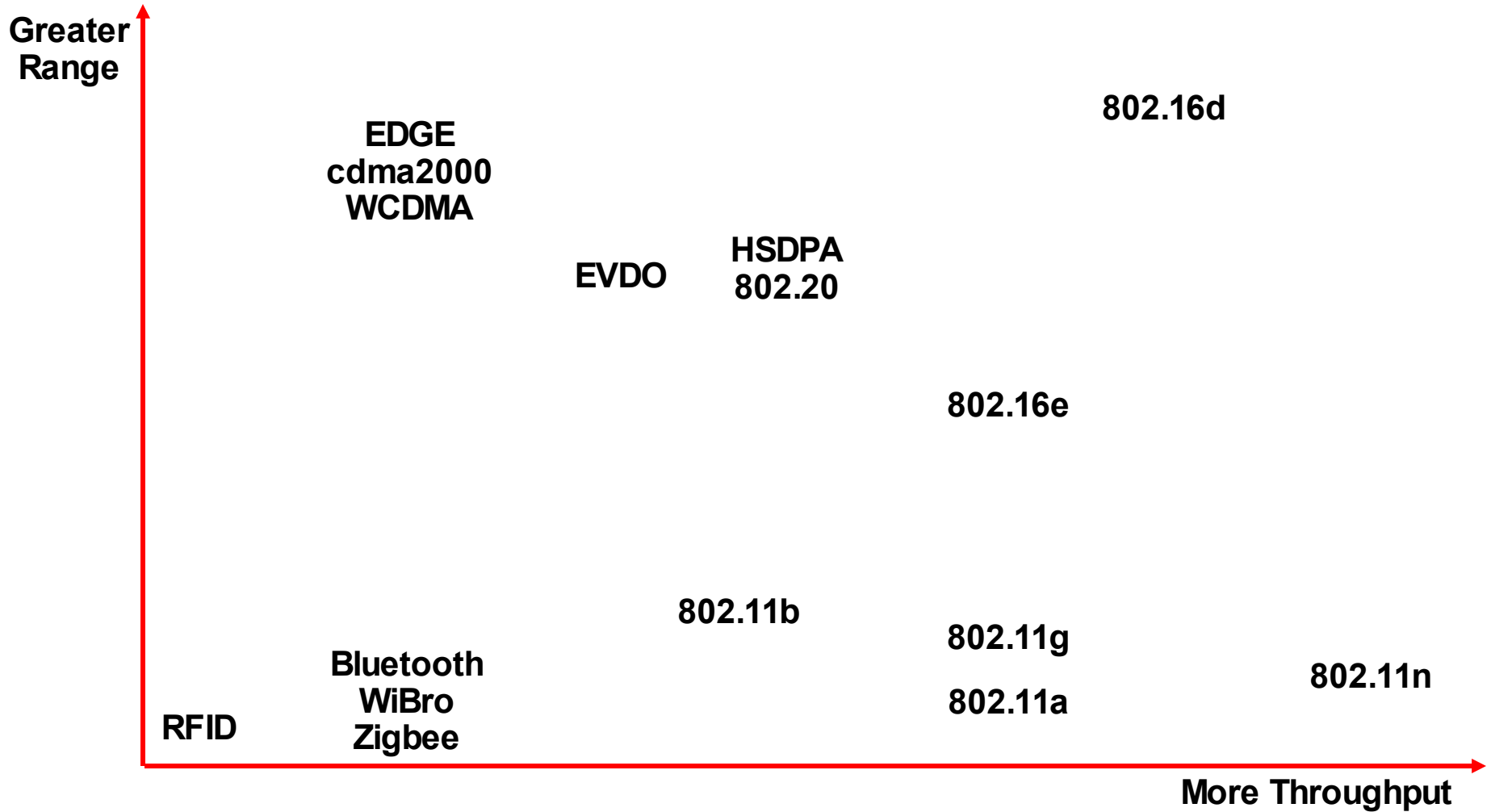
Presented to the Canadian Telecommunications Consultants Association  
October 26, 2006

Roger Hay & Associates Ltd.  
1272 Elgin Crescent  
Oakville, Ontario L6H 2J7  
Tel. +1.416.848.0997  
<http://www.rogerhay.ca>  
(c) 2006 Roger Hay & Associates Ltd.

