



# TECHNOLOGY FUTURES INC.

*Your Bridge to the Future*

# TFI Broadband Forecasts Update

Lawrence Vanston, Ph.D.  
President,  
Technology Futures, Inc.  
lvanston@tfi.com

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Austin, Texas

84 Waller St• Austin, Texas 78702  
(512) 258-8898 • [www.tfi.com](http://www.tfi.com)

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# THANK YOU!

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*Conference Info  
& Updates Here*



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**Combining technology and the  
arts to foster better decisions  
and more insightful people**

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# Technology Forecasting

- Performance Improvement
- Adoption of New Technology
- Replacement of Old Technology
- Impacts of these changes

# Technology Forecasting Tendencies

- Years not Quarters
- The Forest not the Trees
- Industries not Companies
- Technology Types not Brands
- Fundamentals not Perturbations
- Study not Speculation
- Quantitative not Qualitative

**Perfect for estimating lives & values  
of large capital investments**

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# Technology Forecasting Methods

- Fundamental Models
- Data Analysis
- Analogies
- Drivers and Constraints
- Expert Opinion

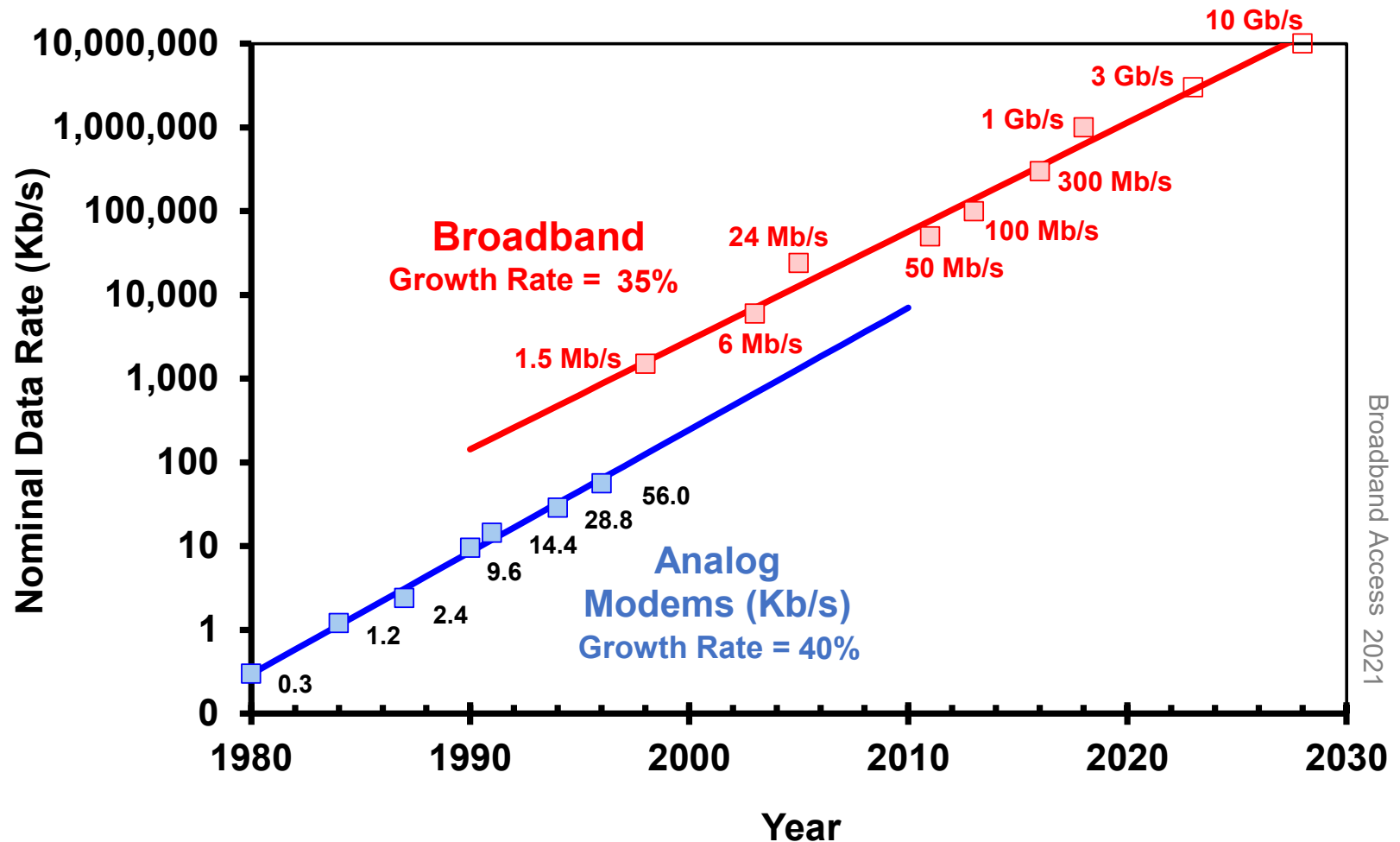
# Technology Forecasting Lessons

- Fundamental technology trends are relentless
- Betting again fundamental technology trends is futile
- Fundamental technology trends destroy value in old technology



# Industry Broadband Forecast

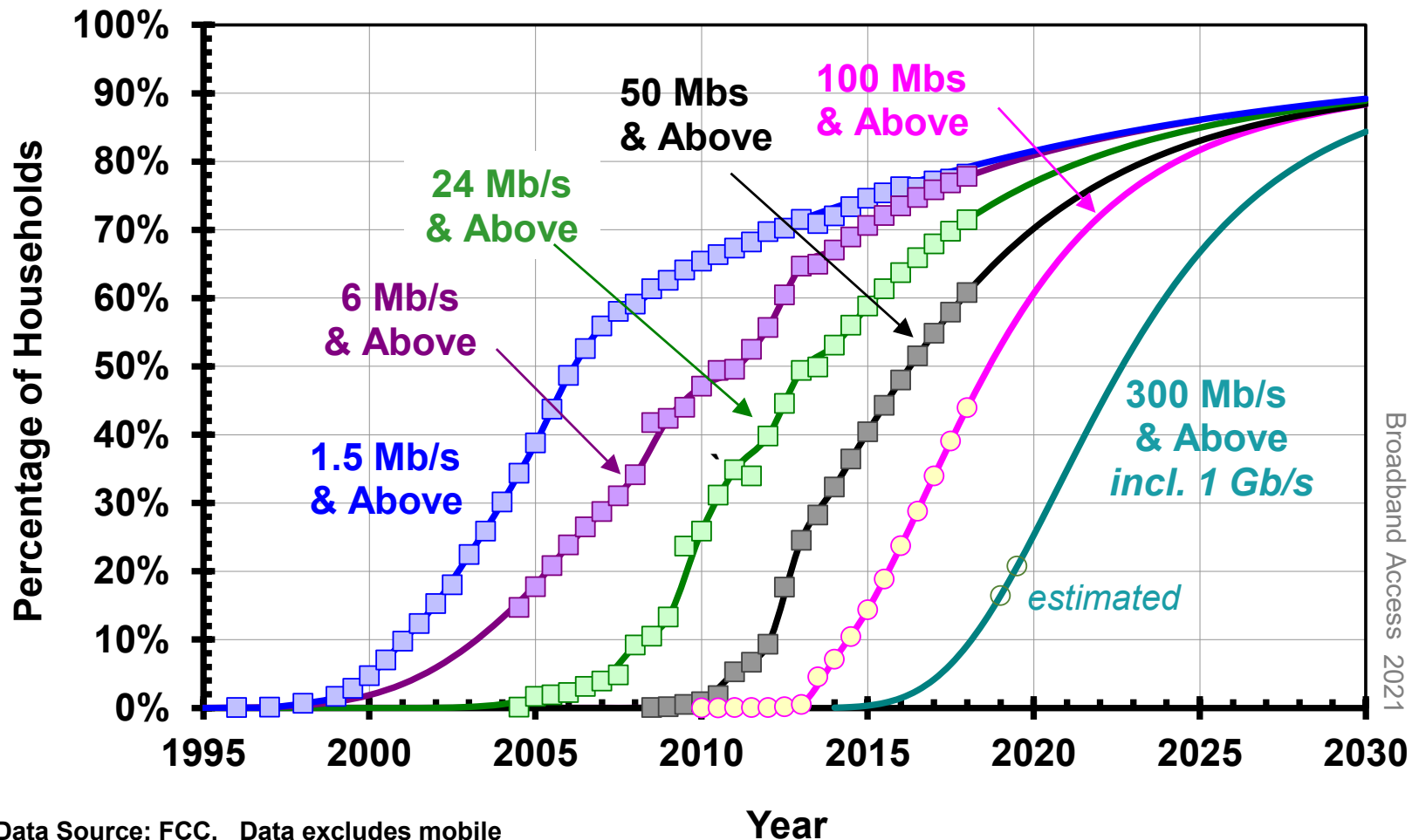
# Broadband Performance Milestones



Source: Technology Futures, Inc.

