Cost-Effectiveness of Active Transportation

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[ Active Transportation = Bicycling and Walking for Utilitarian Purposes]
Why Active Transportation?

- Feasibility
- Efficiency
- Benefits
Cost-Benefit Framework of Active Transportation

**Investment in AT**
- Convenience
- Infrastructure
  - Complete network
- Safety
- Programs
  - Marketing, education
- Incentives

**AT**
- Mode share
- Miles traveled

**VMT avoided**

**Benefits from AT**
- Congestion
- Energy
- Environment
- Health
- Others
- Others
- Others
“Active Transportation for America” quantifies for the first time the profound benefits our nation would see with increased walking and bicycling. Never before has the case been made so clearly that relatively modest federal investment in bicycling and walking can save Americans tens of billions of dollars each year.

The report pulls success stories from communities across the country that are actively engaged in improving their active transportation networks. These stories come from community case statements that are part of their participation in Rails-to-Trails Conservancy’s 2010 Campaign for Active Transportation.

For more about the report, including access to case-making graphs, summaries and opportunities to take action, visit the report Web site:

www.railstotrails.org/ATFA

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Summary of the Benefits from Bicycling and Walking Quantified in this Report

- This report provides quantitative assessments and an overall estimation of the monetary value of the benefits of current and future bicycling and walking in the United States.
- The main premise of the analysis is that short trips of three miles or less, which currently make for about half of all trips taken in the United States, can, to some extent, be shifted from driving to bicycling and walking.

Benefits from bicycling and walking are quantified in the areas:

- transportation
- oil dependence
- climate change
- public health
“Active Transportation for America” Framework

Investment in AT
- Convenience
- Infrastructure
  - Complete network
- Safety
- Programs
  - Marketing, education
- Incentives

AT
Mode share
Miles traveled

VMT avoided

Benefits from AT
- Fuel Savings
- CO₂ Reduction
- Physical Activity
- $$

Trips < 3 miles assumed utilitarian

NHTS
Status quo 2001
Modest scenario
Substantial scenario
Mode Share Assumptions for Benefits Calculations in “Active Transportation for America”

Status Quo 2001
- Bicycling & Walking: 10%
- Transit from Bike & Walk: 5%
- Transit: 1.4%
- Driving: 87%
- Other: 0%

Modest Scenario
- Bicycling & Walking: 13%
- Transit from Bike & Walk: 7%
- Transit: 5%
- Driving: 79%
- Other: 25%

Substantial Scenario
- Bicycling & Walking: 53%
- Transit from Bike & Walk: 15%
- Transit: 5%
- Driving: 25%
- Other: 0%
VMT Reduction Mechanisms

Replace Short Trips <3m

Synergy with Transit

DC Metro Catchment Area

Induced Smart Growth

- Bicycle and Pedestrian Infrastructure
- Shorter Trip Distances
- Closer Destinations
- Mixed Land Use and Land Use Density
- Local Businesses Catering to Bicyclists, Pedestrians, and Motorized Customers
- Safe and Convenient Bicycling and Walking
- Bicyclists and Pedestrians
Monetary Value of Benefits in “Active Transportation for America” Report

• Status quo (2001):
  – fuel savings from short bicycling and walking trips alone are worth $4 billion annually

• Modest scenario:
  – $10 billion annually
    • Incl. $2 billion from induced transit and smart growth

• Substantial scenario:
  – $66 billion annually
    • Incl. $28 billion from health care savings
    • Incl. $10 billion from induced transit and smart growth

Compare to ~$500 million in annual federal spending for bike/ped currently

How much would it cost to achieve these benefits?
Cost-effectiveness of Bicycle Investments in Portland, Ore.
What’s Different About Portland?

Portland Average Daily Bridge Bicycle Traffic 1991-2008
Portland Bicycle Investments Framework

Investments in Bicycling

- Convenience
- Infrastructure: Complete network
- Safety
- Programs: Marketing, education
- Incentives

Bicycling
Mode share/shift
Miles traveled

VMT avoided

Benefits from Bicycling

- Fuel Savings
- CO₂ Reduction
- Physical Activity

- Bike counts
  Mode share goals
  MPO traffic model

- Trips < 3 miles assumed utilitarian

- $57 million
Cost of Infrastructure and Promotion

- In 2008, city estimated cost of 300 miles bikeway network at $57 million
- Since 2003, SmartTrips promotion program $600k per year ($7.2 million total over ten years)
- Assumption: to achieve future mode shift goals Portland will invest another $100 million by 2030

Total investment: $164 million (1991-2040)

- (currently not included: investments in regional trails of $79 million, and plans for full build-out of regional trails of approx. $1 billion)
Converting Bridge Counts into Miles Biked

• 15 years trend data: 10% annual increase
  – Correlated mode share data (2008: 4-8%)
• 2030 mode share goal of 25% (20%)
  – Used to fit a polynomial extrapolation
• 2005 MPO traffic model
  – Provides miles biked by trip length. Limit to trips of 3 miles or less. Predominantly utilitarian, urban.

• By 2030, one out of five Portlanders will ride their bike for about 2.4 miles a day, on average.
  (or about 6.5 miles on every sunny day)
  (based on city population only, 800,000 by 2030)
Bridge bicycle traffic counts 1991-2008 (thousands)

Bike to work mode share Census/ACS/estimates (%)

Annual bike miles traveled based on MPO model and bike traffic trends (millions)
Converting Miles Biked to Health Benefits

- Studies estimate savings in health care costs from sufficient physical activity at around $300 per year (compared to insufficient PA) (Year 2000 $$)
  - Colditz et al. 1999, Pratt et al. 2000, Wang et al. 2004
- Assumption: to become sufficiently active (30 min/day), an insufficiently active person needs to exercise for an additional 15 minutes, on average.
- Convert miles to minutes (10mph)
- Assumption: in 2000, only 20% of cyclists would otherwise be insufficiently active. By 2030, this proportion increases to 50%.
- Alternative: HEAT for Cycling (WHO), based on statistical value of life ($5.8 million)
Converting Miles Biked to Fuel Savings

• Assumption: Fuel efficiency increases to 35mpg by 2030
  – Convert miles to gallons

• Assumption: gasoline costs $3.80 by 2030 (average of EIA high and low predictions)

• (For CO₂ reductions, assume reduced C content of 15% by 2030)
  – CO₂ reduction currently not considered in cost-benefit calculation, but used for cost-per-ton calculations
Cost-Benefit Ratios

By 2040:

- Total investments: $167 million
- Health care savings: $1.05 billion
- Fuel savings: $335 million

Return on investment:

$8.3 in benefits per $1 invested
Concluding Remarks

• Results clearly indicate that increases in active transportation, and bicycling in particular are worth pursuing
• Results indicate that investments in bicycling are highly cost-effective

• Analysis provides ballpark estimates – substantial potential for improvements in methodology and data
• Replication of analysis in other US cities is difficult due to lack of data
• Very limited consideration of benefits outweigh uncertainties in cost estimates, resulting in a conservative assessment of cost-effectiveness
Thank You!

Presentation and further information available upon request:

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