Comparison of Essential Air Service Program to Alternative Coach Bus Service

Keeping Rural Communities Connected

September 2011

M.J. Bradley & Associates LLC

(978) 369 5533 / www.mjbradley.com

Authors: **Dana Lowell, Tom Curry, Lily Hoffman-Andrews, and Lea Reynolds**

M.J. Bradley & Associates LLC
47 Junction Square Drive
Concord, MA 01742
(978) 405-1275
dlowell@mjbradley.com

This document was prepared by M.J. Bradley & Associates for submission to:

111 K Street, NE 9th Floor
Washington, DC 20002-8110

NATURAL RESOURCES DEFENSE COUNCIL
THE EARTH'S BEST DEFENSE
1152 15th Street NW, Suite 300
Washington, DC 20005

The Reason Foundation
3415 S. Sepulveda Blvd., Suite 400
Los Angeles, CA 90034

651 Pennsylvania Ave, SE
Washington, DC 20003

Table of Contents

List of Tables

List of Figures

Executive Summary

This report compares the cost and environmental impact of current subsidized air service provided to rural communities under the Essential Air Service (EAS) program, to an alternative method of connecting these rural communities to the nationwide air transport system. The alternative transport mode which is analyzed here is the use of scheduled inter-city coach bus service between these rural communities and nearby regional hub airports.

The EAS program provides subsidized air links to 153 rural communities in 35 states and Puerto Rico. For this analysis we only evaluated alternative coach bus service for EAS communities in the lower 48 states which are within 150 air miles of a medium or large hub airport – a total of 38 communities. These communities are shown in Figure 1, along with their air links currently subsidized under EAS. As shown, most of the communities analyzed have subsidized air service to only one regional hub airport, while five communities have subsidized service to two different hubs. Virtually all of the subsidized flights connect the EAS community to a large regional hub airport, and this hub is not always the large hub closest to the community.

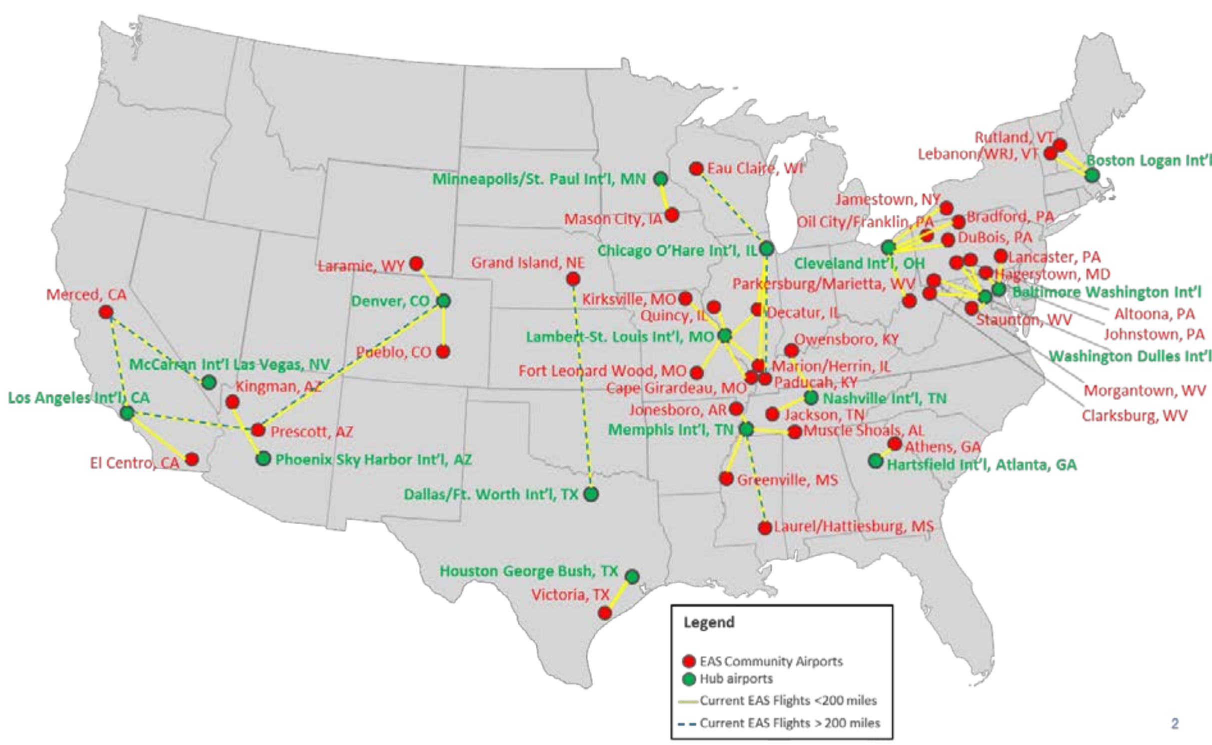

Figure 1 EAS Communities within 150 Air Miles of a Large or Medium Hub Airport

For each of these 38 EAS communities, this analysis compares the current total cost of EAS flights – both government subsidies and passenger fares – to the cost of providing "equivalent" bus service to make the same or similar links. For 32 communities the bus service analyzed goes to the same airport as the current EAS flights – this was done specifically to provide the best direct comparison between modes. For some of these communities there is a closer hub airport which could be reached with a shorter bus trip than the one analyzed, but these alternative bus trips were not included in the analysis.