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# U.S. Broadband Substitutions

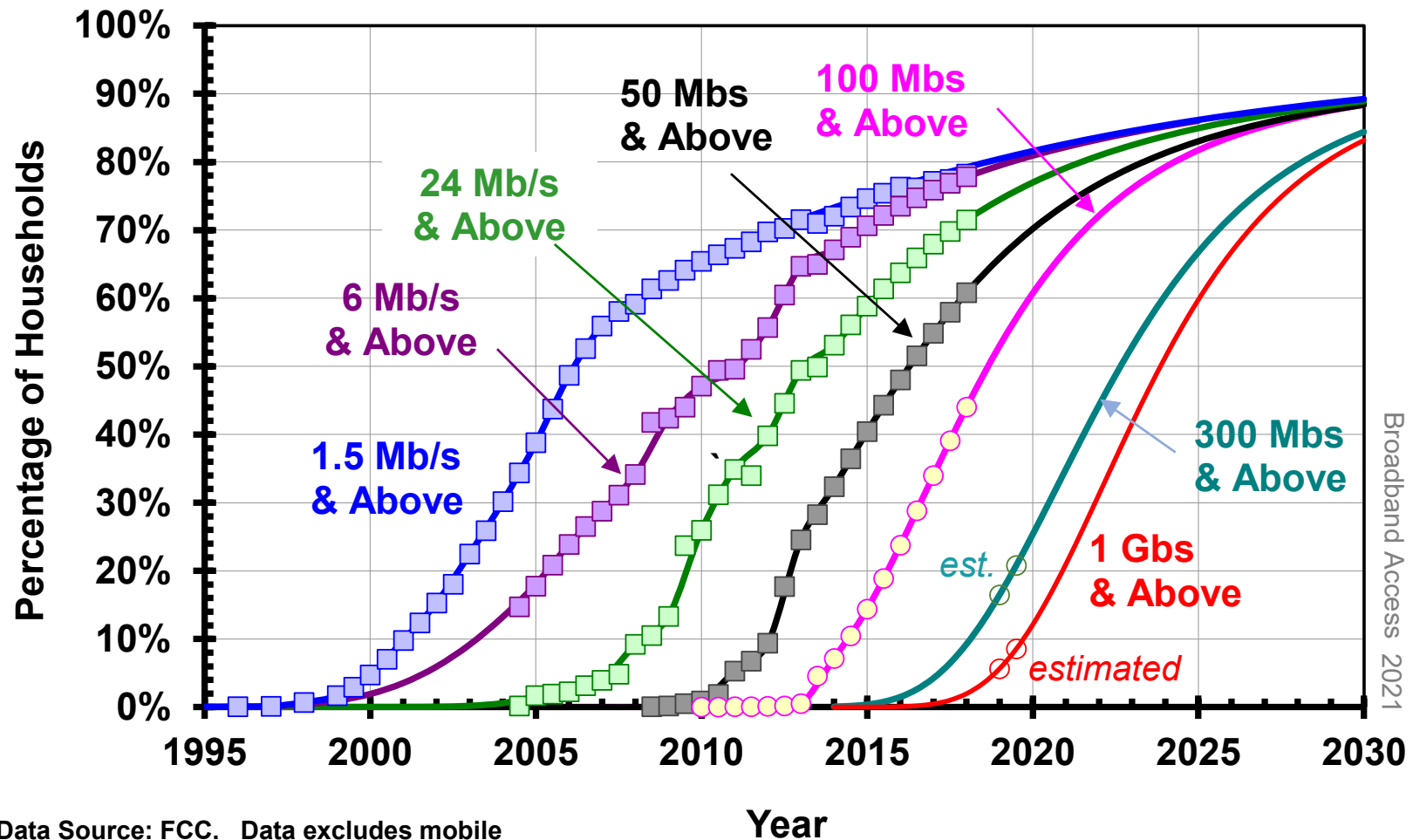


Data Source: FCC. Data excludes mobile wireless broadband

Source: Technology Futures, Inc.

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# U.S. Broadband Substitutions

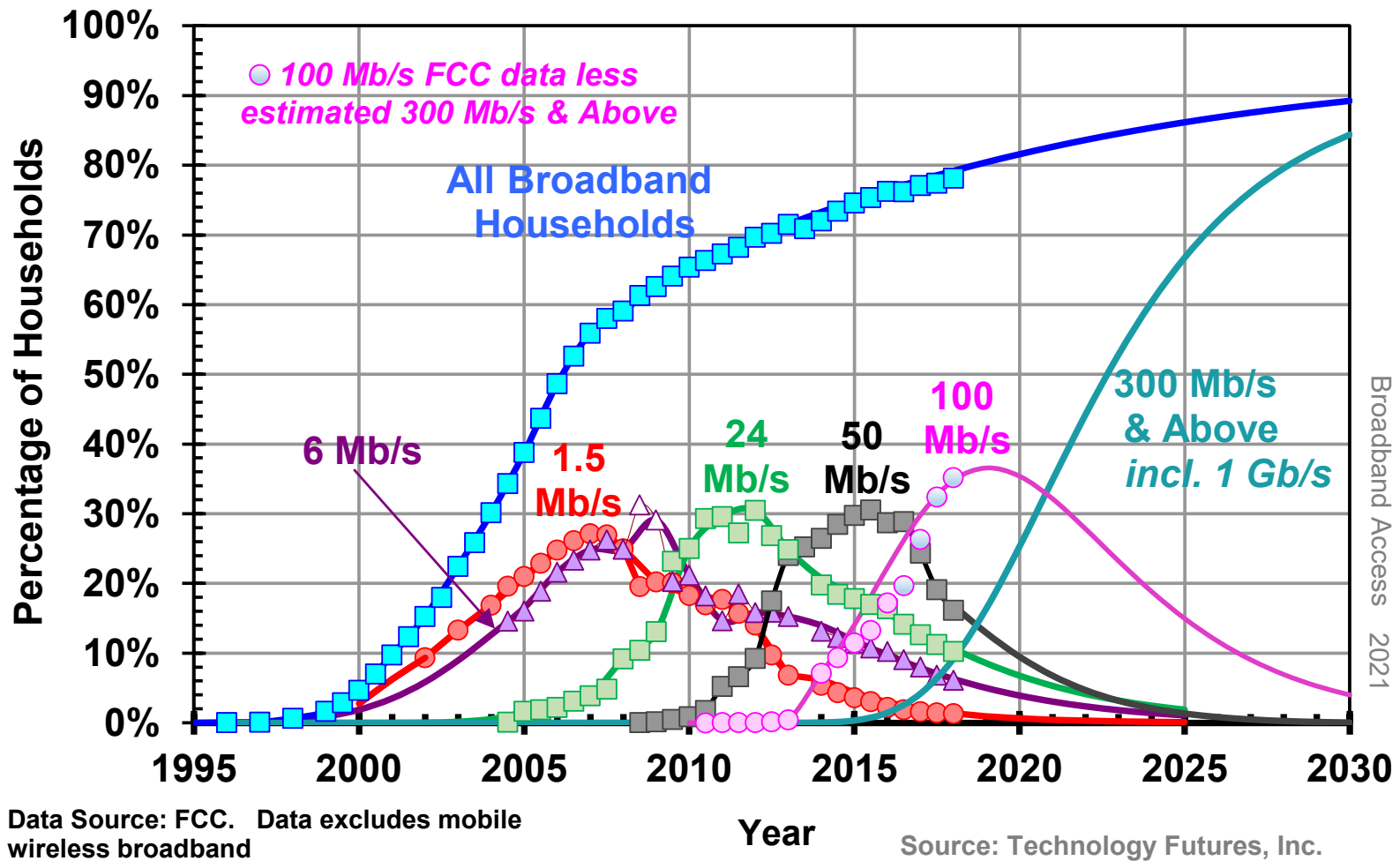


Data Source: FCC. Data excludes mobile wireless broadband

Source: Technology Futures, Inc.

