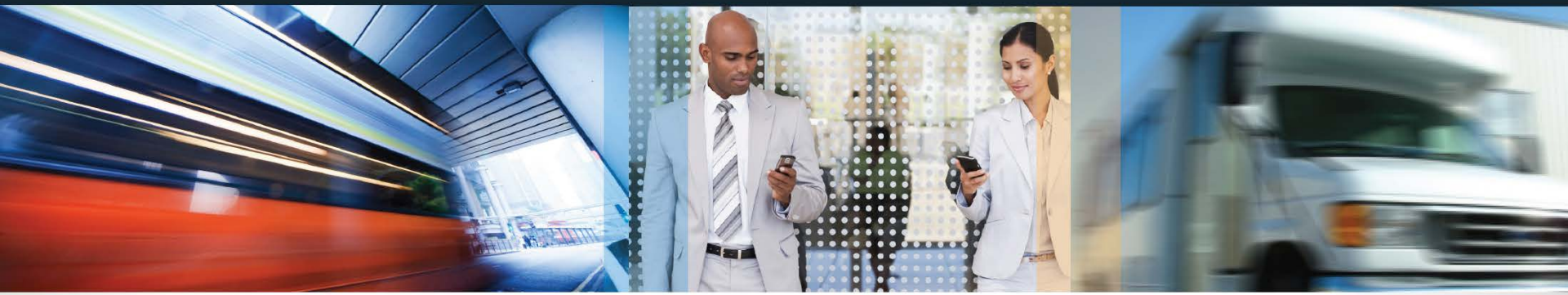
GREEN TECHNOLOGY TRENDS
Paratransit / Fixed Route

Using Innovative Transit Technology to Improve Environmental Sustainability



Presented by Gerard Kirchtag, Trapeze Group

Technologies for Greener Transportation

Why?

- Increasing ridership and regulations to minimize environmental impact has led to new trends in green technology for transit

- Fluctuating fuel costs and economic factors support continued sustainability efforts

- Public transportation plays an important part in reducing society's carbon footprint

Technologies for Greener Transportation

In support of using public transit:

- Public transit creates 95% less carbon monoxide (CO) & ~50% less carbon dioxide (CO_2) per passenger mile than personal vehicles

- Est'd annual reduction of 41 Million tons CO_2

- Using public transit reduces fuel consumption by 4.2 billion gallons per year

Technologies for Greener Transportation

Challenge for Transit Agencies:

Use technology to realize greater operational efficiency while reducing impact on the environment

Technologies for Greener Transportation

How is this possible?

- Choosing technology solutions that optimize resources leads to:
  - Greater operational efficiency
  - More sustainable practices
  - Long-term savings

Technologies for Greener Transportation

Intelligent Transportation Systems (ITS):

- Automate transit processes to maximize resources
- Help achieve environmental and economic goals
- Provide benefits to all levels of an agency
- Enhance the public's perception of transit

Technologies for Greener Transportation

Computer Aided Dispatch/Automatic Vehicle Location (CAD/AVL):

- Electronic trip manifests reduce the need for paper
- Allows monitoring of “live” vehicle data
- Enables re-routing buses in real-time; minimizing idling and reducing fuel consumption

• AVL can increase fleet productivity by 15-24%

• In Winston-Salem, a CAD/AVL system decreased operating expenses by 8.5% per vehicle mile

Technologies for Greener Transportation

ITS Data Reporting:

- Provides accurate data to optimize routes and scheduling
- Know when and where service is “really” needed
- Facilitate reducing vehicle miles traveled (reducing fuel consumptions & greenhouse gas emissions)

• Increase shared passenger rides by 17%

Technologies for Greener Transportation

Mobile Computing:

- Improved operational efficiencies
  - **50% time savings** in dispatch functions
  - On-time performance **greater than 99%**
  - **24% increase** in Paratransit revenue trips per hour
- Decreased Fuel Consumption
  - **35% + time-savings** in same-day trips
- Improved Customer Service
  - **32% decrease** in customer complaints

• Productivity increased from about 1.6 to about 1.7 passengers per vehicle hour (King County Metro)

