The Intercity Bus: America's Fastest Growing Transportation Mode

2010 Update on Scheduled Bus Service

Chaddick Institute for Metropolitan Development

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Key Findings

1. For the third year in a row, intercity bus service was the fastest growing mode of intercity transportation, outpacing air and rail transportation.

2. Intercity bus operations expanded by 6.0% in 2010, showing that the sector's renaissance continues.

3. "Curbside operators," such as Boltbus and Megabus, expanded the number of departures by 23.9% and now account for more than 400 daily bus operations.

4. Megabus has reported ridership growth of 48% in cities served in both 2009 and 2010. Although data on other operators is not available, the curbside sector's overall rate of growth appears to be at least 33%.

5. Passenger loads handled by curbside bus services are reducing fuel consumption by about 11 million gallons annually—the equivalent benefit of removing 23,818 vehicles from the road.

Introduction

Intercity bus service in the United States remained robust through 2010 as a result of rising travel demand, escalating fuel prices, and investments in new routes. These and other factors propelled motor coach travel to its highest level in years and made the intercity bus the country's fastest growing mode of transportation for the third year in the row. "Curbside operators," including BoltBus, DC2NY Bus, and Megabus, which eschew traditional stations in favor of curbside pickup and provide customers access to Wifi and other previously unavailable amenities, enjoyed particular success. Express services linking major cities in the Northeast and Mid-Atlantic states grew at a particularly rapid rate.

This Chaddick Institute briefing provides a status report on the intercity bus sector during the 2010 calendar year. It has two primary objectives: i) to evaluate the extent of the sector's expansion between 2009 and 2010, and ii) to review the extent to which the recent growth of curbside bus operators is reducing fuel consumption and promoting energy efficiency.

Readers will find a descriptive account of the intercity bus industry's changing status in *The Return of the Intercity Bus: The Decline and Recovery of Scheduled Service, 1960 – 2007,* a Chaddick Institute study published in 2008 available at las.depaul.edu/chaddick. This earlier study examines how the opening of interstate highways, increased automobile ownership, and the deterioration of downtown business districts in major cities gradually weakened the demand for intercity bus services. By the mid-1970s, the intercity bus network was rapidly diminishing. Continued retrenchment took place throughout the 1980s and 1990s—a downturn that continued even after the terrorist acts of September 11, 2001, which dramatically reduced the demand for air travel and led to significant increases in rail traffic.

By 2006, signs of a recovery were readily apparent. "Curbside" bus companies began operating express service on relatively short-distance corridors linking major cities. In some instances, these operators followed the lead of so-called "Chinatown Operators"—bus lines, typically operated by Asian businesses and often in the grey area of the law, offering service between the Chinatown districts of major cities. In other instances, curbside carriers infused new life into markets that hadn't had seen new service in many years, drawing attention to a mode of transportation mode that had been all but forgotten by many travelers.

The largest and best-known of the curbside operators, Megabus.com ("Megabus"), a subsidiary of Coach USA (owned by Stagecoach, Ltd., a British company) opened its Chicago hub on April 10, 2006. In 2008, DC2NY Bus began service between New York City and Washington, D.C., differentiating its product with wireless internet service and other amenities that could not be found on traditional bus services. Megabus and BoltBus (a joint venture between Greyhound and Peter Pan Lines) soon followed suit and took the model one step further by building full-scale hubs based out of Manhattan. On the West Coast, California Shuttle launched service between the San Francisco Bay Area and Los Angeles, albeit with limited schedule frequency. Megabus also began providing service in California in 2008 but ended operations six months later, selecting to focus their efforts on expanding the Midwest and Northeast markets.