For the other six communities, bus trips to the current EAS hub airports were judged to be too long – more than 200 miles or more than three hours drive time. For these six communities the alternative bus service analyzed goes from the EAS community to the closest regional hub airport that is within 200 driving miles; for two communities this is a large hub airport and for four it is a medium hub airport. This analysis did not attempt to compare the relative availability of follow-on flights at the alternative airport destinations compared to the current EAS-subsidized flight destinations.

This analysis assumes the same number of scheduled weekly bus trips as current scheduled EAS flights for each community – for most communities this is two or three round trips per day, for a total of between 28 and 72 one-way trips per week to/from the EAS community and a regional hub airport. For the alternative coach bus service operating costs included in the analysis are the annualized cost of bus purchase, annual bus maintenance, annual fuel costs, annual driver labor costs, and annual overhead and profit.

Total trip time for most of the alterative bus trips is longer than the total trip time for current EAS air flights. This analysis assesses the "value" of this incremental trip time to passengers, using a standard Department of Transportation methodology, and adds it to bus operating costs to determine the total cost of the bus alternative.

The analysis also evaluates the environmental impact of coach bus service compared to current EAS flights, by determining for each mode and each route annual fuel use (gallons) and annual exhaust emissions (tons) of carbon dioxide (CO_2), nitrogen oxides (NO_x), volatile hydrocarbons (HC), carbon monoxide (CO) and sulfur dioxide (SO_2)[1].

See Table 1 for a summary of the analysis. As shown, the EAS program currently subsidizes 79,040 annual one-way flights to/from the 38 EAS communities included in this analysis, which serve 615,528 annual one-way passengers. The total annual cost of these flights is $131.5 million – an average cost of $214 per one-way passenger trip. Government EAS subsidies currently cover 46% of this cost and passengers cover the rest via fares.

[1] For the coach bus option the analysis also includes total annual particulate matter (PM) emissions, but PM emissions from current air flights could not be determined due to a lack of data.

Table 1 Costs and Environmental Effects of EAS Program Compared to Coach Bus Service

			unit	EAS-Subsidized Flights	Alternative Coach Bus Service	*Difference*
SERVICE	Annual Trips		#	79,040	79,040	0
	Annual Seats		#	1,539,720	4,347,200	2,807,480
	Annual Passengers		#	615,528	615,528	0
COSTS	Current Annual EAS Subsidy		$	$60,838,832		
	Current Annual Passenger Fares		$	$70,652,143		
	Annual Bus Operating Cost		$		$33,860,696	
	Annual Incremental Travel Time		$		$8,098,098	
	TOTAL			**$131,490,975**	**$41,958,794**	**($89,532,180)**
ENVIRONMENT	Annual Miles		mi	12,310,688	11,953,411	(357,277)
	Annual Fuel Use		gal	7,930,259	2,213,595	(5,716,665)
	Annual Emissions	CO_2	ton	88,149	24,605	(63,544)
		NOx	ton	28.1	14.9	(13.2)
		HC	ton	1,188.2	2.0	(1,186.3)
		CO	ton	2,067.7	1.2	(2,066.6)
		SO_2	ton	28.1	0.2	(27.8)

Totals for 38 EAS communities that are within 150 miles of a medium or large air hub. For 32 communities alternative bus service is to the the same destination as current EAS flights (large air hub); for two communities bus service is to the closest large air hub, and for 4 communities bus service is to the closest medium air hub.

This analysis indicates that the cost of providing equivalent hub airport links to these communities using scheduled coach bus service would be $41.9 million – an average cost of $68 per one-way passenger trip. Total costs for providing hub airport links to these communities using scheduled coach bus service are 68% lower than current costs for EAS-subsidized air links.

Eighty-one percent of the total cost for bus service is the operating cost of the buses required, and 19% is the "cost" to passengers of longer trip times using the bus. Incremental average trip times for the coach bus service compared to current air flights range from two minutes shorter to almost two hours longer. More than 67% of the bus trips are shorter, or are less than one hour longer, than current flights; the weighted average incremental trip time for all bus trips analyzed is 43 minutes[2].

For this analysis trip times on each route include check-in, drive time, congestion delays, and disembarking for buses, and include check-in/security clearance, flight time, flight delays, and deplaning for flights.

The use of scheduled coach bus service instead of air service would also reduce annual fuel use by 5.7 million gallons, would reduce annual CO_2 emissions by over 63,000 tons, and would reduce annual emissions of NO_x, HC, CO, and SO_2 by 13.2 tons, 1,186 tons, 2,066 tons, and 27.8 tons respectively.

See Figure 2 for a comparison of average total EAS one-way flight costs to average total one-way bus trip costs ($/passenger) for each of the EAS communities analyzed. As shown, for every community analyzed the total cost of bus service, including bus operating costs and the "cost" to passengers of additional trip time, is significantly less than the cost of current EAS air service[3].

See Figure 3 for a comparison of projected one-way bus operating costs to the one-way fares currently charged on EAS-subsidized routes. As shown, for more than half of the routes the actual cost of operating coach buses not including travel time ($/passenger, in red) is less than the fare currently charged for air flights not including the subsidy (in blue). This indicates that these routes might be able to operate profitably using buses, without the need for any government subsidy in the long term. If only the bus routes for which per-passenger operating costs are higher than current air fares were subsidized, and if the subsidy was set equal to the difference between current fares and bus operating costs, then the total required annual subsidy for coach bus service to these 38 communities would be $8.6 million. Compared to current annual EAS

[2] This weighted average only includes bus trips that are to the same hub airport destination as current flights. For the six communities where the analyzed bus trips are to a different, closer hub airport the bus trip is generally shorter than current flights (by up to 1.7 hours). If these trips are included the weighted average incremental trip time for all analyzed bus trips falls to 25 minutes.