## There is lots going on in wireless. Some interesting trends stand out

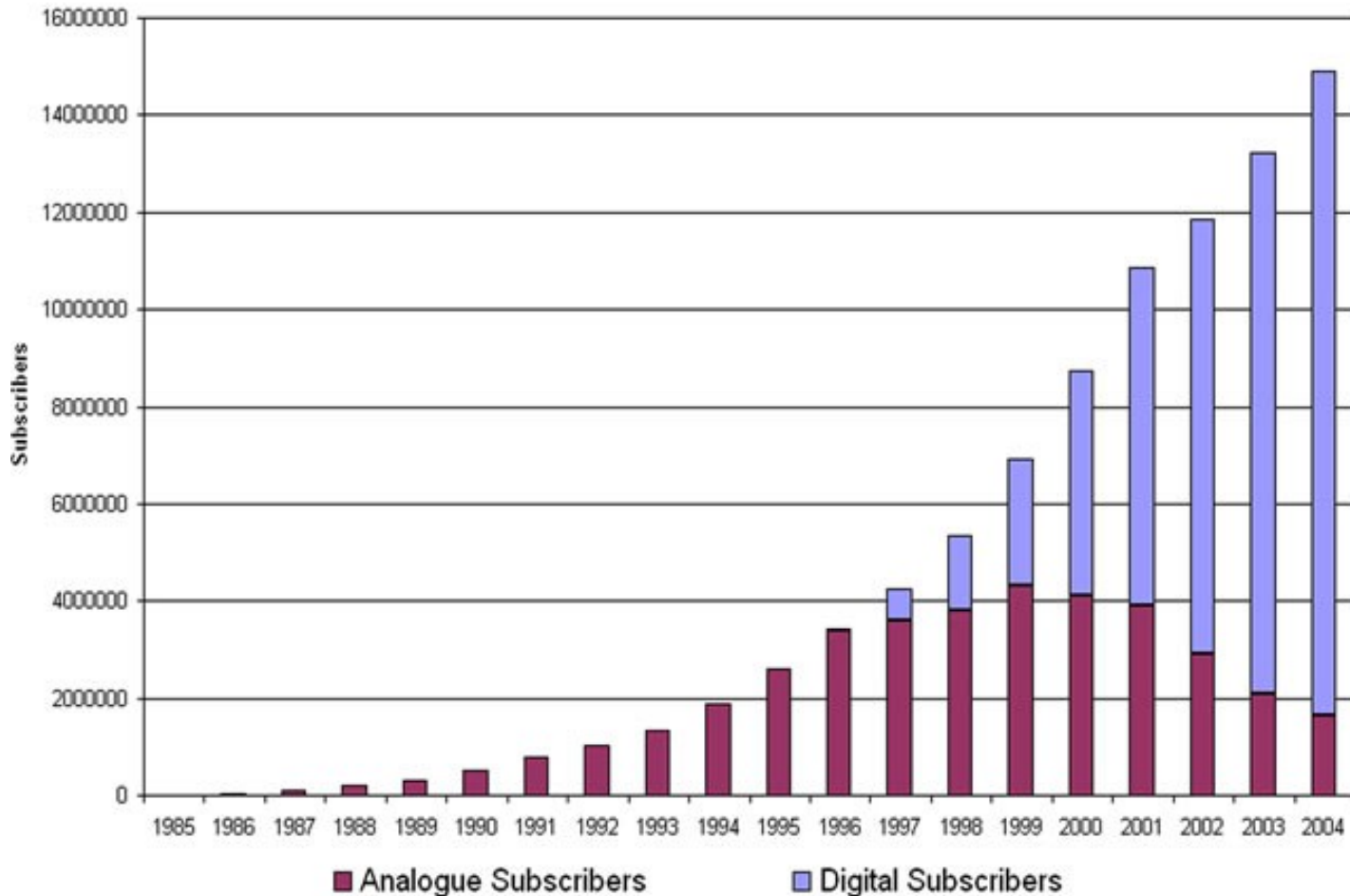
- Cellular mobile growing
- Shift to mobile from wireline telephony
- Mobile integration and segmentation in the terminals
- Mobile bandwidth and 3G/4G
- WiFi growing and adding bandwidth
- WiMax emerging