Key Findings

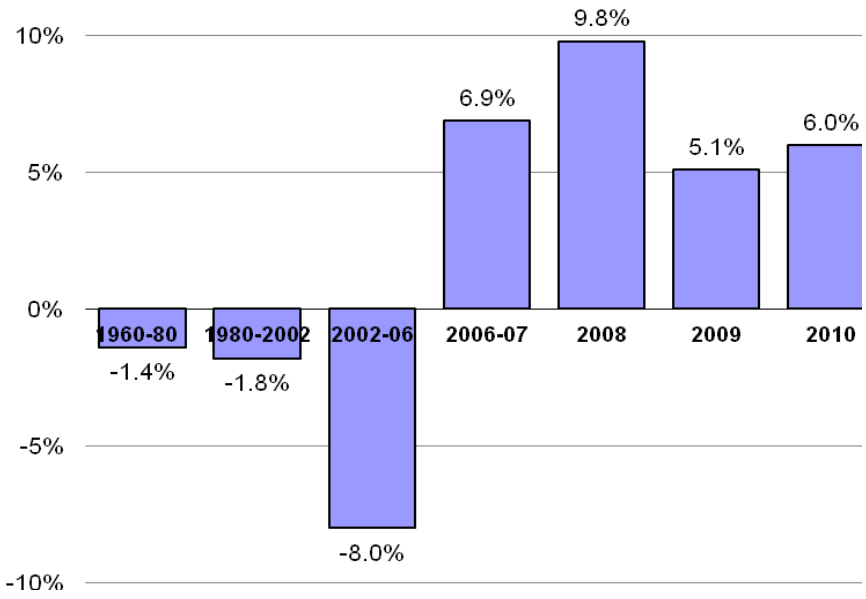
Our analysis of the sector's performance in 2010 suggests the following:

- Intercity bus operations expanded by 6.0% in 2010, showing that the sector's renaissance continues.

The annual rate of growth for the sector between 1960 and 2010 is shown in Figure 1. These numbers show the dramatic decline of the sector through the early 20th Century and its subsequent recovery starting in 2006. The sector's recovery shows no sign of ending, although the growth rate did slip downward to 5.1% in 2009 apparently due to the soft economy.

Between December 2009 and the same period in 2010, the number of weekday bus operations rose from 2,005 to 2,125, a growth rate of 6.0%. Simply put, new bus departures are being added as carriers see an opportunity to win back customers, many whom never considered the bus as an option. A disproportionate share of the growth involves service to and from large metropolitan areas rather than in smaller rural communities. We estimate (through a random sampling technique discussed in Appendix A) that service from metropolitan areas grew by an ever faster amount (about 8.5%) over the past year whereas service linking small communities remained relatively flat.

Figure 1:
Changing Level of Intercity Bus Service
Percentage Annual Growth or Decline



Notes: Rates of growth in 2010 were determined by measuring the number of scheduled departures as noted in Appendix A. For the period between 1960 and 2008, estimates are made based on a statistical sampling method as noted in this appendix.

Another important aspect of this year's growth is that nearly all the service is being provided by curbside operators, and by Megabus in particular, rather than by traditional operators such as Greyhound

and Trailways. By December 2010, the curbside sector (Boltbus, California Shuttle Bus, DC2NY Bus, and Megabus) had grown to account for 21.2% of daily departures, compared to just 17.9% the previous year.

At the same time, conventional operators gradually upgraded their product to increase their competitiveness. On December 1, 2010, Greyhound introduced premium service on selected routes from Chicago offering passengers receive free WiFi internet, more spacious cabins, and guaranteed seating. This follows a pattern started in 2009, when Greyhound unveiled a similar product upgrade on certain East Coast routes that included new buses and an advertising campaign aimed at diversifying its ridership. In the Southeast, a new luxury operator, Red Bus, launched service earlier this year between South Florida and Central Florida as well as points as far north as Atlanta. The Red Bus, with four northbound and four southbound trips daily, offers spacious interiors with seats that decline to near-horizontal positions as well as a GPS satellite monitoring system.

- "Curbside operators," such as Boltbus and Megabus, expanded their number of departures by 23.9% and now account for more than 440 daily bus operations in the continental United States.