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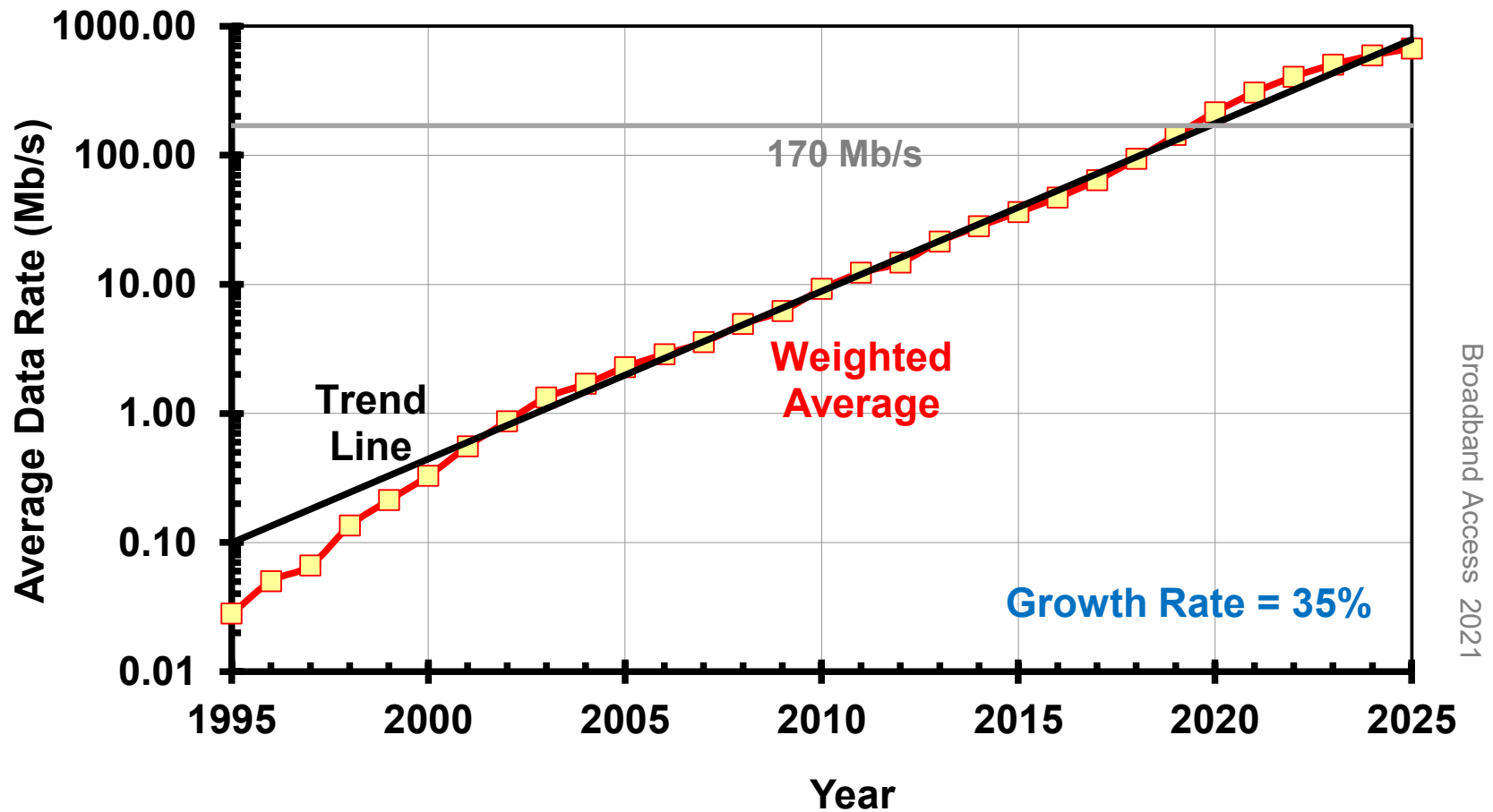
# 2021 TFI U.S. Broadband Forecast



Lifecycle (t) =  
Substitution (t) – Next Substitution (t)

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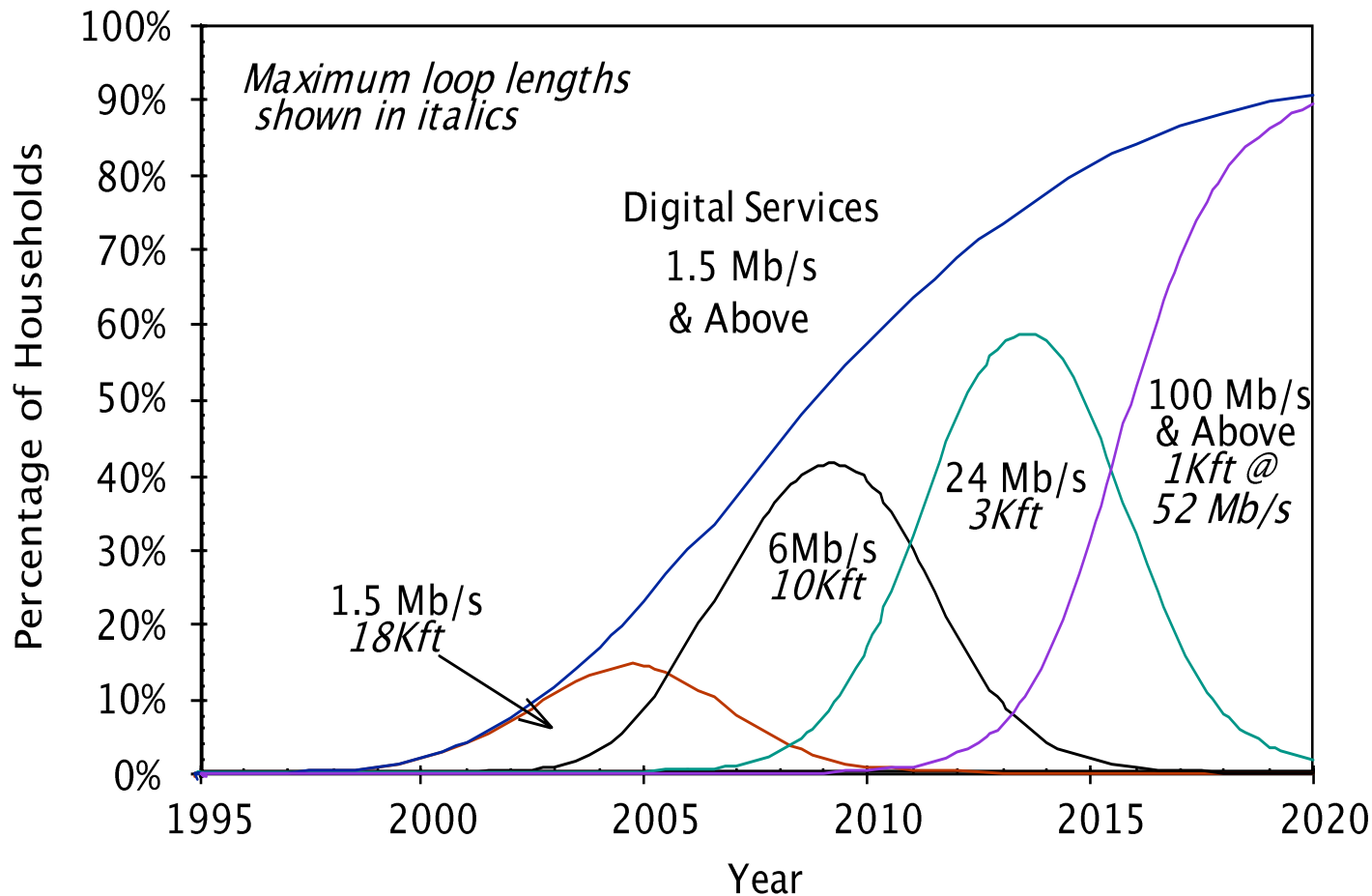
# TFI Average Broadband Speed Forecast



Source: Technology Futures, Inc.

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# 1999 TFI Broadband Forecast