[3] For the seven routes on the extreme right of Figure 2 the alternate bus trip is to a closer hub airport than the EAS flight. For most of these routes the total bus trip time is significantly shorter than the EAS air trip time, resulting in a negative "cost" for incremental trip time. For some of these routes the value of this trip time benefit is greater than bus operating costs, resulting in a negative value for total bus costs.

subsidies for these 38 communities, annual savings to taxpayers could be $50 million per year or more.

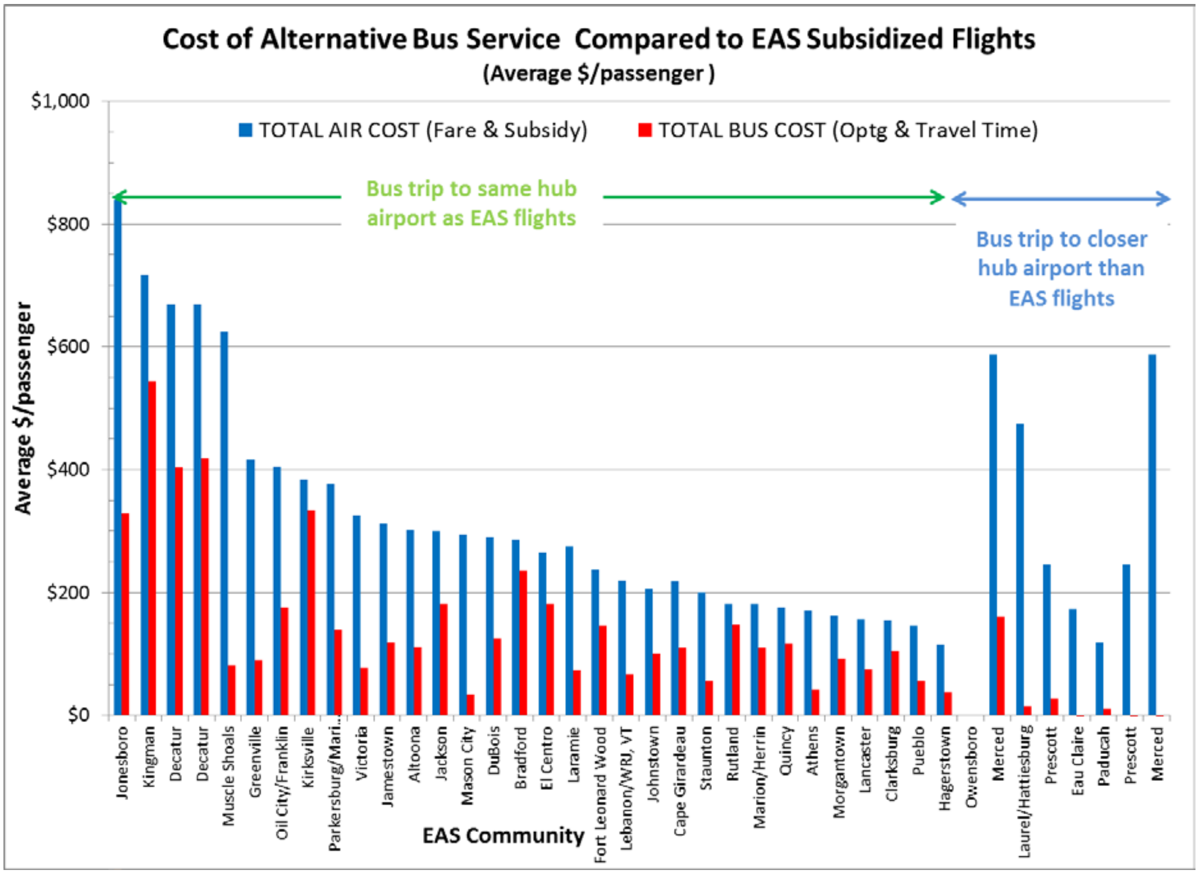

Figure 2 Total EAS Costs Compared to Total Costs for Alternative Bus Service ($/passenger)

