OUTLINE

• Ridership and Travel Behavior
• Energy
• Other
PMT and VMT per Capita by Age

2001 Per Capita VMT
2008 Per Capita VMT
Trip Rate and Length

Annual Trips per Person 5+

Trip Length

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Trips</th>
<th>Trip Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>1067</td>
<td>9.47</td>
</tr>
<tr>
<td>1983</td>
<td>1054</td>
<td>8.68</td>
</tr>
<tr>
<td>1990 Adj.</td>
<td>1371</td>
<td>9.29</td>
</tr>
<tr>
<td>1995</td>
<td>1568</td>
<td>10.78</td>
</tr>
<tr>
<td>2001</td>
<td>1449</td>
<td>9.00</td>
</tr>
<tr>
<td>2008</td>
<td>1385</td>
<td>9.52</td>
</tr>
</tbody>
</table>
### NPTS and NHTS Work Trip Walking

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>5.00%</td>
</tr>
<tr>
<td>1977</td>
<td>4.60%</td>
</tr>
<tr>
<td>1983</td>
<td>4.50%</td>
</tr>
<tr>
<td>1990</td>
<td>4.00%</td>
</tr>
<tr>
<td>1995</td>
<td>2.60%</td>
</tr>
<tr>
<td>2001</td>
<td>2.92%</td>
</tr>
<tr>
<td>2008</td>
<td>3.03%</td>
</tr>
</tbody>
</table>

**Walk is 10.95% of all trips in 2008**
Census/ACS Work Trip Percent Walking

Graph showing the percent walking to work from 1960 to 2010:

- 1960: 10.40%
- 1970: 7.40%
- 1980: 5.60%
- 1990: 3.90%
- 2000: 2.90%
- 2009 ACS: 2.86%
- 2010: 2.86%
Vehicle Occupancies - NHTS

Occupancy:
- Work Trip
- All Trips


Values:
- Work Trip: 1.40, 1.30, 1.30, 1.20, 1.20, 1.20, 1.13, 1.90, 1.90, 1.80, 1.70, 1.59, 1.64, 1.67, 1.13
- All Trips: 1.90, 1.90, 1.80, 1.70, 1.59, 1.64, 1.67, 1.13

Graph showing a decrease in occupancy from 1969 to 2009 for both work trips and all trips.
Carpooling Mode Share (ACS)

Percent Carpooling to Work
Transit Mode Share Trends

- Census/ACS Journey to Work, Usual Mode
- NPTS/NHTS Work Trips, Survey Day
- NPTS/NHTS All Trips
- NHTS 2001 Adjusted
- NHTS Work Trip, Work Trip Usual Mode

Percent on Transit

- 1968: 8.90%
- 1970: 6.40%
- 1972: 5.30%
- 1974: 4.70%
- 1976: 4.99%
- 1978: 4.60%
- 1980: 3.56%
- 1982: 3.67%
- 1984: 3.68%
- 1986: 3.40%
- 1988: 2.70%
- 1990: 2.20%
- 1992: 1.81%
- 1994: 1.56%
- 1996: 1.76%
- 1998: 1.56%
- 2000: 1.92%
- 2002: 1.76%
- 2004: 3.67%
- 2006: 4.70%
- 2008: 5.05%
- 2010: 5.13%
- 2012: 4.99%
Vehicle Availability

- Vehicles per worker
- Vehicles per person 16 and older
- Vehicles per person
- Vehicles per driver
Declining Zero-Vehicle Households?

Source: CUTR analysis of NHTS, NPTS, U.S. Census Bureau and 2002-09 ACS
Transit Market Share by Car Availability

<table>
<thead>
<tr>
<th>2001</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cars = Workers</strong></td>
<td><strong>Cars = Workers</strong></td>
</tr>
<tr>
<td>1 Car, 1 Worker</td>
<td>1 Car, 1 Worker</td>
</tr>
<tr>
<td>0 Cars, 1 or More Workers</td>
<td>0 Cars, 1 or More Workers</td>
</tr>
<tr>
<td>0 Cars, 0 Workers</td>
<td>0 Cars, 0 Workers</td>
</tr>
<tr>
<td>2+ More Workers than Autos</td>
<td>2+ More Workers than Autos</td>
</tr>
<tr>
<td>Cars is Greater than Workers</td>
<td>Cars is Greater than Workers</td>
</tr>
<tr>
<td>1 More Worker than</td>
<td>1 More Worker than</td>
</tr>
</tbody>
</table>

- In 2001, 0 car household riders make up 44.6% of riders.
- In 2008, 0 car household riders make up 48.1% of riders.
Transit Mode Share by Income

<table>
<thead>
<tr>
<th>Mode Share Percent</th>
<th>Under $15,000</th>
<th>$15,000-$50,000</th>
<th>$50,000+</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>5.98</td>
<td>2.31</td>
<td>1.05</td>
<td>1.92</td>
</tr>
<tr>
<td>2001</td>
<td>5.32</td>
<td>1.38</td>
<td>0.91</td>
<td>1.57</td>
</tr>
<tr>
<td>1995</td>
<td>4.98</td>
<td>1.57</td>
<td>1.07</td>
<td>1.81</td>
</tr>
</tbody>
</table>
Transit Mode Share by Home Ownership Status