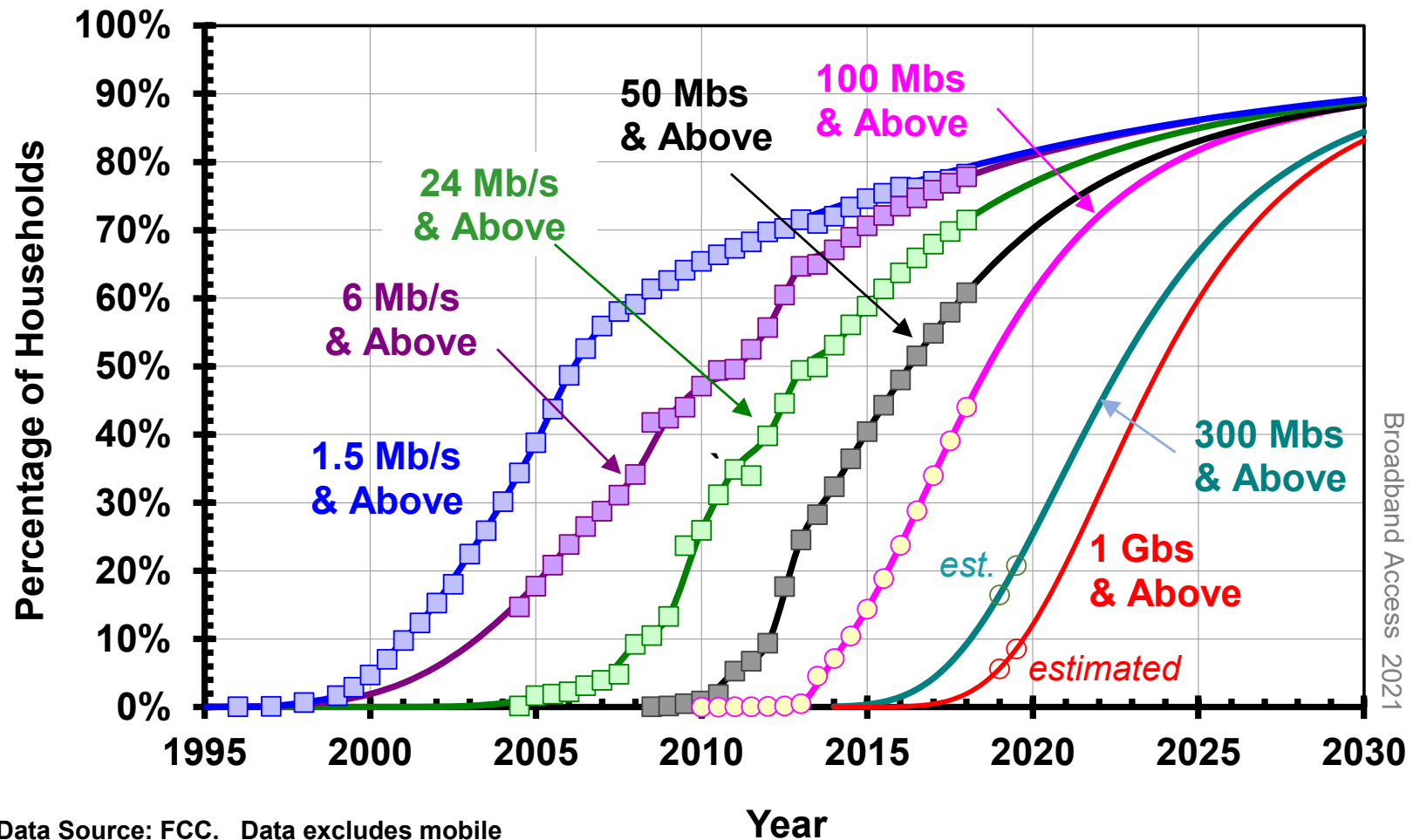


Lawrence Vanston, “Forecasts for Internet/Online Access,” to the 17th Annual ICFC Conference June 1999

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# U.S. Broadband Substitutions

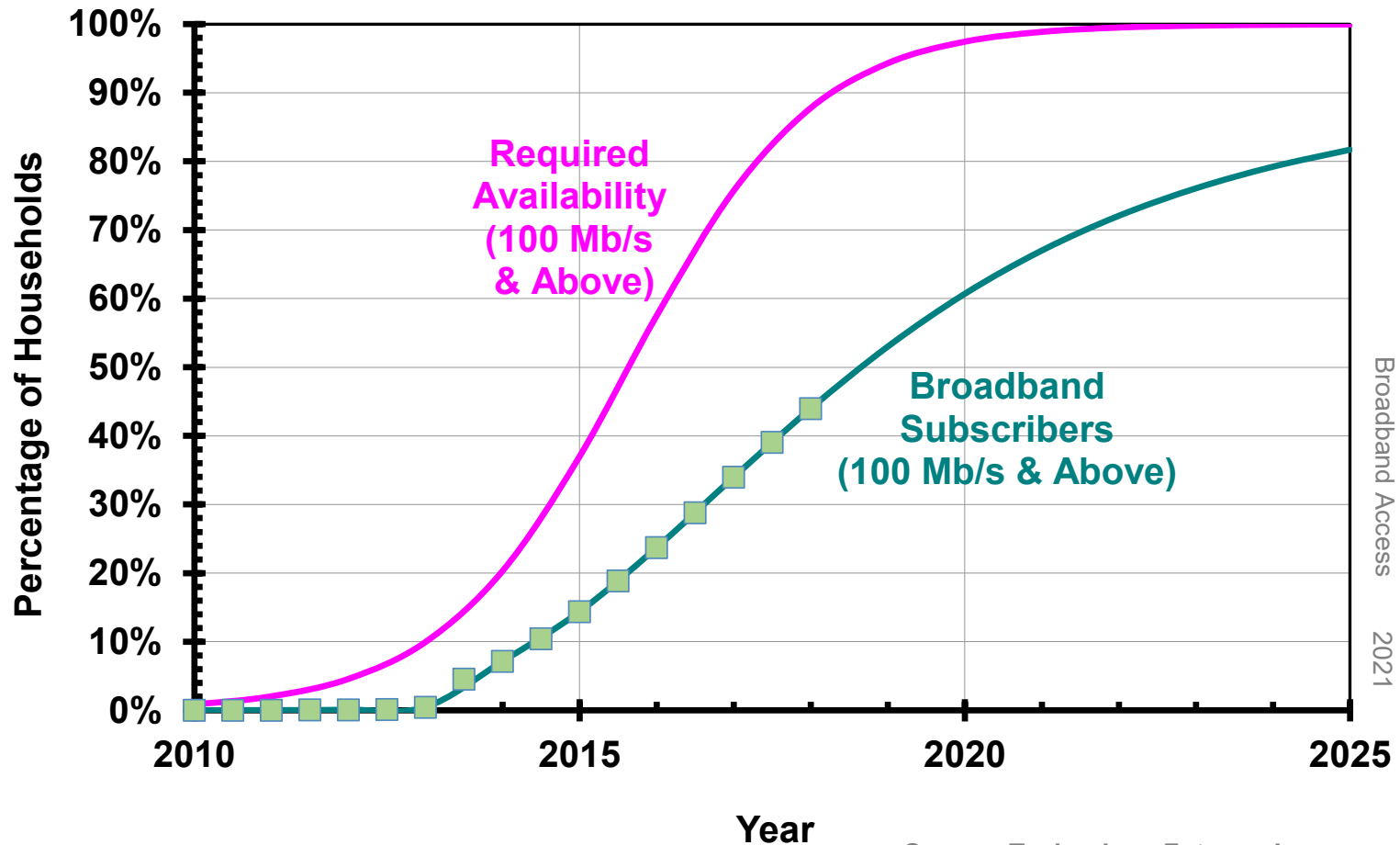


Data Source: FCC. Data excludes mobile wireless broadband

Source: Technology Futures, Inc.

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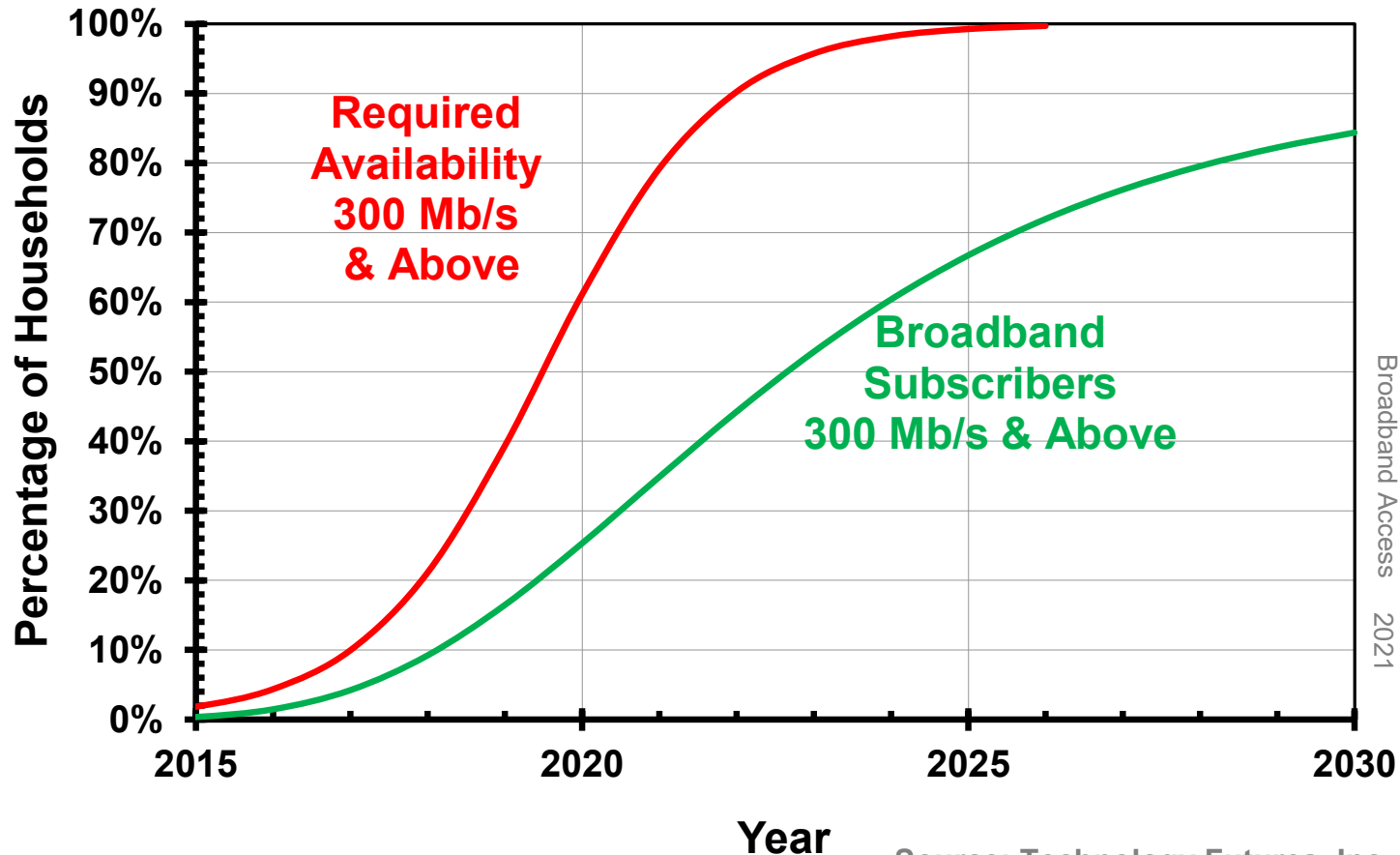
# Availability vs Subscribers, 100 Mb/s & Above



Source: Technology Futures, Inc.

