The Transportation Revolution Revisited

Bob Murphy, PE, PTOE, RLS
President
RPM Transportation Consultants, LLC
Overview of Presentation

- Historical Perspective
- Travel Trends Now & in the Future
- Driving Forces Behind the Next Revolution
- Conclusions
National Road - 1811-1834

- First road built with Federal funds
- Took 7 years to construct the first 10 miles
Fulton Steamboat - 1807

Number of Steamboats in America

The Transportation Revolution Revisited

1807 1817 1820 1855
1 17 69 727
Erie Canal - 1825

- Linked Great Lakes to Hudson River with 363 miles of canal
- 12 times longer than any previously built canal
- Helped make NYC largest & richest city in nation

1816 ~100 miles of canals
1850 ~3,800 miles of canals
Steam Locomotive - 1830

The US started developing steam locomotives in 1830 with the Baltimore and Ohio Railroad's *Tom Thumb*. 
Roads, Canals, and Railroads

Transportation in 1820

Railroad System in 1870-1890

The Transportation Revolution Revisited
Travel Trends Today -
The Driving Boom is over

- Expensive gas
- Demographic changes
- Housing/Job/Lifestyle preferences
- Internet & Mobile Technology
- Recession

<table>
<thead>
<tr>
<th>Average Annual Change - Vehicle Miles Driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miles Driven</td>
</tr>
<tr>
<td>Total Miles</td>
</tr>
<tr>
<td>Miles per Capita</td>
</tr>
</tbody>
</table>

Source: FHWA, “A New Direction”, U.S. PIRG Education Fund, Frontier Group
Travel Trends Today - Decreasing VMT Since 2007

Historical Vehicle Miles Traveled (VMT) in U.S.

Source: FHWA and Census Bureau.

The Transportation Revolution Revisited
Travel Trends Today

Per capita, Americans drive fewer miles now than they did 8 years ago.

Source: FHWA and Census Bureau.
Travel Trends Today - Increases in Transit Ridership

From 1995 to 2012, transit ridership increased by 34%.
(Source: APTA)

16-34 year olds rode 40% more miles on transit in 2009 than in 2001.
Travel Trends Today - Increases in Biking & Walking

- From 2000-2010, bike commuting increased 63% in the 70 largest U.S. cities. (U.S. Census Bureau, League of American Bicyclists)

- In Portland Oregon - 238% more people biked to work in 2010 than in 2000 (Portland Bureau of Transportation)

- More than 200,000 people bike every day in New York City. (USAToday.com)

- Commuter bike traffic increased 125% between 2007 and 2010 in Knoxville, Tennessee. (knoxnews.com, June 5, 2010)
For cyclists of all stripes, there's nothing like Bike to Work Day — our annual celebration of active transportation. Caravans of excited new riders enjoying their commute like never before. Veteran bicyclists seeing and connecting with old friends over free breakfast and live entertainment. Thanks, in part, to encouragement efforts like BTWD, the number of bike commuters is on the rise — especially in Bicycle Friendly Communities. Since 2000, bicycle commuting rates in large BFCs increased 80 percent — far above the national average of 47 percent and more than double the rate in non-BFCs (32 percent). Here are just a few key cities where bike commuting is growing by leaps and bounds.

produced by THE LEAGUE OF AMERICAN BICYCLISTS
WWW.BIKELEAGUE.ORG
Designed by Corey Duraflle, studio d
The Revolution Revisited

What’s Driving This New Revolution?
• Demographic Changes
• Technology (Vehicles & Infrastructure)
• New Travel options
• Internet Technology & Mobile Apps
Between 2001 and 2010, the nation’s urban population increased by 12.1% compared to the overall growth rate of 9.7% (U.S. Census Bureau).

Urban areas now account for about 81% of the U.S. population up from 79% in 2000.

Fastest growing urban areas = Charlotte at 64.6% & Austin at 51.1% (Among urbanized areas with more than 1 million people)

By 2040 over 70% of population growth in TN will occur in urban counties.
Demographic Trends - Impact of Millennials

• Significant decrease in driving by young people - In 2009, ages 16-34 drove 23% fewer miles than young people in 2001.

• The percentage of driving age Americans with driver’s licenses has declined - in 2011 86% held licenses, the lowest percentage in 30 years (U.S. Census Bureau).

• Today only about 77% of age 20-24 have licenses - down from about 90% in the 1980s.
Demographic Trends - An Aging Population

- An American turns 50 every 7 seconds—that's more than 12,500 people every day (U.S. Census).
- By 2030, the 65-plus population will double to about 71.5 million (U.S. Census).
- By 2040 senior population in TN will double.
Demographic Trends - Housing Trends

- In 1970 about 45% of all households had children.
- Some projections show that decreasing to 27%
- 90% of the increase in demand for new housing will be households without children & 47% of this will be senior citizens (Melina Druggall, RCLCo)

<table>
<thead>
<tr>
<th>Household Type</th>
<th>1970</th>
<th>2000</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH with Children</td>
<td>45%</td>
<td>33%</td>
<td>27%</td>
</tr>
<tr>
<td>HH without children</td>
<td>55%</td>
<td>67%</td>
<td>73%</td>
</tr>
<tr>
<td>Single/Other HH</td>
<td>14%</td>
<td>31%</td>
<td>34%</td>
</tr>
</tbody>
</table>

Source: Arthur C. Nelson
Technology - Intelligent Transportation Systems (ITS)
Technology - Connected Vehicles

Systems designed to:
- Increase situational awareness
- Reduce or eliminate crashes

Government currently looking into research and regulatory action needed to require inclusion of this technology in cars by a future date.
Technology - Driverless Cars

Google has been working for 5 years on driverless car technology.

The car is summoned by a smart phone and requires no interaction from the driver.
Technology - Drones for Delivery

• Many companies looking at alternative ways of delivering packages
• Technology has the potential to reduce large trucks on the roadways
New Travel Options - Uber, Uber X, Lyft, Sidecar

45 Countries, 108 cities in U.S.

64 cities in U.S.
New Travel Options

Boost by Benz

- White glove transport service for kids (Palo Alto, CA)
- Mobile iPhone application
New Travel Options - Car Share

The Transportation Revolution Revisited
New Travel Options -
Bike Share Systems

More than 600 cities worldwide operate bike share systems

Approximately 80 systems in North America

The Transportation Revolution Revisited
Mobile Apps

- INRIX
- WAZE
- Parkme
- Parkingmate
Mobile Technology

- Teleworking
- Online Shopping
- Social Networking
- Real-time travel info
What Does This Mean?

A New Transportation Revolution is Underway
• VMT will be less than forecast over next 25 years
• How we travel will be transformed - driven by technology
• More travel options (Modes, Vehicle Sharing & ???)
What Do We Do?

We Need A New Transportation Vision

• Embrace & Accelerate Technology
• Figure Out Funding
• Spend Our Limited Funds Wisely
• Think Multi-modal
• Smart Growth
The Transportation Revolution Revisited

Bob Murphy, PE, PTOE, RLS
President
RPM Transportation Consultants, LLC