Our estimates indicate that curbside bus operations expanded by 23.9% between December 2009 and the present. A significant share of the growth—68 daily departures-- accounts for Megabus' new Philadelphia and Washington, D.C. hubs launched in August 2010 and December 15, 2010, respectively.

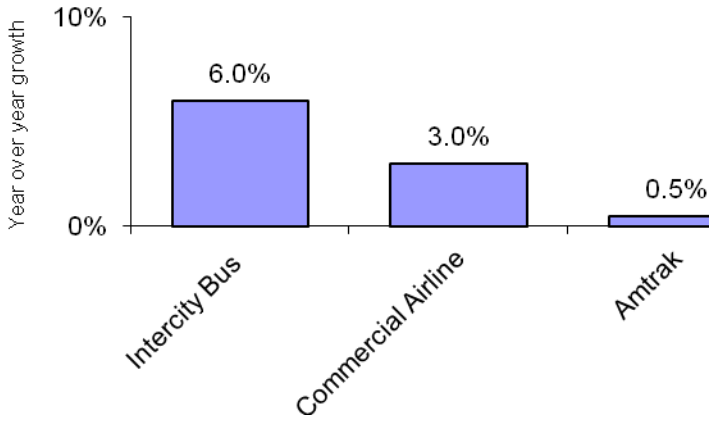
For the first time, with the advent of its Philadelphia hub, Megabus operated a route that did not originate nor terminate in Chicago, Los Angeles, or New York. This change marks an important shift in expansion strategies of curbside operators into somewhat smaller origin-destination combinations. This trend continues with the creation of the hub in Washington, D.C., resulting in a new express service provided to eight cities, including Boston, Mass., Knoxville, Tenn., Pittsburgh, Penn., Raleigh, N.C., and Richmond, Va. It should be noted, however, that all curbside operations still either originate or depart in large cities with dense urban centers supported by a rapid transit systems. As presented, no route is confined entirely to cities with automobile-oriented downtown districts.

At its existing hubs, Megabus added routes between Chicago and Iowa City and Des Moines, Iowa, as well as between New York and Amherst, Mass., Hartford, Conn., Providence, R.I., College Station, Penn., Pittsburgh, and other points, while diminishing frequencies on several routes, including Chicago –Milwaukee, Wis. Operations by BoltBus, California Shuttle, and DC2NY Bus, meanwhile, have remained virtually unchanged.

- For the third year in a row, the intercity bus service was the fastest growing mode of intercity transportation, outpacing air and rail transportation.

The rate of growth on intercity bus service, measured in terms of the number of daily departures, exceeded that of rail and air travel by comfortable margins in 2010. The number of airline departures rose by 3.0% in the most recent month for which data is available (October) while the number of train miles operated by Amtrak in the most recent month (October) rose by a modest 0.5% over the previous year. We do not expect these numbers to be appreciably different as new data becomes available in the next few months. As previously noted, the amount of bus service, measured by the number of departures, grew by 6.01%.

Figure 2:
Change in Number of Daily Operations
2010 vs. 2009



* Based on most recent data available. Intercity bus estimate based on schedules advertised in October 2010 for travel in December 2010 vs. same period the previous year. Airline comparisons are departure Sept. 10 vs. same period previous year. Rail estimates based on train miles for Oct. 10 vs. same period previous year.

This marks the third year in a row that scheduled bus service grew faster than these other modes of intercity transportation.