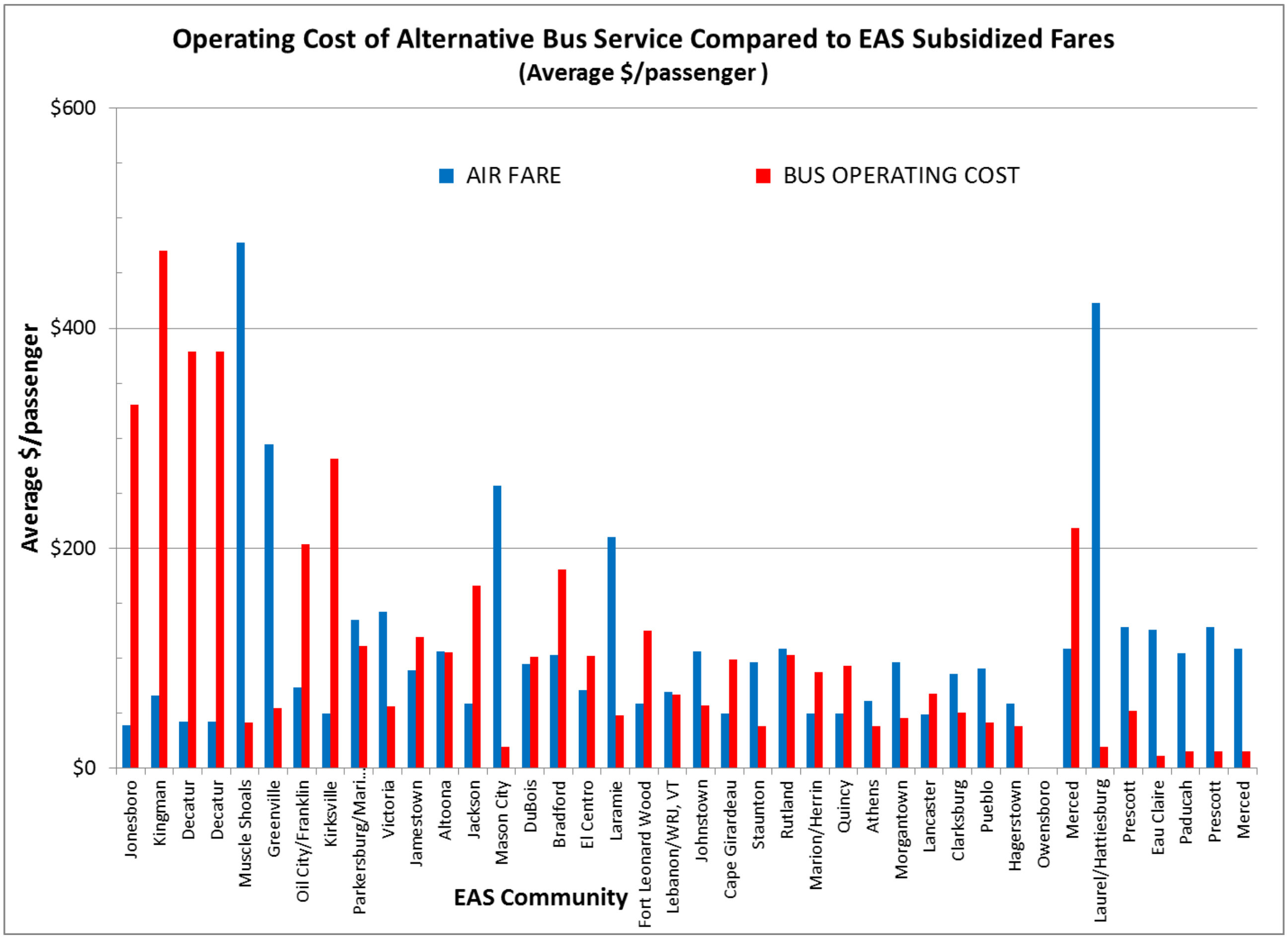

Figure 3 Coach Bus Operating Costs Compared to Current Fares on EAS Flights ($/passenger)

1 Background – Essential Air Service Program

The following text is from "WHAT IS ESSENTIAL AIR SERVICE (EAS)?, Prepared by the Office of Aviation Analysis, U. S. DOT, Revised April 1, 2009 (http://ostpxweb.dot.gov/aviation/rural/easwhat.pdf).

In 1978, when the Airline Deregulation Act (ADA) was enacted, 746 communities in the United States and its territories were listed on air carrier certificates issued under section 401 of the Federal Aviation Act of 1958. Before deregulation, air carriers' operating certificates for most of these communities required carriers to schedule and provide two daily round trips at each point on their certificates. During the pre-ADA debates, the prospect of allowing carriers to terminate scheduled service without prior Government approval raised concern that communities with relatively lower traffic levels would lose service entirely as carriers shifted their operations to larger, potentially more lucrative markets. To address this concern, Congress added section 419 to the Federal Aviation Act, which established the EAS program, which today is administered by the Department of Transportation, to ensure that smaller communities would retain a link to the national air transportation system, with Federal subsidy where necessary.

Under this program, the Department determines the minimum level of service required at each eligible community by specifying a hub through which the community is linked to the national network, a minimum number of round trips and available seats that must be provided to that hub, certain characteristics of the aircraft to be used, and the maximum permissible number of intermediate stops to the hub. The program's guidelines were codified by rulemaking as a Policy Statement of the Department in Volume 14, Code of Federal Regulations (CFR), Part 398. Where necessary, the Department pays subsidy to a carrier to ensure that the specified level of service is provided. Most eligible points, of course, do not require subsidized service; as of April 1, 2009, the Department was subsidizing service at 108 communities in the contiguous 48 states, Hawaii, and Puerto Rico, and 45 in Alaska.

Congress initially authorized the program for a ten-year period, through October 23, 1988. Its interest in ensuring service at small communities remained strong, and before the program's expiration, Congress enacted the Airport and Airway Safety and Capacity Expansion Act of 1987, Public Law 100-223, which expanded the program and extended it for ten more years, through fiscal year 1998. In so far as service guarantees were concerned, Public Law 100-223 amended section 419 of the Federal Aviation Act by codifying many of the Department's guidelines in 14 CFR 398 as well as specifying an increased minimum level of service—termed "basic" EAS--for any community that was eligible for service under the earlier program and actually receiving service during any part of fiscal year 1988. In addition, Public Law 100-223 provided for a higher level of service--termed "enhanced" EAS--which communities could obtain either by agreeing to a subsidy-sharing commitment or by agreeing to risk the loss of basic service if the Department-funded enhanced service failed to meet agreed levels of passenger use.

Effective June 1994, the Federal Aviation Act was recodified as subtitles II, III, and V-X of title 49, United States Code, "Transportation." The former section 419 of the Federal Aviation Act is now 49 U.S.C. 41731--41742.