# Wireless (today) means mobile and nomadic radio for consumers and (some) enterprises

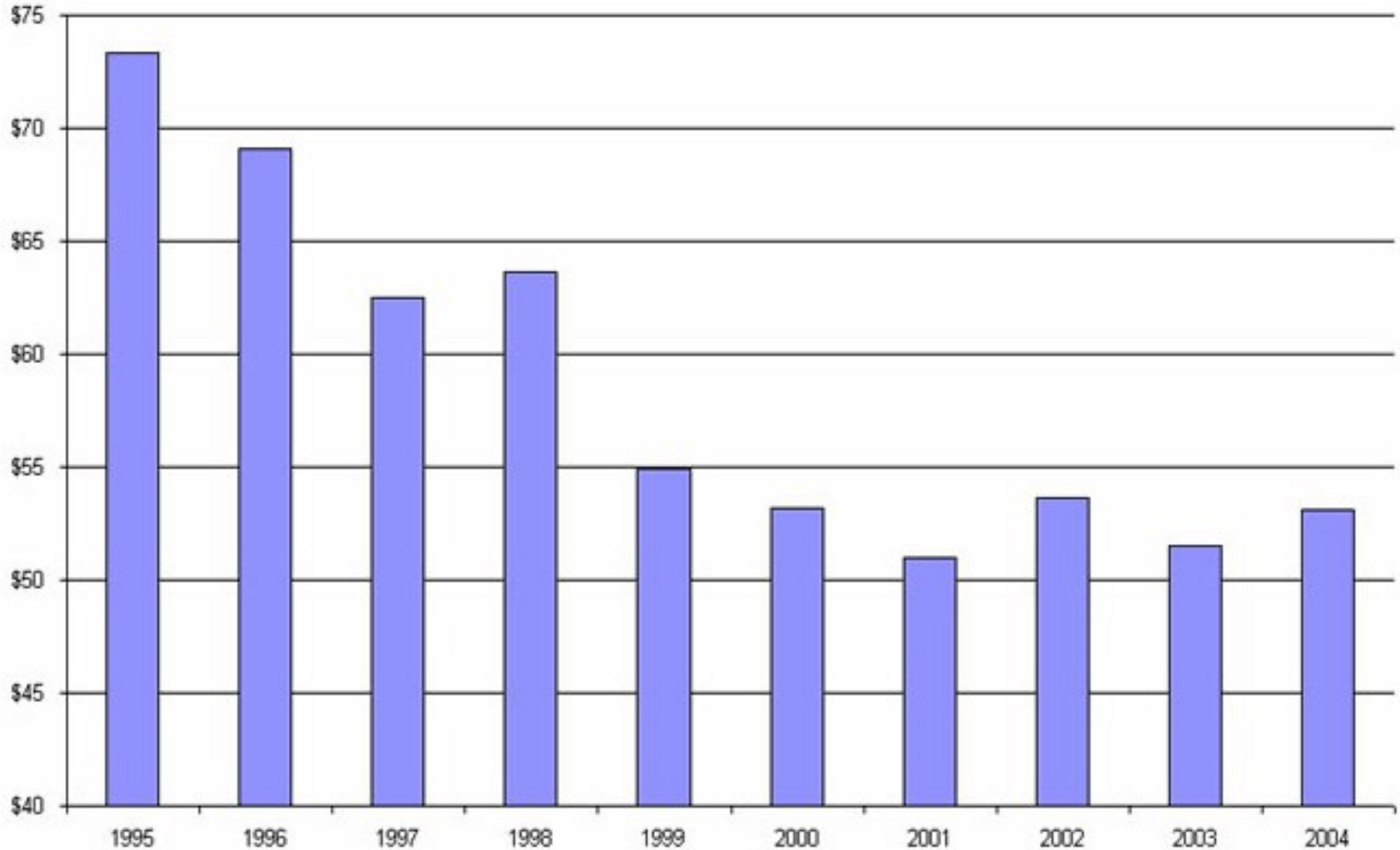


Canada reached 17.4m subs at 1Q2006 (54% penetration of population)