Mode Share Percent

- **Renter**
  - 2008: 4.93
  - 2001: 4.25
  - 1995: 4.57

- **Owner**
  - 2008: 0.81
  - 2001: 0.73
  - 1995: 0.90

Legend:
- **2008**
- **2001**
- **1995**
Mode Speeds

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not in MSA or CMSA</td>
<td>29.1</td>
<td>11.2</td>
<td>11.2</td>
<td>11.2</td>
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<tr>
<td>MSA of Less than 250,000</td>
<td>13.7</td>
<td>10.1</td>
<td>10.1</td>
<td>10.1</td>
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<tr>
<td>MSA of 250,000 - 499,999</td>
<td>10.8</td>
<td>10.9</td>
<td>10.9</td>
<td>10.9</td>
</tr>
<tr>
<td>MSA of 500,000 - 999,999</td>
<td>8.7</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>MSA or CMSA of 1,000,000 - 2,999,999</td>
<td>10.3</td>
<td>11.2</td>
<td>11.2</td>
<td>11.2</td>
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<tr>
<td>MSA or CMSA of 3 million or more</td>
<td>11.8</td>
<td>11.8</td>
<td>11.8</td>
<td>11.8</td>
</tr>
</tbody>
</table>
Transit and Elderly

Person Trips per Day by Age

Transit Mode Share by Age

Share of Transit Trips by Age Groups

5-14, 6.5%
15-24, 21.3%
25-64, 64.0%
65+, 8.2%
How is Transit Green?

How Green is Transit?
# Transportation Energy Use Measurement Concepts

<table>
<thead>
<tr>
<th>Complexity and Uncertainty</th>
<th>Basic Energy Use Component</th>
<th>Possible Measures of Energy Use</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Propulsion energy per vehicle mile</td>
<td>Operating Energy Intensiveness</td>
</tr>
<tr>
<td></td>
<td>Average number of occupants</td>
<td>Energy Intensiveness</td>
</tr>
<tr>
<td></td>
<td>Fuel production and delivery</td>
<td>Lifecycle Energy Intensiveness</td>
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<tr>
<td></td>
<td>Facility and maintenance energy</td>
<td>Modal Energy Intensiveness</td>
</tr>
<tr>
<td></td>
<td>Construction/recycling energy</td>
<td>Transportation Energy Impact</td>
</tr>
<tr>
<td></td>
<td>Vehicle manufacturing /recycling energy</td>
<td>Total Energy Impact</td>
</tr>
<tr>
<td></td>
<td>Mode of access</td>
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<tr>
<td></td>
<td>Network circuity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Travel and location behavior changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-travel energy consequences of transportation</td>
<td></td>
</tr>
</tbody>
</table>

Based on CBO concept
RESPONSES TO TRANSPORTATION CHANGES THAT IMPACT ENERGY USE

Change in Transportation Service, Infrastructure, Pricing, Etc.

Land Use Changes
- Locations of residences
- Locations of employment
- Locations of activities

Travel Changes
- Number of trips
- Timing of trips
- Destination of travel
- Path of travel
- Mode of travel

Personal and Business Vehicle Ownership Changes
- Number of vehicles
- Size of vehicles

Changes in Transportation Energy Use
ENERGY INTENSITY BY MODE

BUS LOAD FACTORS 1975 - 2007

Average number of passengers on bus
US Bus Vehicle Miles per Gallon Fossil Fuel

Source: 2010 Public Transportation Fact Book APTA
TRANSIT BUS – PASSENGER MILES PER GALLON OF FOSSIL FUEL 1984-2008
Modal Energy Intensity Comparison

Bar chart showing BTU per passenger mile for various modes:
- Bus DOE: 4,315
- Bus DOT: 3,262
- Bus CUTR/NTD: 3,951
- Auto DOE: 3,514
- Auto DOT: 3,525
- Heavy Rail DOE: 2,577
- Commuter Rail DOE: 2,638
- Bus DOE LF: 2,84
- Bus DOE LF: 2,627
- Bus CUTR LF: 2,101
- Bus CUTR LF: 2,480
Denver RTD. The SD-160’s dimensions are 81.37 ft by 8.71 ft by 12.50 ft and can be used in trains of up to six cars. It is powered by four AC motors which provide a maximum of 580 kW and a maximum speed of 50 mph. It has a passenger capacity of 236 passengers (including standees) with 64 seats.
Vehicle Technology Adoption Considerations

Diagram:
- Technology
- Progress
- Public Acceptance
- Fuel Price, Policy
- Economic Health

The diagram illustrates the interrelations between technology, progress, public acceptance, fuel price, policy, and economic health in the context of vehicle technology adoption.
Questions