Finally, the new law contained provisions by which new communities could participate in the program if they were willing to pay part of the total subsidy. The various statutorily-mandated elements comprising basic EAS exceeded the minimums that had prevailed under the Department's discretionary regulatory guidelines since 1978, but, at the time that Public Law 100-223 was enacted, program funding was insufficient for the Department to implement the service upgrades to meet the new standards, much less for what would be necessary to support enhanced service or service at new points. In fact, during fiscal year 1990, twenty-six communities were made ineligible as a result of reduced funding.

2 Study Methodology

This section briefly discusses the methodology, data sources, and assumptions used in this study. Additional details are included in Appendix A.

2.1 Current EAS Flights

For each of the EAS communities analyzed in this report, basic information about the location of the community, the hub to which EAS subsidized service flies, the EAS-subsidized carrier, the aircraft flown on EAS-subsidized routes, the number of seats on the aircraft, and current annual EAS subsidies, was taken from the U.S. Department of Transportation *EAS Subsidy Report, May 2010*; the data in this report was updated based on review of DOT dockets.[4]

The number of passengers carried annually on each EAS subsidized route was determined from annual enplanement data for each rural EAS airport in 2010, as published by the Federal Aviation Administration.[5] These data cover only passengers who leave from the airport – to calculate total annual passengers on each route enplanement numbers were doubled, on the assumption that virtually all passengers make a round trip.

For each route the number of daily/weekly scheduled flights, the scheduled flight time, and typical one-way passenger fare were determined by reviewing the website of the carrier serving the route. These websites were accessed on 8/18/2011 and 8/19/2011. Listed fares and flight times represent the lowest price and shortest duration for all outbound flights from the rural EAS airport on 9/19/2011; listed fares for flights on other days in the same week on six of the routes indicates that there is generally minimal variation in fares for flights on different days of the week.

Prices and durations are for direct flights only unless no direct flights exist. The listed fare on each route represents the price for a 30-day advance ticket; a review of fares listed on 9/7/2011, for travel on 9/19/2011, on a random sample of six routes, indicates that fares can increase by as much as 97% for a two-week advance booking compared to a 30-day advance booking. The fares used for this analysis represent a conservative (low) estimate of passenger costs; actual fares may be higher depending on how far in advance the ticket is purchased.

[4] http://ostpxweb.dot.gov/aviation/x-50%20role_files/essentialairservice.htm#US. For 30 of 38 communities included in this analysis the data in the May 2010 subsidy report (the most current posted) is out of date. For these communities subsidy levels and other details of service (i.e. carrier, route) were updated between June 2010 and June 2011. See Appendix A. In most cases changes to annual subsidy levels since the May 2010 report were small in magnitude.

[5] *Preliminary CY10 Passenger Enplanements by State and Airport*, 6/22/2011, http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/media/cy10_all_enplanements_prelim.pdf

2.2 Alternative Bus Service

To evaluate requirements for scheduled coach bus service in lieu of current EAS-subsidized flights on each route, this analysis assumes that there will be an equal number of scheduled bus trips each week as currently scheduled EAS flights. The number of currently scheduled weekly one-way fights (outbound and inbound) ranges from 14 to 72 on the routes analyzed.

Total one-way route length (miles) and average drive time (hours) for the bus on each route were determined using Google Maps, for trips from each rural EAS airport to the regional hub airport destination. For the routes analyzed this data results in average route speeds of between 46.6 MPH and 63.5 MPH, exclusive of loading and disembarking time.

The minimum number of buses required to service each route was determined based on the number of weekly one-way trips required and the drive time for each trip, assuming that trips would only be scheduled for fifteen hours per day (6 AM – 9 PM, or equivalent), and that average daily bus availability would be 85%. For most routes a minimum of two buses are required, while a few routes require only one bus and a few require three.

The analysis assumes that the calculated minimum number of buses (and their annualized purchase costs) would be dedicated to the route and not shared with other routes; this is a conservative assumption because for most routes bus utilization using this assumption (hours used ÷ hours available) is less than 70%. The annualized capital cost used is $75,960/bus/year based on an average bus purchase price of $500,000, an eight year bus life, and 5% cost of capital.

Other annual bus operating costs are calculated as follows:

- Operator Labor = Annual operator hours x $20.28/hr (direct labor plus benefits)
- Bus Maintenance = Annual miles x $0.39/mi
- Annual Fuel = Annual miles ÷ 5.4 MPG x Fuel Cost ($/gal)
- Overhead & Profit = (Operator Labor + Maintenance + Fuel) x 30%

Total annual bus operating costs for each route are calculated as: annualized bus purchase cost + operator labor cost + bus maintenance cost + fuel cost + overhead and profit. For the routes included in the analysis total bus operating costs range from $2.61/mile to $3.27/mile.

Annual bus hours are calculated as weekly trips x total trip time x 52 weeks x 1.05 – the factor of 1.05 is to account for an assumed 5% additional daily "dead-head" miles on each route[6].

Annual operator hours are calculated as annual bus hours, plus 0.5 hr/day x 365 day/yr x number of operators required each day (full-time-equivalent, FTE). The number of operators required each day (FTE) is calculated as annual bus hours ÷ 2,080 hrs/yr/FTE.

Annual bus miles are calculated as weekly one-way trips x distance per trip x 52 weeks/year x 1.05 (to account for assumed 5% daily dead-head miles).

Bus operating cost factors ($/hr operator labor, $/mi maintenance, OH&P %, average bus purchase price, and average bus MPG) were determined via a survey of American Bus Association (ABA) member companies. Responding companies represent national, large and medium sized companies from various parts of the country. These companies operate a total of approximately 2,000 coach buses. While there was variability in the responses received, there was no clear pattern of regional differences, so the analysis assumes one set of bus operating cost factors for all routes. For each cost factor the values used represent the median of all responses received.