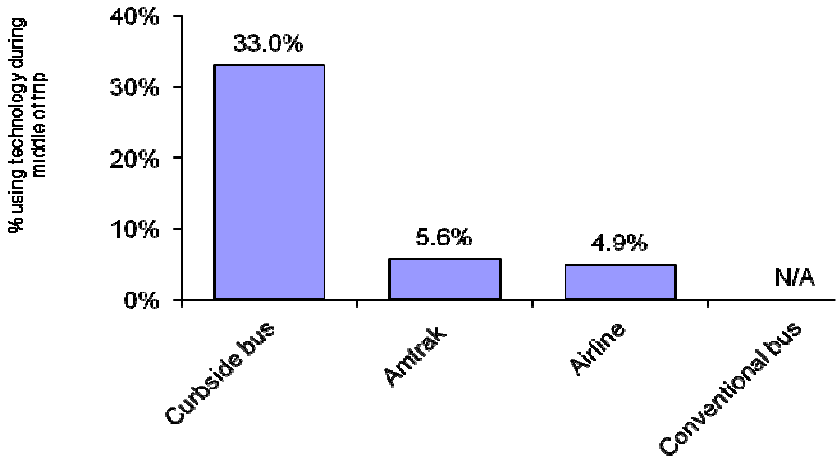
- Megabus has reported 48% ridership growth on the routes it operated in both 2009 and 2010. Although data on other operators is not available, the curbside sector's rate of growth during the 4th quarter of this year appears to be at least 33% compared to the same period last year.

Accurate traffic statistics are not available for intercity bus travel due to the fact that no federal government agency compiles such statistics, as is done for intercity rail and airplane travel. Moreover, Greyhound—the largest provider—no longer publicly reports traffic numbers.

The data provided by Megabus, which accounts for more than 58% of curbside departures, however, suggest that sector experienced growth of 48% during the January - November period of 2010 relative to that of 2009 in the markets it has continuously served—a figure that does not include revenue from many of the new routes. Our surveys of passenger loads on 30 buses during each of these years suggest the average loads have remained strong, exceeding 30 passengers per departure. We believe, consequently, that 33% is a conservative middle-ground estimate of the growth in curbside traffic between the 4th quarter of 2009 and 2010. Amtrak and commercial airline traffic were up 5.6% and 4.9% during the most recent month available.

Figure 2:
Estimated Change in Passenger Ridership

Year to Date 2010



Based on most recent data available. Airline and rail comparisons are year-to-date through Sept. 10 vs. same period previous year. Bus data is estimated year-to-date through November 2010.

- The amount of services provided by traditional bus lines, such as Greyhound and Trailways, did not appreciably change over the course of the year.

Based on our analysis of published bus schedules, the number of bus departures offered by traditional operators remained virtually unchanged between December 2009 and 2010. The number of unique "bus numbers" (analogous to flight numbers used by airlines) rose only modestly from 1,647 to 1,665 over the course of the year.

Among the notable additions in service were new Peter Pan Line frequencies between New York and Washington; and addition of Bieber Trailways service to Harrisburg, New York, Philadelphia, Scranton, and Washington D.C., as well as the aforementioned Red Bus routes.

Among the most notable reductions in service were reduced Trans-Bridges Lines service to metropolitan New York. Greyhound and Trailways made only modest changes to their schedule.

- Curbside bus service is reducing fuel consumption by about 11 million gallons annually and reducing carbon emissions by an estimated 249 million pounds. This is the equivalent benefit of removing 23,818 vehicles from the road or having 68,053 people convert from conventional to hybrid cars.

Curbside buses achieve an estimated 196 passenger-miles per gallon of fuel burned, making them about four times as fuel efficient as commercial airplanes and private automobiles, after adjusting the latter for the fact that many car trips involve multiple occupants. When making estimates of the changes in energy use, however, it needs to be recognized that curbside operators, in part due to the low fares they

offer, have a stimulating effect. That is, they generate new travel. Thus, some of the potential benefits are offset by additional trips made by consumers.

Our analysis quantifies the net savings in fuel by evaluating how passengers would have traveled had curbside bus service *not* been available. We administered surveys exploring how the travel behavior of passengers would have changed in the absence of curbside service. This survey was administered to 190 curbside-bus passengers in East Coast and Midwestern cities during the fall 2010.

A summarization of our estimation methods appears in Appendix A. The results, using standard assumptions, suggest that the sector is reducing carbon emission by an estimated 242 million pounds. This is the equivalent benefit of removing 23,818 vehicles from the road or having 68,053 people convert from conventional to hybrid cars.