Cellular/PCS Subscriber Growth in Canada

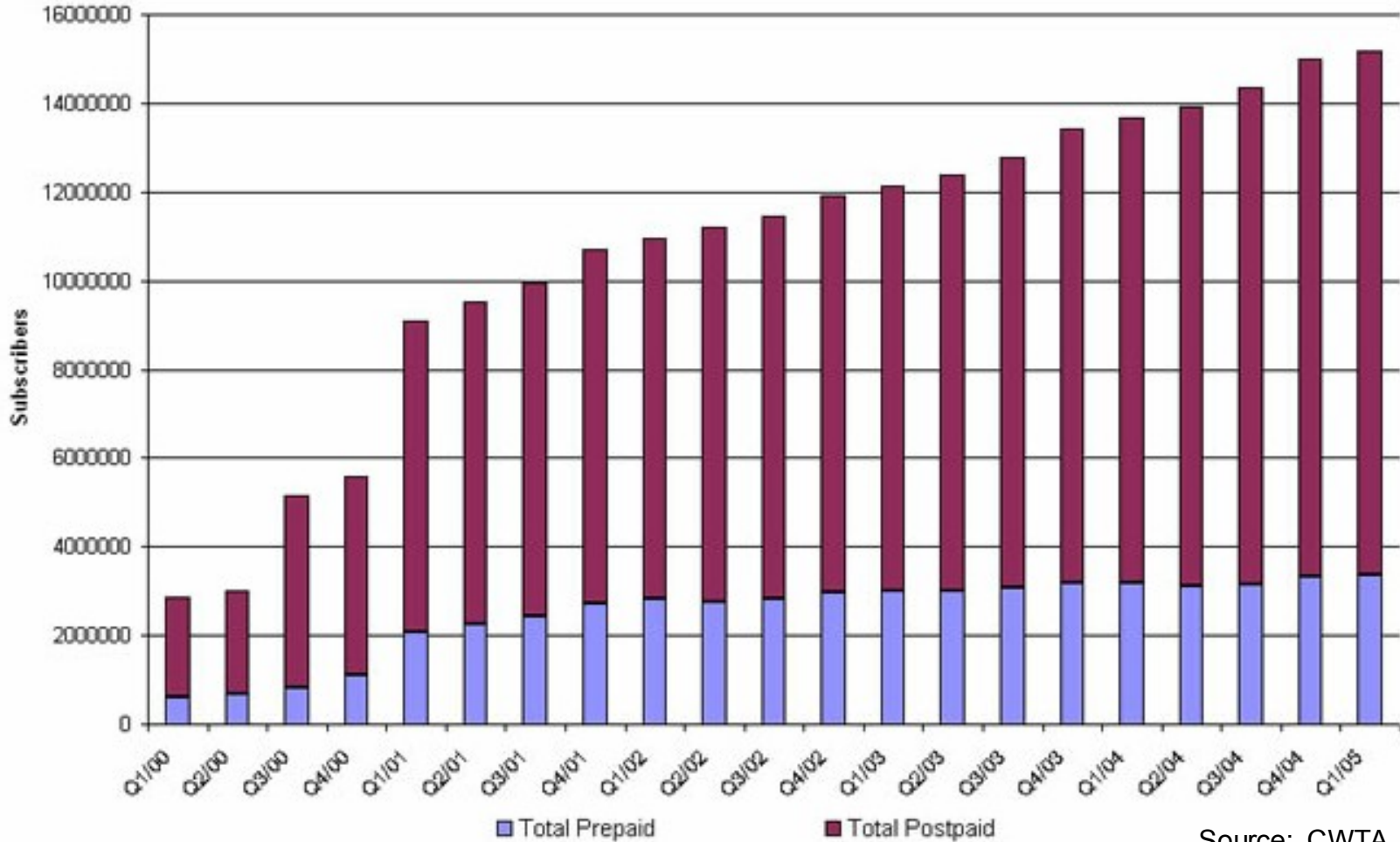


## Average monthly revenue per user is in the range \$51-\$54 in Canada



Source: CWTA

# The postpaid proportion is rising in Canada, although new MVNOs are reaching for prepaid segments



Source: CWTA

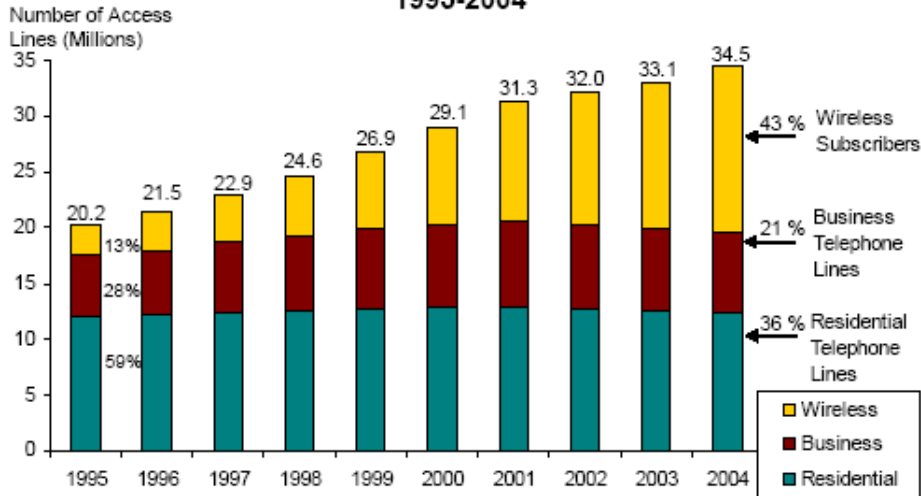
## MVNOs in Canada reaching for new segments

- Virgin (on Bell) seeking teenager market
  - Cheap handsets through grocery stores