Assumed fuel costs ($/gallon) are current average retail prices published by the Energy Information Administration (Weekly Retail Gasoline and Diesel Prices, 8/22/11, Diesel (on highway) all types). The assumed fuel prices vary from a low of $3.77/gallon in the East South Central region, to a high of $3.99/gallon in the New England region.

Note that all of the assumptions used to evaluate operating costs for coach buses on each route are conservative (high) – it is likely that in a competitive environment actual costs would be lower on many routes.

2.3 Incremental Trip Time

See figure 4 for a representation of how total trip time was calculated for both current EAS flights, and alternative bus trips, on each route. As shown, the assumed total trip time for EAS flights includes the scheduled flight time, and an assumed average flight delay, both of which vary by route. It also includes for every route a constant 60 minutes for check-in/security clearance at the EAS airport (per TSA guidelines), and ten minutes for deplaning at the hub airport.

[6] Dead-head miles are non-revenue miles required to move between the bus storage location and beginning/end of the passenger route each day.

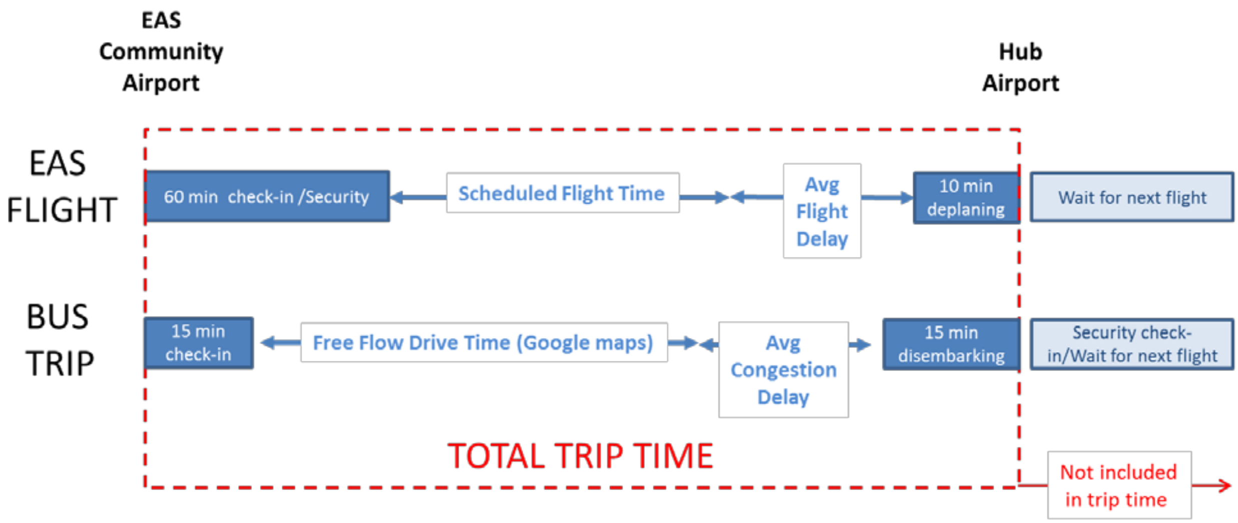

Figure 4 Calculation of Total Trip Time for EAS Flights and Alternative Bus Trips

For bus trips the assumed total trip time includes the free-flow route driving time, and an assumed average congestion delay for the urban portion of the trip (near the hub airport), both of which vary by route. It also includes for every route a constant 15 minutes for bus check-in at the EAS airport (or bus terminal), and 15 minutes for disembarking at the hub airport.

It is likely that most current trips taken on EAS-subsidized flights do not end at the hub airport, but continue on with a second flight to the passenger's final destination. Waiting and check-in time for these follow-on flights was not included in the total trip time for either current air flights or alternative bus trips. This analysis assumes that the minimum scheduled connection time at the hub airport between flight legs (for air passengers), and the time for check-in/security clearance at the hub airport (for bus passengers) would be essentially equal. Also, given that for most routes there are only two or three round-trip flights per day from the rural airport to the hub airport, actual wait time at the hub airport between flight legs is likely highly variable by passenger.

For each route, scheduled flight time for air trips was taken from the air carrier's website. Average flight delay time for each route was taken from Flight Stats.[7] The average flight delay for different routes ranges from 8 minutes to 95 minutes. The passenger-weighted average flight delay for all routes is 26 minutes.

For bus trips average free-flow drive time was taken from Google Maps. For each route the assumed average congestion delay is based on the Travel Time Index and Daily Congestion Time for the urban area which includes the hub airport destination. These values are published in the 2010 Annual Urban Mobility Report.[8]

[7] *On-time ratings by route*, http://www.flightstats.com/go/FlightRating/flightRatingByRoute.do, accessed 8/25/11
[8] Texas Transportation Institute, *Congestion Data for Your City*, http://mobility.tamu.edu/ums/congestion_data/

The travel time index is a measure of the ratio of travel time in the peak period to travel time during free flow conditions in that urban area, and the Daily Congestion Time is a measure of the average time each day (hr) in which congested conditions exist, resulting in slower drive times. To assess the average increase in travel time due to congestion during the urban portion of each bus trip (near the hub airport) this analysis assumes that for each route the urban portion is 30 miles long and that free flow traffic speed is 50 miles per hour, resulting in a baseline trip duration of 0.60 hours for the urban portion of each bus trip. This is multiplied by the travel time index to determine the increase in trip time (hr) when traffic is congested. Since not all trips will occur during peak periods, this peak period delay time is multiplied by the ratio of daily congestion time (hr) to total available daily bus travel time (15 hours) to get the average congestion delay time for all daily trips.[9]

For the urban areas included in the study the calculated congestion delay for the urban portion of the bus trips during peak periods ranges from four to fourteen minutes per trip, and the average congestion delay for all daily trips ranges from one to seven minutes. The passenger-weighted average congestion delay for all bus trips in the study is 2 minutes.