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# Availability vs Subscribers, 300 Mb/s & Above



Source: Technology Futures, Inc.

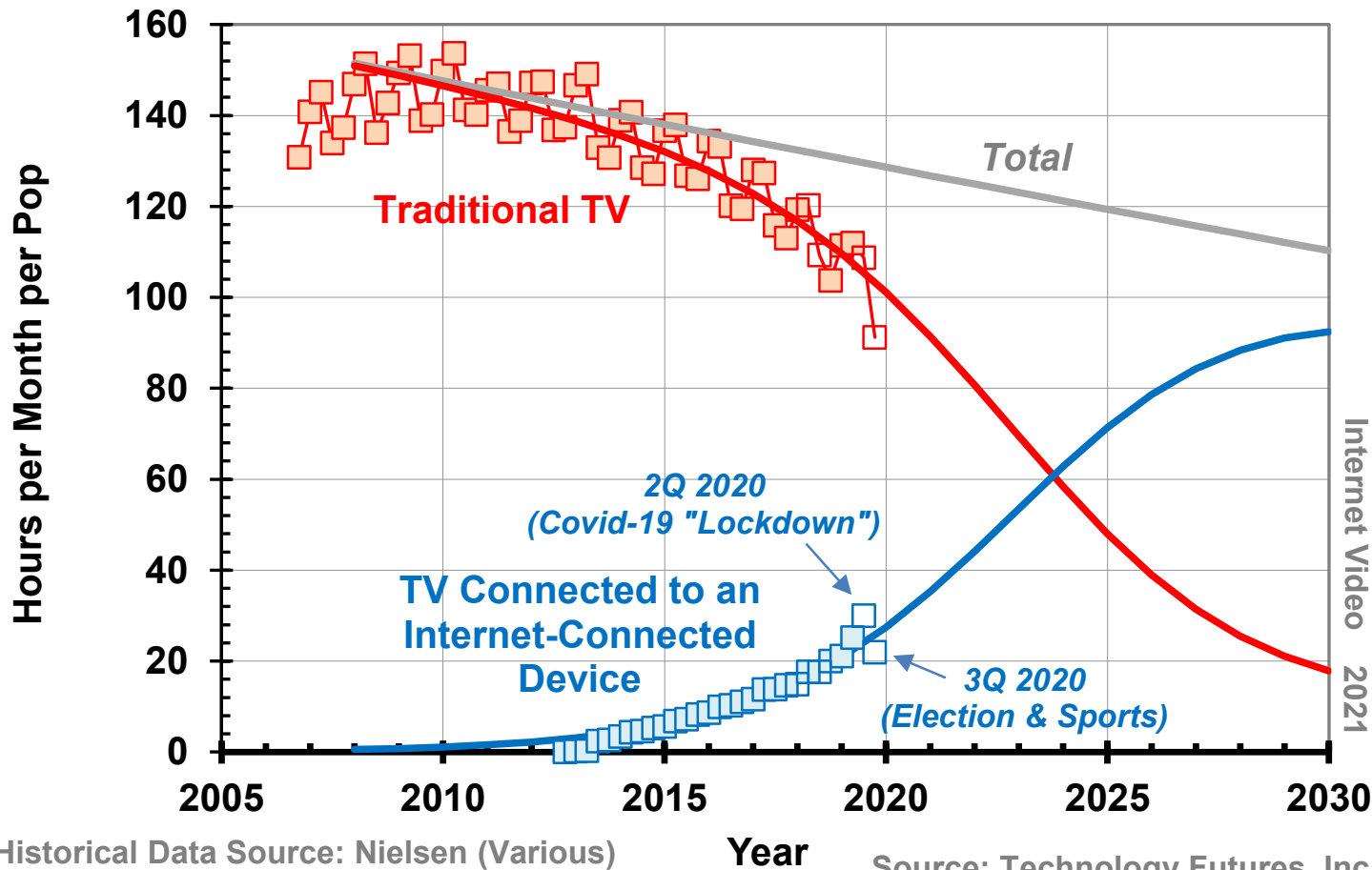
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# Broadband Summary

- Broadband speeds continue to increase, 100 Mb/s standard. 300+ optimal.
- Telcos and Cable companies must invest, especially in fiber, to keep up
- Competition from 5G Wireless Imminent
- Telco copper is doomed. Has been for years.