Table 3
Comparative Statistics on Energy Savings from Curbside Buses

Savings in fuel:	*11,350,377 gallons (DEU*)*
Savings in fuel per passenger trip shifted from other modes:	*2.41 gallons*
Reduction in carbon emissions:	*249,708,288 (or 124,854 tons)*
Equivalent # of cars removed from road:	*23,818*
Equivalent # of conversions to hybrid cars:	*68,053*

* Diesel Equivalent Units

These numbers may understate the environmental benefits for several reasons that could not be documented in our survey. For example, the sector's emphasis on downtown-to-downtown service augments living in dense urban environments. Accordingly, curbside buses encourage "transit lifestyles" that place comparatively little emphasis on single-occupant automobile travel (and more emphasis on common-carrier providers) and thus apparently lower carbon footprints per mile traveled. Arguably, there has been no comparable phenomenon that has reinvigorated intercity travel from departure points in the downtowns of major cities in the United States since the growth of rail-passenger travel during World War II.

A second benefit is the spillover effect that the sector's expansion is having for bus travel in general. The American Bus Association observes that Greyhound and other carriers are seeing benefits from what it describes as "the Megabus effect", i.e., the tendency for the publicity produced by Megabus to encourage new constituencies to consider bus travel, formerly a mode of last resort for many intercity travelers (Schwieterman and Fischer, 2008). This suggests that measurements of the benefits of curbside bus travel may understate the true effects of the industry's recovery.

Conclusion

As this report shows, the expansion of intercity bus service crossed important milestones in 2010 and generated significant environmental benefits. Rising traffic on established routes and the apparent success of curbside bus services in a more diverse array of markets suggest that additional expansion is likelycoming in 2011. We anticipate that new service will likely emerge over the next several years in places where little or no curbside service is available, such as in California, Florida, and Texas. We suspect it is only a matter of time before curbside operators launch service in routes that neither originate nor terminate in cities without dense downtown districts supported by rapid transit systems.

Other research the Chaddick Institute is conducting suggests that the growing prevalence of portable electronic technology among intercity travelers is giving intercity bus travel a new competitive advantage. At randomly selected points, more than 40% of passengers on curbside buses are engaged with portable devices, a percentage much higher than on Amtrak, Greyhound, or commercial airplanes. The availability of WiFi and ability to access wireless signals throughout the entire journey differentiates bus travel from air and rail competitors. Please contact the Institute for a copy of this study.

Appendix A

Measuring the Rate of Growth in the Intercity Bus Sector

Understanding the full extent of the intercity bus sector's decline and recovery has been hampered by the absence of data on the number of fare-paying passengers and the changing level of service provided. All available national statistics include commuter- and charter-bus services, making it impossible to isolate changes in travel on conventional scheduled intercity routes. By contrast, passenger statistics for the air and rail industries are accurately categorized, available, and evaluated in great detail.

In 1992, the General Accountability Office attempted a systematic evaluation of changes in intercity bus ridership since the 1960s. This study showed that traffic declined from 140 million passengers to 40 million in 1990. Nevertheless, the authors acknowledge that their estimates are far from perfect due to significant changes in the ways carriers are categorized.

To estimate the rate of growth or decline from 1960 through 2008, we measured the number of bus departures for 16 cities over time. The research team collected arrival and departure information from the *Russell's National Motor Coach G*uide on all routes operating through Akron, OH, Baltimore, MD, Charleston, SC, Chicago, IL, Cleveland, OH, Columbus, OH, El Paso, TX, Evansville, IN, Kansas City, MO, Louisville, KY, Minneapolis, MN, Philadelphia, PA, Portland, OR, Providence, RI and Sacramento, CA, and Washington, D.C. We supplemented *Russell's Guide* data with departure information for curbside operators, mostly notably BoltBus and Megabus, which do not publish their schedules in the monthly compendium. Information for these carriers was collected directly from their individual timetables, as reported on their websites,between 2006 (when Megabus launched service) and the present. Each bus departure is recorded as one entry in the data set.