  - Nokia 1100 from emerging markets
  - Getting the over-60s instead?
- 7-11 (on Rogers) 1100
- Cityfone (on Rogers)

## Shift from Telephone to Mobile

# Trend from telephone to mobile in Canada (and to CLECs)

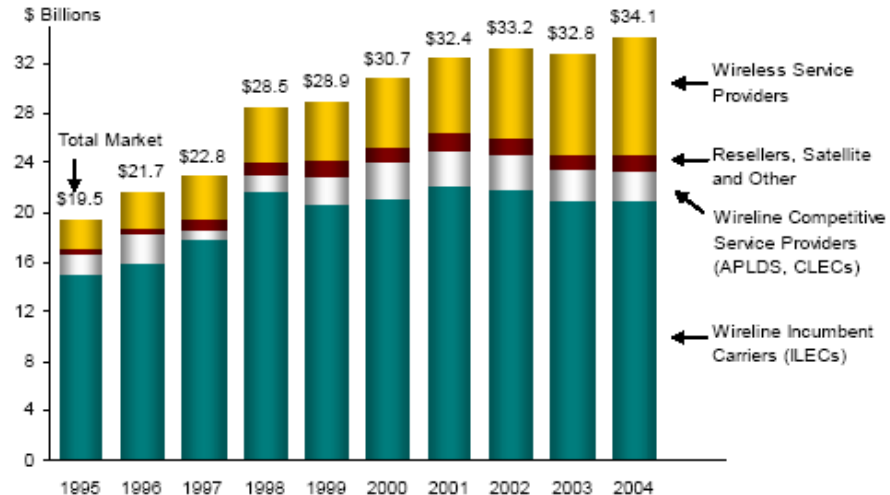
**Share of Wired Telephone Lines & Wireless Subscribers,\* 1995-2004**



\*Wired telephone lines are in voice grade equivalents, (B-channel equivalents) - percentage of total for the year.