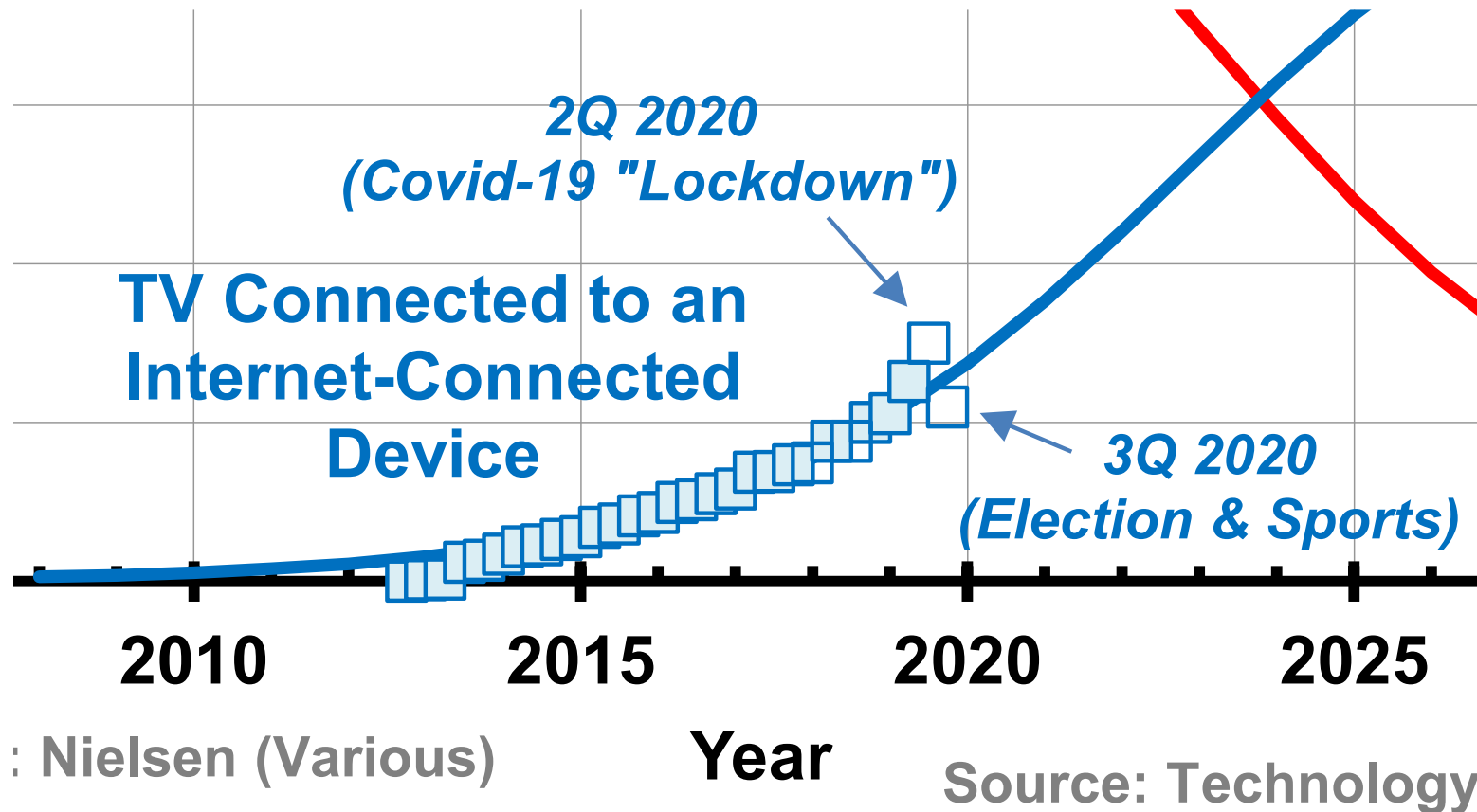
# Online Video Forecasts

# Traditional TV vs TV Connected to an Internet-Connected Device – Hrs/Mo/Pop



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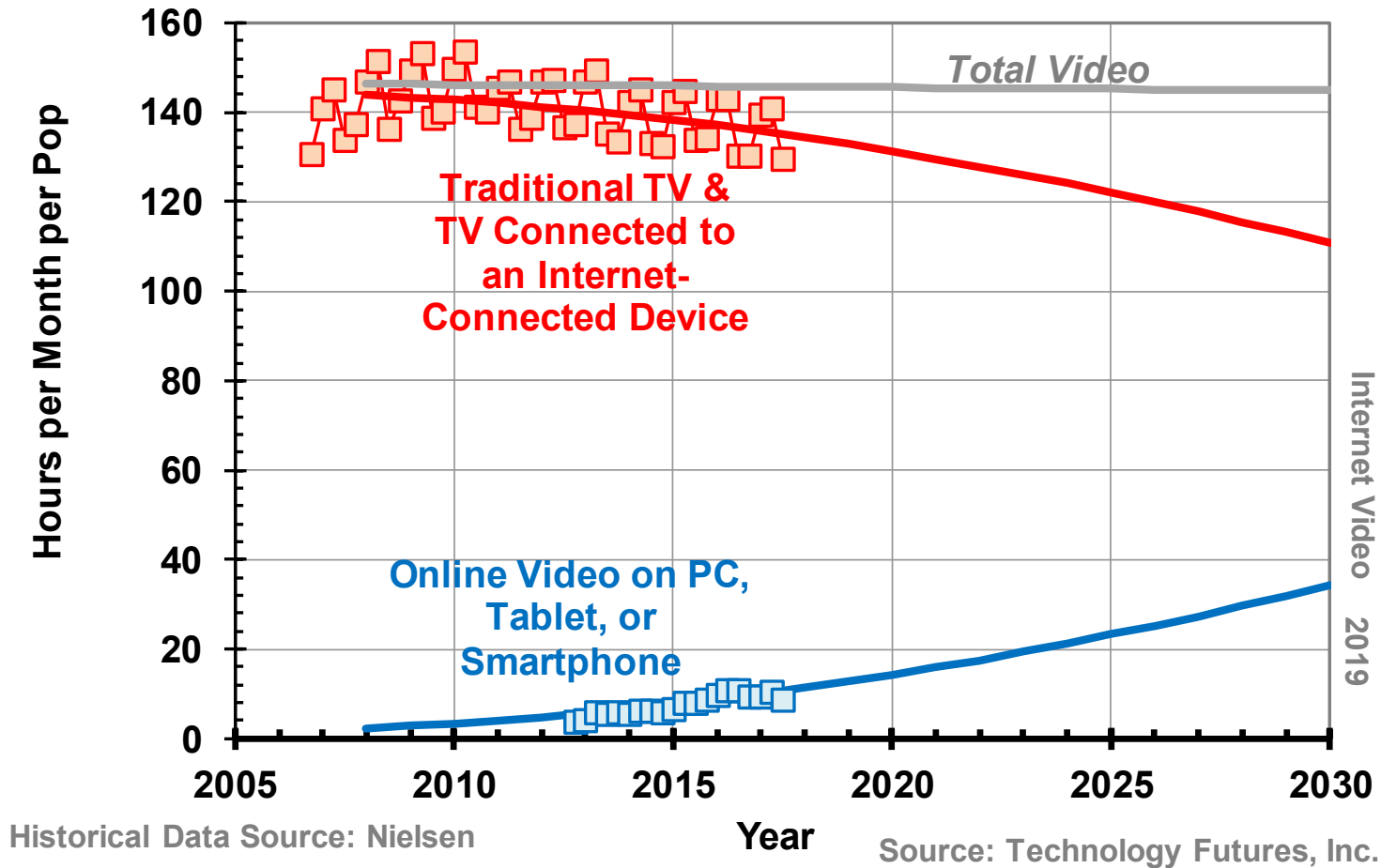
# Traditional TV vs TV Connected to an Internet-Connected Device – Hrs/Mo/Pop



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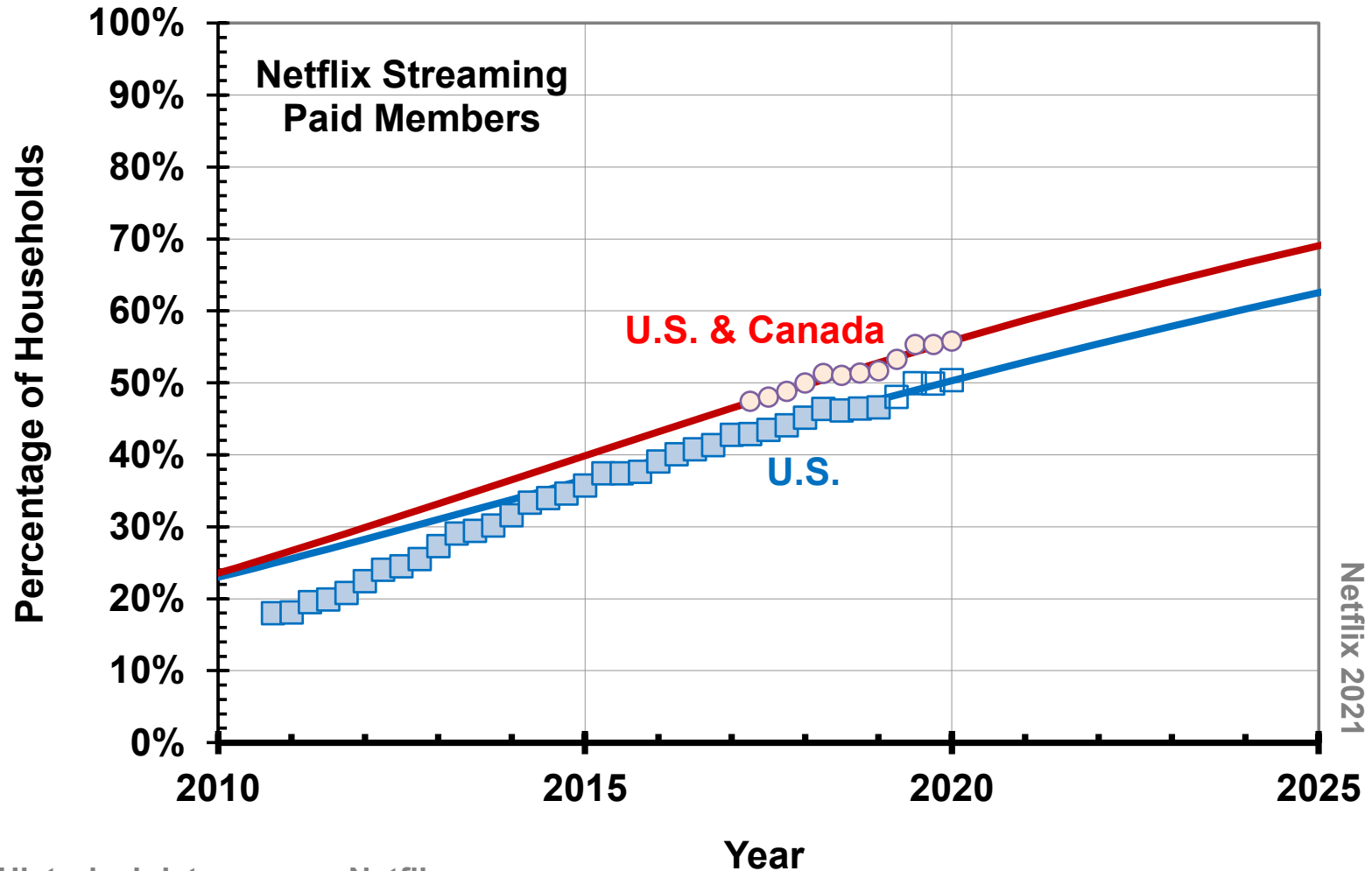


# Online Video Devices vs Television Viewing, Hours per Month per Pop



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# Netflix Streaming Paid Members