Assurances were made that no departure was counted more than once by sorting by bus number and making note of arrival and departure times. Eliminating such duplication was necessary due to the fact that carriers commonly list the same bus departure in several different timetables. For example, a Chicago – Minneapolis departure operated by Greyhound may appear in that carrier's Chicago – Milwaukee timetable as well as its Chicago – Twin Cities timetable since the same bus serves both markets. The resulting data set encompasses 11,400 observations of bus operations. Further information is available in our *Return of the Intercity Bus* report (2007).

To measure growth rates during 2009 and 2010, we undertook more exhaustive data collection by enumerating the entire population of bus operations in the United States. This was done by reviewing all schedule information published in the *Russell's Guide* as well as those advertised on websites of carriers that do not participate in the guide. Whereas our earlier estimates were based on the number of *departures* from city terminals, this new technique measures the number of *unique bus operations* (which are akin to flight numbers in the commercial airlines industry). The two methods produced growth estimates of 8.5% and 6.0% respectively for the period between December 2009 and December 2010. Much of the difference between the two measures is accounted for by the fact that one bus operation can result in multiple departures from metropolitan areas. For example, a Los Angeles – New York bus will generate departures in many intermediate cities.

Appendix B

Measuring Fuel Savings from Curbside Buses

To measure the fuel savings from the advent and expansion of curbside bus service, we examined changes in fuel consumption in diesel equivalent units, or DEUs, attributable to changing passenger travel behavior. One diesel equivalent gallon is defined as 138,000 British thermal units (btu). One gallon of highway gasoline typically contains about 114,000 btu, or 0.826 diesel equivalent gallons. Conversely, a gallon of jet fuel has substantially higher btu content than diesel fuel.

In order to determine how passengers of curbside bus operators would have traveled had curbside bus service *not* been available (as well as estimate how many would not have traveled at all), estimates were taken from a survey conducted by the authors about the behavior changes that would take place in the absence of curbside service. This survey, administered to 190 passengers in Eastern and Midwestern cities at curbside bus stops, suggest that about 80 percent of travelers would have used other modes and 20 percent would not have traveled in the absence of curbside bus service. Moreover, about 27 percent of bus riders would have used private vehicles, 17 percent would have traveled by air, and 22 percent would have used Amtrak. Fourteen percent would have used conventional bus lines, such as Greyhound.

The comparative fuel efficiency of air, rail, and conventional bus operations are determined using previously published estimates (appearing in column A of Table 1). This research suggests that automobile users (assuming vehicle occupancy equal to the national average) and rail service achieve 43 and 66 passenger-miles per gallon, respectively (expressed in diesel equivalent gallons), while air travel achieves 43 passenger miles per gallon. Data from the Bureau of Transportation Statistics (see M.L. Associates, 2007) on scheduled bus operations suggests that the average motor coach service achieves 5.42 vehicle miles per gallon. The authors' field observations determined that conventional and curbside bus departures handled an average load of 25.1 and 36.6 passengers, respectively, in the fourth quarter of 2009. Accordingly, curbside buses achieve about 196 passenger-miles per gallon burned, while conventional buses achieve 136. These estimates are similar to those reported in M.L. Associates, 2007, and thus appear reasonable.

Table 1
Fuel Efficiency by Mode of Travel
Measured in Passenger Miles per Gallon (Diesel Equivalent Unit)

	(a) Share of Travel if Curbside Bus Not Available	(b) Passenger-Miles Achieved per Diesel Equivalent Gallon
Air	17%	42
Private vehicle (car)	27%	44
Intercity rail	22%	66
Conventional bus	14%	136
Curbside bus	N/A	196
No travel	20%	N/A

Source: The assumptions in Column a are derived from a Chaddick Institute (DePaul University) survey the authors conducted in the autumn of 2010. This survey asked passengers in boarding areas questions about the purpose of their trip, their anticipated use of electronic technology on the journey, and passenger preferences toward having departures from curbside rather than conventional bus stations. Responses of 190 passengers were collected in Midwestern cities. The assumptions in Column b were based on several different published reports. Estimates for private vehicle and rail estimates were taken from the National Transportation Database (2007), while estimates for conventional bus and air service were derived from M.J. Bradley and Associates (2007). Estimates for curbside bus were based an average fuel efficiency of 4.52 miles/gallon (derived from the Bradley study) and an estimated 36.6 passengers per trip, based on direct observation on buses made by the Chaddick Institute, as reported in Schwieterman and Fisher, 2011.