Source: Statistics Canada, *Survey of Telecommunications Service Providers* (May 2005).

**Telecommunications Service Revenues Market Segments, 1995-2004\***



\*The large increase between 1997 and 1998 is due to accounting changes in intra-industry transactions.

Source: Industry Canada compilations based on Statistics Canada, *Survey of Telecommunications Service Providers* and company annual reports (May 2005).

- Mobile margins now exceed wireline margins, and the gap is growing
- Doubly bad news for LECs, who are losing 650,000 lines p.a.
  - CLECs had 1m telephone subs at end 2005 (59% cable; cable putting in 40,000 telephone lines/month)

Sources: Strategis, StatCan, Digital Home Canada

## Trend from telephone to mobile in Canada

- 4.8% of Canadian households had only a cellphone at Dec. 2005
  - Up from 1.9% in mid-2003
- Households in large urban centres more likely to have a cell phone only
- Lower-income households more likely to have only a cellphone
  - 7.7% of households that were below Statistics Canada's low-income cutoff (LICO)
  - Compared with 4.1% of households above the LICO

Source: StatCan (December 2005)

## Globally, mobile growth is outstripping landline growth

	1991	2001
Cellphone subs, m	16	2,140
Landline phones, m	546	1,260

Source: ITU

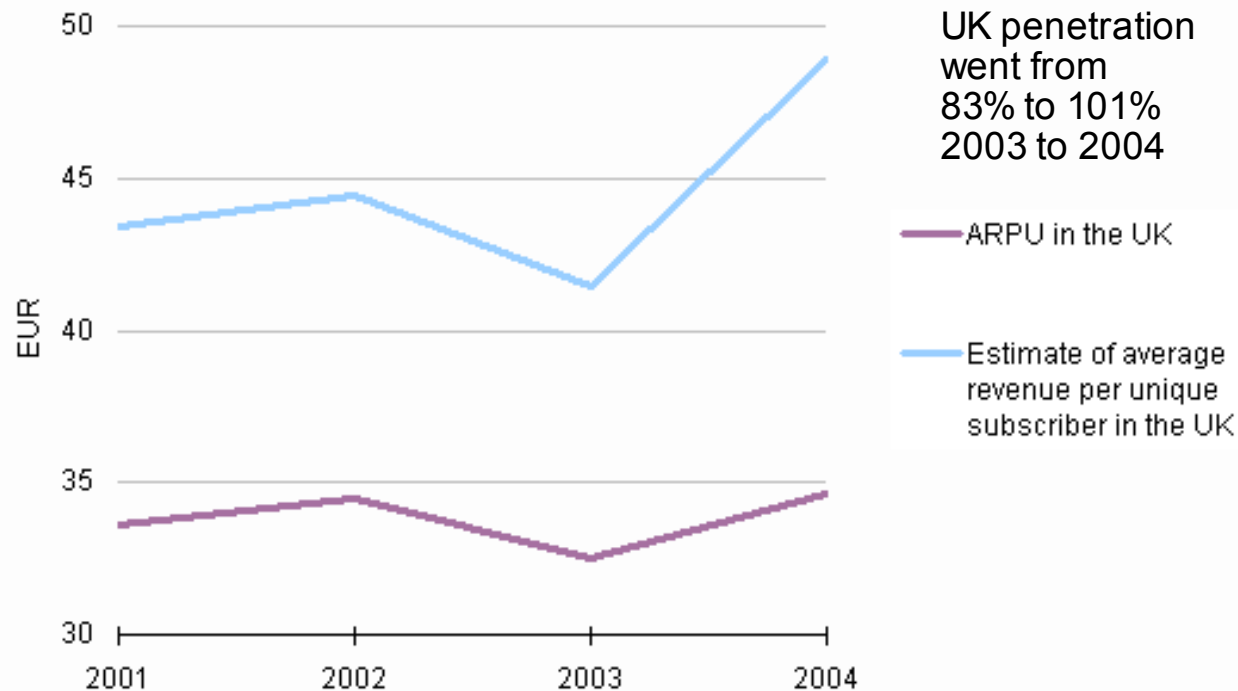
- Cellphone penetration now exceeds 100% in some countries, particularly in Western Europe
- Developing country mobile penetration taking off
  - Availability of cheap cellphones
  - Extensive adoption of prepaid
- Availability of substitutes and different lifestyles affect this more than economic productivity