For each route the incremental total trip time for bus trips compared to current EAS-subsidized fights is calculated by subtracting total air trip time from total bus trip time. For most routes included in the analysis the incremental trip time is positive (i.e. the bus trip takes longer than the air trip).

2.4 Value of Incremental Trip Time

To determine the appropriate monetary value for incremental trip time for this analysis the authors used the methodology recommended by the U.S. Department of Transportation for transportation investments.[10] For personal travel this methodology starts with U.S. Census data on median annual household income, by census region, to calculate median hourly income ($/hr); DOT recommends using 110% of this figure for the value of time related to personal air travel. For business travel the methodology starts with data from the Bureau of Labor Statistics on total employer costs for employee compensation ($/hr), by census region; DOT recommends using 189% of this figure for the value of time related to business air travel. To determine a single figure for the value of time for all air travel DOT assumes that 68.7% of travel is personal and 31.3% is for business.

[9] For this analysis this average congestion delay is applied to all bus trips to a given urban area – in fact some daily trips will experience no congestion delay and others will experience a delay longer than the average.
[10] U.S. DOT, *Revised Departmental Guidance, Valuation of Travel Time in Economic Analysis, 2/22/03*

Using this methodology, the values used to monetize incremental trip times in this study range from a low of $28.71/hr (East South Central region) to a high of $42.35/hr (New England region).

2.5 Emissions and Fuel Use

For the specific aircraft used on current EAS-subsidized fights average fuel use (gallons/flight-hour) was gathered from various websites that offer aircraft specifications and advice to aircraft owners on typical operating costs (See Appendix A). The values used for average fuel use range from 37 gal/hr for the 9-seat Cessna 402, to 324 gal/hr for the 50-seat Bombardier CRJ-200. Using these values, calculated specific energy use on the routes analyzed (mega-joules per available seat kilometer, MJ/ASK) varies from 1.07 to 4.38 MJ/ASK, with an average of 2.73 MJ/ASK for all routes. These values are consistent with published values for specific energy use by turbo-prop aircraft used for regional service[11].

Calculated CO_2 emissions from air flights are based on calculated total fuel use on each route, and a fuel-specific CO_2 emissions factor of 10,084 grams CO_2 per gallon[12].

Calculated exhaust emissions of NOx, HC, CO, and SO_2 from air flights are based on calculated total fuel use and fuel-specific emission factors (g/gal). These fuel-specific emission factors are based on landing and take-off (LTO) cycle emission factors for turbo-prop powered aircraft published by the IPCC.[13]

Annual fuel use for coach buses is based on annual miles driven on each route, and an assumption that coach buses average 5.4 MPG (per ABA cost survey). Calculated CO_2 emissions from bus trips are based on calculated total fuel use and a fuel-specific CO_2 emissions factor of 10,084 grams CO_2 per gallon[11]. Calculated SO_2 emissions from bus trips are based on calculated total fuel use and a fuel-specific emissions factor of 0.1 grams SO_2 per gallon[14].

Calculated exhaust emissions of NOx, PM, HC, CO, from bus trips are based on calculated total annual fleet mileage and distance-specific emission factors (g/mi) from EPA's MOVES emissions model. The emissions factors used are national average

[11] See: R. Babikian, et al, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, *The Historical Fuel Efficiency Characteristics of Regional Aircraft from Technological, Operational, and Cost Perspectives*, Figure 1

[12] EPA420-F-05-001, February 2005

[13] *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual*, Table 1-50, pg. 1.96. Emissions factors are not available for all of the aircraft used on EAS routes, so the SAAB 340 was used as a proxy for other turbo-prop aircraft.

[14] This emission factor is based on the maximum allowable sulfur content of 15 parts per million for highway diesel fuel, and an assumption that all fuel-borne sulfur is oxidized to SO_2 during combustion in a diesel engine.

values for vehicle type = intercity bus, model year = 2011, and roadway type = composite road (mixed driving cycles representing urban and rural traffic conditions). For this analysis the authors assumed that any alternative coach service would be operated with new vehicles.

3 Results

This section summarizes the detailed results of this analysis for each community and route studied. Additional detail is provided in the tables included in Appendix A.

3.1 EAS Air Flights Compared to Coach Bus Service

See Table 2 for a summary of average costs per passenger and per seat for all EAS-subsidized flights to/from the 38 EAS communities included in this study. This data is also plotted in Figure 5. As shown, average total costs for current flights range from a low of $115.41/passenger (Hagerstown, MD to Baltimore-Washington Airport) to a high of $840.00/passenger (Jonesboro AR to Memphis, TN). As is obvious in Figure 5, subsidy levels also vary significantly by route. The highest EAS subsidy ($801.00/passenger) also occurs on the Jonesboro-Memphis route, and the lowest subsidy ($14.32/passenger) occurs on the route from Paducah, KY to Chicago O'Hare airport.