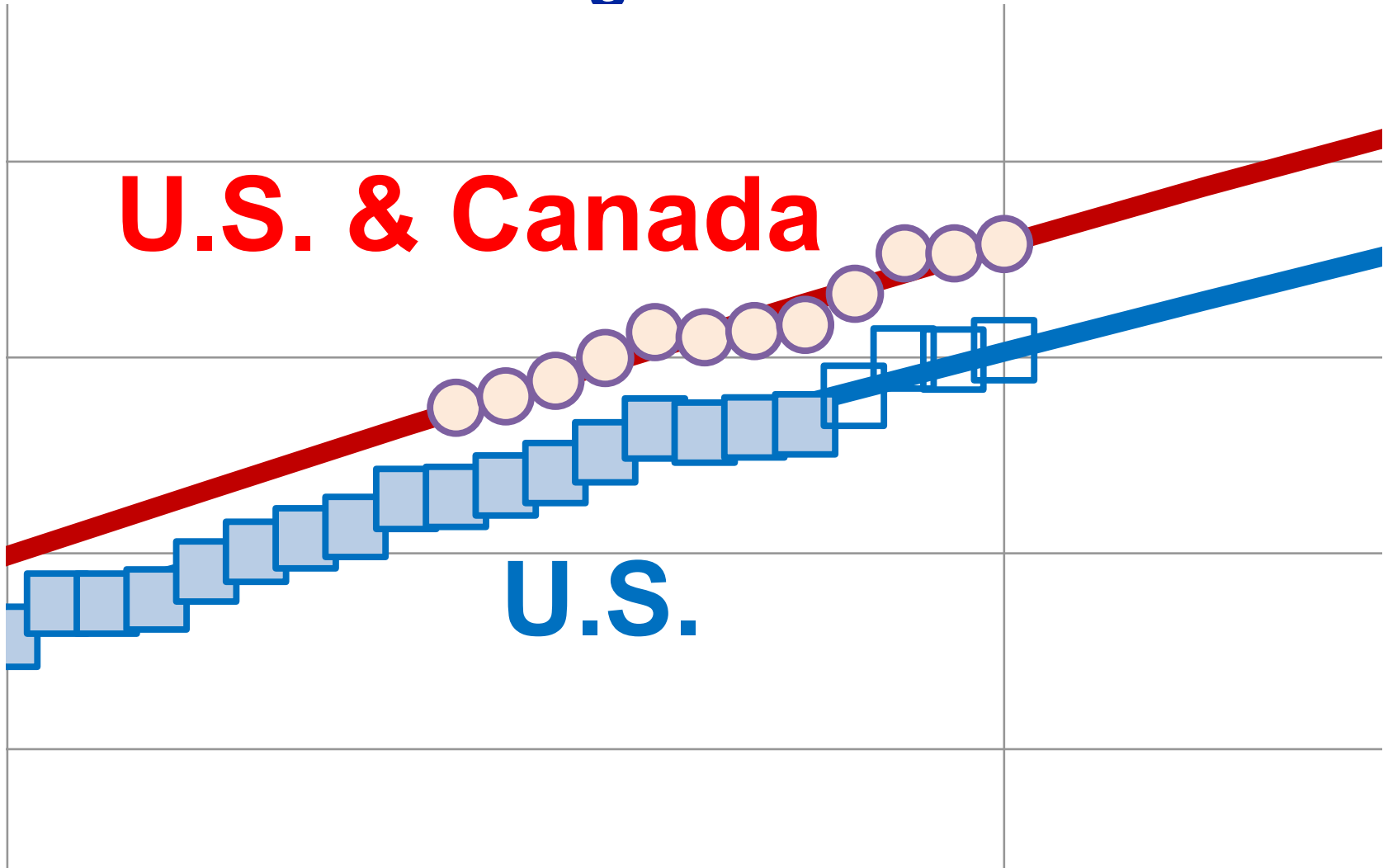


Historical data source: Netflix

Source: Technology Futures, Inc.

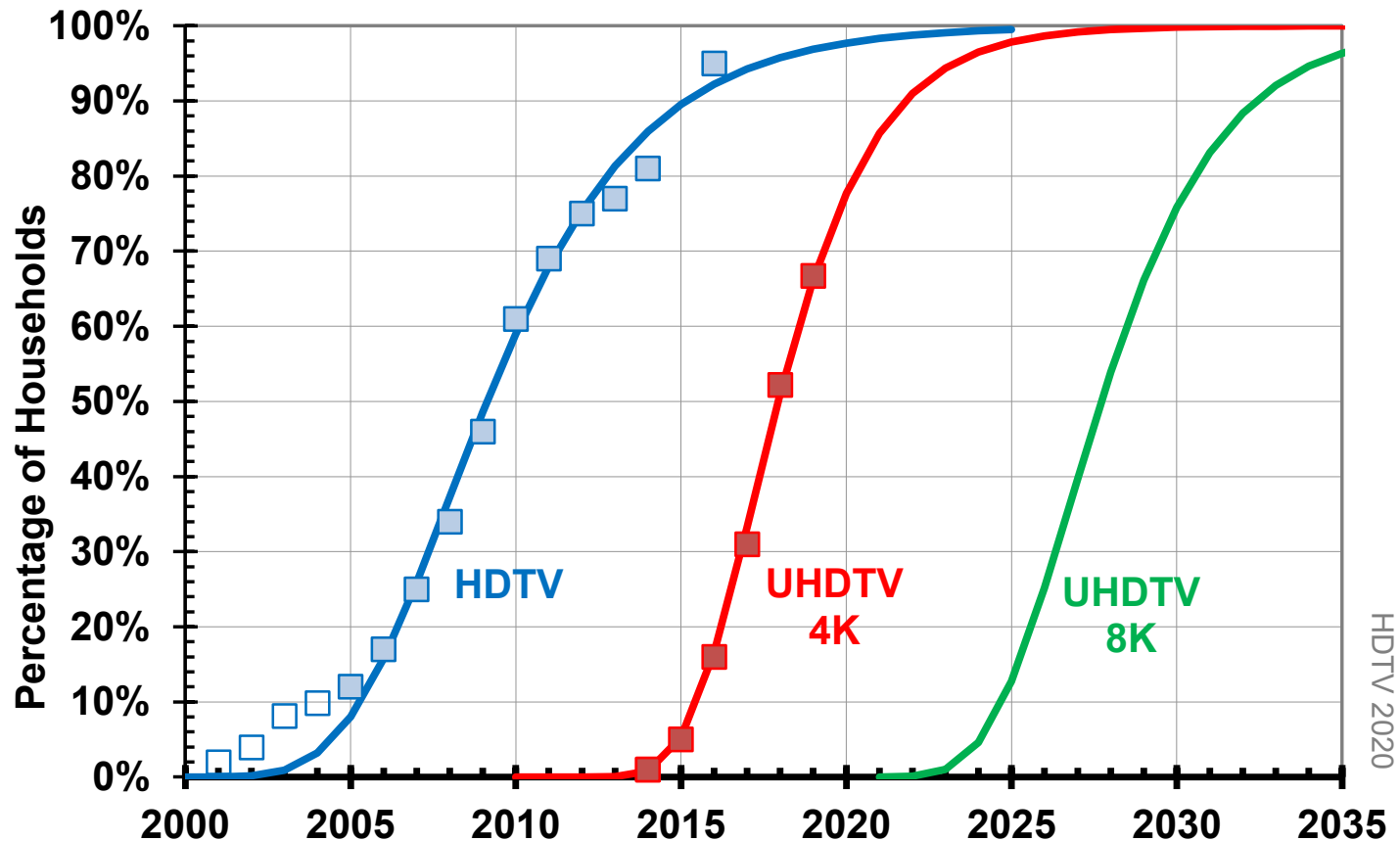
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# Netflix Streaming Paid Members



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# Ultra-HD Households (aka 4K)



Historical data sources: HDTV - 2001-2004 Misc,  
2005- Leichtman Research;  
UHD TV 2014-15 Strategy Analytics  
2016-17 Consumer Technology Assc, 2018- TFI

Year

Source: Technology Futures, Inc.

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**Netflix SD Stream = ~ 2 Mb/s**

**Netflix HD Stream = ~ 4 Mb/s**

**Netflix 4K Stream = ~ 18 Mb/s**

# Video Summary

- Cable companies face continued losses in multichannel TV subscriptions
- Cable companies must continue to provide multichannel and enhance broadband service simultaneously
- Competition from 5G Wireless is imminent
- Cable companies must increase investment in fiber, but without commensurate increase in revenue