Country	2005 Cellphone Penetration, Per cent	2005 PPP per Capita, kUSD
Algeria	42	7
Argentina	57	14
Bangladesh	6	2
Canada	51	34
Chad	2	2
China	30	7
France	79	29
Germany	96	31
Guatemala	25	4
India	7	3
Japan	74	31
Kenya	13	1
Mexico	44	10
Russia	84	11
South Africa	65	12
United Kingdom	102	30
United States	68	41
World	32	

Source: ITU, IMF

## Western European penetration exceeds 100% in some countries; partly an artifact of multiple device or SIM use

- Existing subs acquiring another handset or SIM card for:
  - Separate accounts for personal and business use
  - Datacards and Blackberry devices
  - Separate SIMs for different service plans
- New SIM cards for:
  - Machine-to-machine
  - Temporary 2G->3G
- Effectively inflates subscriber numbers
- ARPU per unique user may actually be growing



Source: Analysys (2005)

# Driving mobile adoption through matching terminals to segment needs

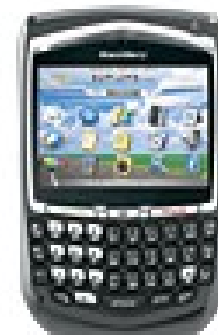
- Moore's Law made this possible
- Bottleneck: battery technology advancing slowly



Simple, cheap handsets for developing countries and low-end markets



Muti-function handsets including cameras and PDA functions



Data-oriented devices

Adding gaming and television viewing to spark consumer interest



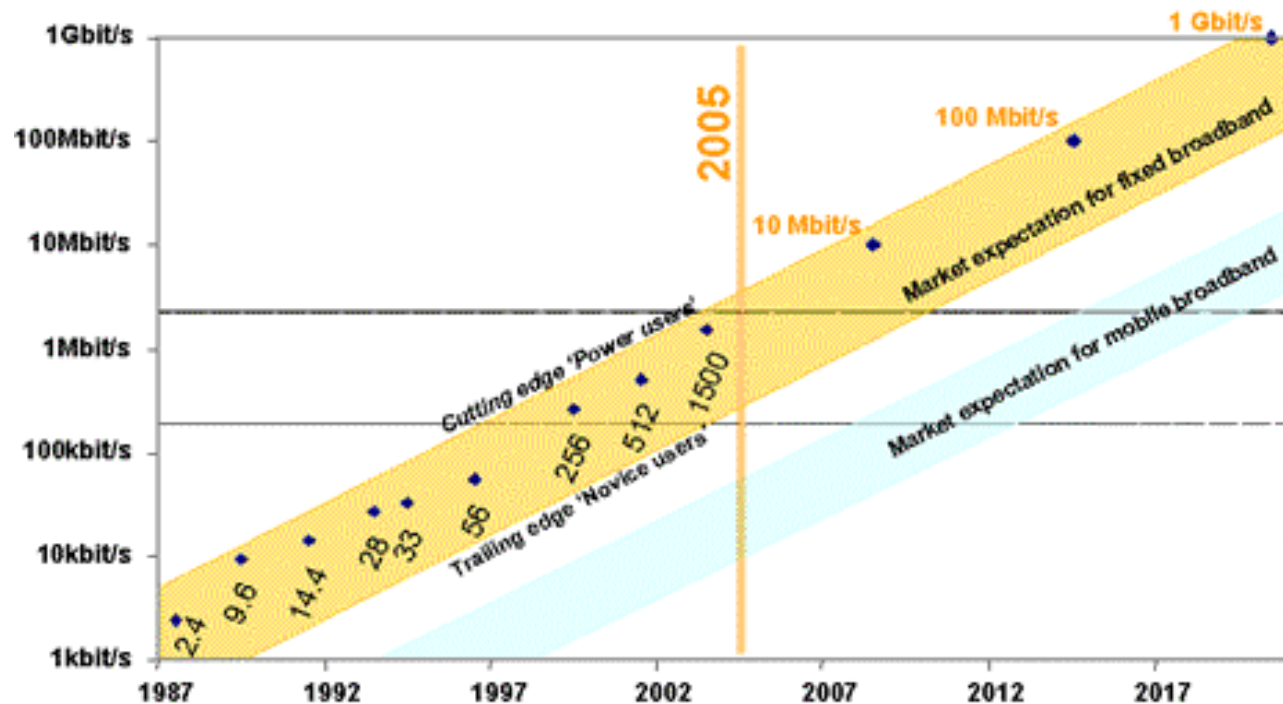
Copyright © 2000 Lucent Technologies.  
<http://www.bell-labs.com/history/75/gallery.html>