An estimate of the total number of passengers that use curbside bus operators is based on the authors' analysis of published schedules for trips to be made on November 15, 2010. This analysis showed that the curbside bus industry has grown to 444 daily trips in 2010, up more than 94 trips since 2009. Assuming the same average

load of 36.6 previously noted, the figures suggest that the sector handles about 5.93 million passengers per year. The average trip distance of curbside bus riders is estimated at 205 miles, generating results on net fuel consumption totals that appear in Table 2.

Table 2
Aggregate Fuel Consumption
With and Without Curbside Bus Service

	(a) Trips	(b) Psgr. Miles	(c) Fuel Consumption Diesel Equiv. Gallons
	With Curbside Bus		
Curbside Bus	5,931,396	1,215,936,180	6,203,756
	Without Curbside Bus		
Air	1,011,918	207,443,180	4,939,123
Private vehicle (car)	1,572,365	322,334,788	7,359,242
Rail	1,276,573	261,697,551	3,965,114
Conventional bus	856,238	175,528,845	1,290,653
No travel	1,214,302*	248,931,816*	
Total	5,931,396	1,215,936,180	17,554,133

[Columns may not add due to rounding]

* These figures represent trips and passenger-miles no longer generated due to the absence of bus service.

The totals presented in column a show that curbside buses remove about 1.57 million private automobile passengers from the highway system annually, 1 million passengers from the airline network, and more than 2 million from the rail and conventional bus sectors combined. Column b provides estimates of the associated changes in the passenger-miles of travel. As noted in column c, the sector has reduced fuel consumption by an estimated 11.4 million diesel-equivalent gallons per year. Total fuel consumption has dropped from 17.6 million to 6.2 million DEU, or about 65 percent.

Alternatively stated, these estimates suggest that curbside bus operations have achieved the equivalent of taking 23,818 cars off the road, or the equivalent of having 68,053 vehicle owners permanently convert from conventional to hybrid cars usage. Curbside buses reduce fuel consumption by 2.41 gallons per one-way passenger trip.

Finally, the analysis shows growth of curbside buses in reducing carbon emissions by an estimated 249 million pounds (or 124,854 tons) annually, assuming an estimate of 22 pounds of carbon per DEU. As previously noted, these estimates are based on a proportional shift in travel from less fuel-efficient modes to more fuel-efficient modes of transportation.

All figures provided here should be recognized as estimates. Additional benefits accruing from the reduction in congestion on expressways, which adds to the reductions in fuel, are not measured. Nor do these figures consider the fact that fuel consumption savings resulting from a reduction in private-automobiles trips is likely skewed by that fact that much of the displaced automobile travel would have been in single-occupant vehicles. (Single-occupant drivers are probably more likely to opt for bus travel than those traveling in groups due to the disproportionate savings in cost).

Conversely, the fuel saving that results from shifts by railroad passengers may be upwardly biased due to the fact that many passengers would have otherwise used Amtrak trains in the Northeast Corridor, which use electric rather than diesel propulsion (and thus are more energy efficient than the average fuel-consumption estimates used in Table 2). Unfortunately, more refined estimates on Amtrak energy consumption will require newly collected data that is not presently available.

Another issue affecting measurements is the assumption that curbside bus services have resulted in actual reductions in the supply of air and train service. Although this assumption is standard in this type of analysis, reducing capacity (or slowing the rate of capacity growth) on other modes may be a non-incremental process that takes years to achieve. This is particularly true for Amtrak service, which is driven by a political process.

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