Technologies for Greener Transportation

Integrated Navigation:

- Allows drivers to access maps and turn-by-turn voice prompts to quickly reach their destination
- Is a fuel-efficient way to navigate through detours
- Reduces fuel consumption and improves response times

• Use of MDT navigation improves schedule adherence by ~10%

Technologies for Greener Transportation

Vehicle Telematics:

- Optimize vehicle performance
- Capture engine diagnostics for prompt maintenance
- Proper maintenance minimizes vehicle emissions
- Analysis of fuel efficiencies
  - retire the least efficient vehicles first
  - excessive fuel consumption is often a symptom of a problem
- Monitor tire pressure levels to optimize fuel efficiency

• Using AVL to optimize routing can save over 2400 miles or 173 gallons of fuel per year.

Technologies for Greener Transportation

Driver Behaviour:

- Speeding

Estimated cost of speed related accidents is **$40.4 B/Yr** - what's yours?
Each **5** mph driven above **60** mph used ~8% more fuel

- Idling

Idling **30** min / day costs **$562** of gas / year
Idling causes **twice** as much wear & tear as driving
Idling for **10** or more seconds uses more fuel then restarting
Idling emits nearly **20** times more air pollution than driving at **30** mph

- Harsh Braking /Acceleration

Increases wear & tear, increases maintenance, reduces tire/brake life and contributes to more accidents

- Unauthorized vehicle use

Are vehicles being used for personal or non-transit use?

Technologies for Greener Transportation

Fuel Consumption & Speed

Speed (mph)	% Increase in Fuel Cost	Equivalent cost per Gallon of Fuel
60	7.58%	$3.50
65	15.15%	$3.75
70	22.73%	$3.99
75	30.3%	$4.24
80	37.88%	$4.49
85	45.45%	$4.73

Fuel Consumption & Idling

Idle Time per Vehicle per Day	Wasted Fuel Cost per Vehicle per Day	Wasted Fuel Cost per Vehicle per Year
30	$1.63	$593.77
60	$3.25	$1,187.54
90	$4.88	$1,781.30

ITS in Action

Central Area Rural Transit System

ITS has improved efficiencies and better trip combinations

- Reduced the need to contract-out service
- Money saved by not contracting out enabled better driver pay
- Better driver wages increased driver recruitment
- More drivers means less contracting out, etc .....

Before Mobile Data up to 30% service on busier days was contracted

After deployment contracting has been reduced to ~ 2%

- resulting in less single person trips

Data reliability has improved

ITS in Action

AnchorRides

- First implemented Paratransit ITS in 2004 (~10 years ago)
- Improved efficiency & reduced voice communications
- Upgrading to new ruggedized MDT platform next month

ITS in Action

YORK REGION TRANSIT

York Region Transit (YRT):

- Since using an ITS solution YRT has reduced deadhead kilometers, resulting in over 6 tons of CO_2 emissions saved since inception
- ITS resulted in at least a 50% time savings in dispatching functions
  - Instead of having drivers idle vehicles while getting instructions over the radio, dispatchers can instantly provide updated schedule info to their in-vehicle computers

ITS in Action

Massachusetts Bay Transportation Authority (MBTA):

- Over 800 vehicles, complete more than 1.9 million trips per year
- ITS resulted in:
  - On-time performance greater than 99%
  - 32% decrease in customer complaints

ITS in Action

Urban Paratransit Agency:

- Using a test subset of their fleet, the agency reported drivers exceeding their speed threshold by 32 mph = additional cost of $1.28 per gallon of gas to the agency
- Based on 9 vehicles, the agency reported 2.79 hrs of idling per vehicle per day = $9.09 per vehicle per day
- = $2,364 of fuel wasted per year (Mon-Friday)

Conclusion

- Increased focus on environmental stewardship demands greater action from transit agencies

- Agencies that embrace green technology can:
  - increase driver and public safety
  - improve service
  - raise rider satisfaction
  - reduce operating costs and improve its bottom line

Thank You

www.trapezegroup.com

Gerard Kirchtag, Trapeze Group
gerard.kirchtag@trapezegroup.com
604 357 7540