**Mobile bandwidth -- not so hot -- costs too much to carry a bit -- thus not going to supplant wireline broadband for the foreseeable future**

- Current
  - 3G UMTS with HSDPA --
    - The killer app was voice (or was it ringtones)
    - HSUPA coming
  - GSM EDGE/EGPRS
  - cdma2000 and EV-DO
- Emerging
  - 802.16e adds mobility to 802.16d WiMax; symmetric; has worked at 155 km/h
    - Products hitting the market
  - p802.20 “MobileFi” in development
    - Adaptive antennas and Flash OFDM
    - New MAC and PHY optimized for full mobility, 3GPP2 elements
    - Want to get 1 Mb/s at 15 km and 250 km/h below 3.5 GHz, symmetric

## Low marginal cost per bit is essential for success, in mobile and fixed

- The graph at right shows one view of how the peak bit rate expectations of leading landline users have grown over the 17 years ended 2004
- Growing at about 45% per annum
  - Slope similar to Moore's Law
  - 8 Mb/s in 2008
  - 100 Mb/s in 2015
- Meanwhile, high-speed access prices are staying constant
- -> price per bit falling at the same rate
- So cost per bit must fall at that rate or faster
- Winning wireline platforms: HFC (near term), FTTP (medium term)



Source: Infonetics Research (2004)

## WiFi is hot, and congestion is already a problem

- WiFi (802.11) now pervasive in businesses and on new laptops, and frequently found in homes (e.g., as part of cable/DSL routers)
- WiFi congestion common in downtown areas
- Public WiFi hotspots are common and growing
  - Toronto Hydro downtown
  - Telus, Bell, Rogers hotspot roaming
  - Mesh deployments
- WiFi VoIP handsets frequently found
- Cellular mobile handsets emerging that include WiFi capabilities
- 802.11n (to be approved in 2007) will provide >100 Mb/s + overheads
  - Better OFDM, MIMO, diversity antennas, double channel width option
  - Likely to add to rather than fix the congestion problem
  - Perhaps better suited to consumer applications

## WiMax not hot yet, but getting warm

- Advantages of fixed wireless access:
  - Low cost per home passed
  - Investment can track revenues
  - -> good for new entrants
- Despite these advantages, LMDS, MMDS and some other FWA residential/SOHO deployments were busts
  - Subscriber self-installs were not possible and ate up margins
- Self-installs now practical with 802.16e
- Intel shipping silicon; chip to break the 200 USD barrier in 2008
- Canadian 2.5 and 3.5GHz spectrum locked up, but there is some 5.8 GHz unlicensed spectrum
- Bell and Rogers with pre-802.16e Inukshuk
  - May wish to manage introduction to avoid cannibalizing other products

## Thank you for listening. We hope you found it useful.

- For further information, or to make comments, please contact us at

Roger Hay & Associates Ltd.  
1272 Elgin Crescent  
Oakville, Ontario L6H 2J7, Canada  
Telephone +1.416.848.0997  
E-mail [papers@rogerhay.ca](mailto:papers@rogerhay.ca)

- Also you are welcome to have a look at our other papers at <http://www.rogerhay.ca/papers.html>, and suggest topics to add