# THE BIG BIG PICTURE



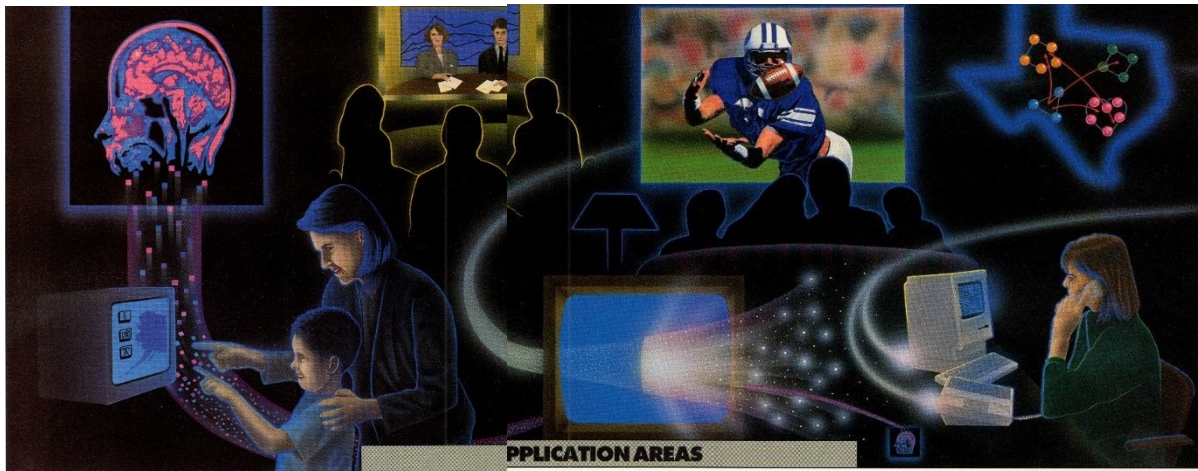
# First Wave Transitions - 1990s→

Physical Movement → Telecommunications

Analog → Digital Communications

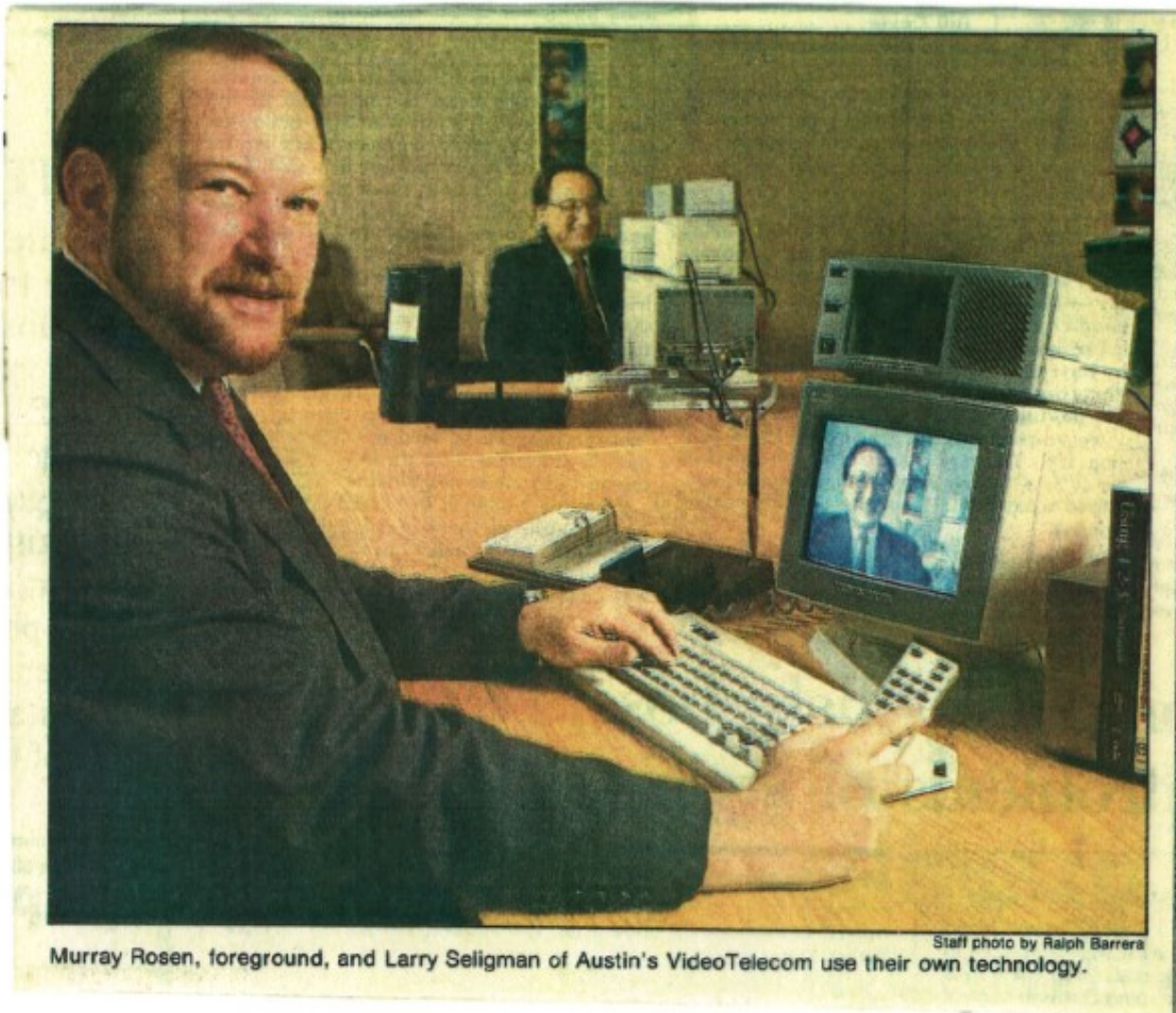
Low Bandwidth → High Bandwidth

Wireline → Wireless



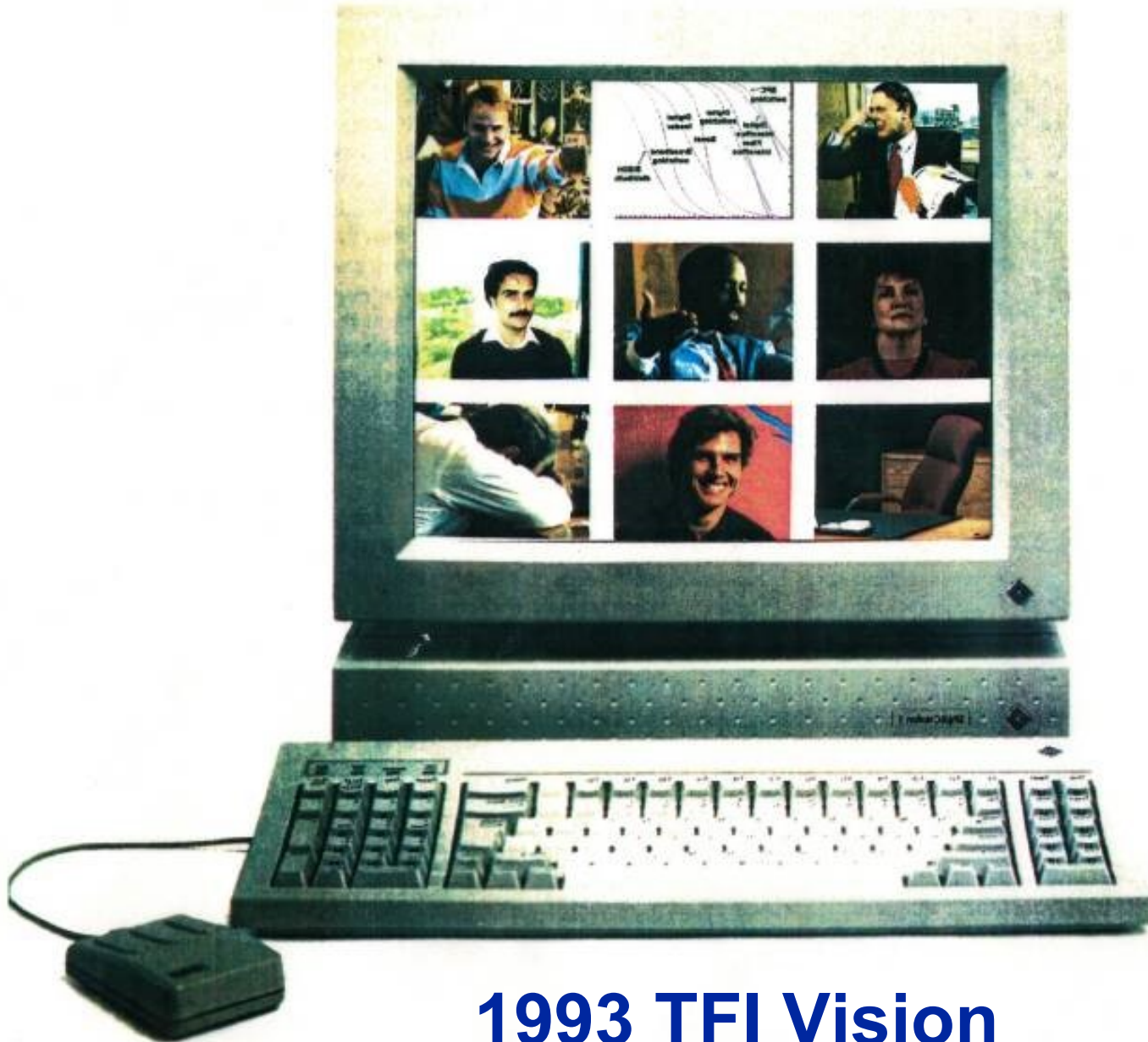
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# 1993 State of the Art



Staff photo by Ralph Barrera  
Murray Rosen, foreground, and Larry Seligman of Austin's VideoTelecom use their own technology.

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## 1993 TFI Vision

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# New Wave Transitions – 2015→

Humans ➡ Robots, Drones, Autonomous Vehicles

People Communicating ➡ Things Communicating (IoT)

Human Programming ➡ AI /Cognitive Computing

Screen-based ➡ Augmented/Virtual Reality



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A stylized graphic of a bridge with two arches, rendered in a light blue color. The bridge is positioned behind the main text and extends across the width of the slide.

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