See Table 3 for a summary of average costs per passenger and per seat for alternative coach bus service to/from the 38 EAS communities in this study. This data is also plotted in Figure 6. As shown, for bus trips to the same hub airport as current EAS flights, average total costs for alternative bus service range from a low of $38.41/passenger (Hagerstown, MD to Baltimore-Washington Airport) to a high of $543.94/passenger (Kingman, AZ to Phoenix Sky Harbor airport). As is obvious in Figure 6, for most routes bus operating costs constitute the vast majority of total cost, and the "cost" of incremental trip times for most bus trips is nominal (less than $25/passenger). The route with the highest cost for incremental bus trip time is the route from El Centro, CA to Los Angles, CA, at $78.43/passenger.

The last eight routes at the bottom of Table 3 (and at the extreme right in Figure 6) are routes for which the alternative bus trips analyzed are to a different location than current EAS-subsidized flights. For these routes the bus trip time is generally shorter than total trip time for current EAS flights, and the value of incremental trip time is negative.

Table 2 Costs of Current EAS-subsidized Air Service, by Route

	EAS Community	State	To/from	Current EAS Subsidized Air Trips						
				Trip Time [hr]	Cost per Current Passenger			Cost per Scheduled Seat		
					Subsidy	Fare	TOTAL	Subsidy	Fare	TOTAL
AIR & BUS TRIPS TO SAME LOCATION	Hagerstown	MD	Baltimore Washington Int'l	2.12	$56.41	$59.00	$115.41	$45.91	$48.02	$93.93
	Lancaster	PA	Baltimore Washington Int'l	2.07	$107.06	$49.00	$156.06	$52.37	$23.97	$76.34
	Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	2.25	$109.20	$61.50	$170.70	$93.61	$52.72	$146.32
	Lebanon/WRJ, VT	NH	Boston	2.52	$149.98	$69.50	$219.48	$89.58	$41.51	$131.09
	Jamestown	NY	Cleveland	3.13	$222.79	$89.00	$311.79	$46.09	$18.41	$64.50
	Bradford	PA	Cleveland	2.71	$183.54	$103.00	$286.54	$30.57	$17.16	$47.72
	Jonesboro	AR	Memphis Int'l, TN (M)	2.00	$801.00	$39.00	$840.00	$74.45	$3.63	$78.08
	Morgantown	WV	Washington Dulles	2.80	$66.15	$96.00	$162.15	$23.38	$33.93	$57.32
	Johnstown	PA	Washington Dulles	2.75	$98.98	$106.00	$204.98	$26.30	$28.17	$54.47
	Jackson	TN	Nashville Int'l	2.33	$240.79	$59.00	$299.79	$68.92	$16.89	$85.80
	Oil City/Franklin	PA	Cleveland	3.28	$331.56	$73.50	$405.06	$30.87	$6.84	$37.72
	Kingman	AZ	Phoenix-Sky Harbor	2.32	$651.28	$65.92	$717.20	$45.48	$4.60	$50.09
	Owensboro	KY	Nashville Int'l	2.25	CANNOT BE DETERMINED [1]			CANNOT BE DETERMINED [1]		
	Altoona	PA	Washington Dulles	3.28	$194.85	$106.00	$300.85	$24.92	$13.56	$38.47
	Quincy	IL	Lambert-St. Louis Int'l, MO (L)	2.20	$125.71	$49.97	$175.68	$58.07	$23.08	$81.16
	Clarksburg	WV	Washington Dulles	2.98	$69.58	$86.00	$155.58	$23.38	$28.90	$52.28
	El Centro	CA	Los Angeles	2.55	$194.87	$71.00	$265.87	$42.40	$15.45	$57.85
	Parkersburg/Marietta	WV	Cleveland	2.72	$241.21	$135.00	$376.21	$55.72	$31.18	$86.90
	Rutland	VT	Boston	2.68	$72.07	$109.00	$181.07	$40.55	$61.33	$101.89
	DuBois	PA	Cleveland	2.70	$194.57	$95.00	$289.57	$49.04	$23.95	$72.99
	Decatur	IL	Lambert-St. Louis Int'l, MO (L)	2.33	$627.53	$42.00	$669.53	$182.95	$12.25	$195.20
	Decatur	IL	Chicago O'Hare	2.75	$627.53	$42.00	$669.53	$182.95	$12.25	$195.20
	Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	2.29	$130.77	$49.97	$180.74	$66.13	$25.27	$91.40
	Muscle Shoals	AL	Memphis Int'l, TN (M)	2.04	$147.08	$478.00	$625.08	$51.58	$167.62	$219.20
	Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	2.43	$167.42	$49.97	$217.39	$34.33	$10.25	$44.57
	Victoria	TX	Houston Bush	2.59	$184.27	$142.00	$326.27	$40.39	$31.13	$71.52
	Pueblo	CO	Denver Int'l, CO (L)	2.39	$55.83	$90.42	$146.25	$27.41	$44.39	$71.80
	Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	2.36	$177.70	$59.00	$236.70	$63.17	$20.97	$84.14
	Mason City	IA	Minneapolis/St. Paul Int'l, MN (L)	2.26	$36.73	$257.00	$293.73	$20.55	$143.83	$164.38
	Staunton	VA	Washington Dulles Int'l, VA (L)	2.39	$104.75	$96.00	$200.75	$61.30	$56.18	$117.49
	Laramie	WY	Denver Int'l, CO (L)	2.29	$65.65	$210.18	$275.83	$33.22	$106.35	$139.57
	Kirksville	MO	Lambert-St. Louis Int'l, MO (L)	2.50	$334.30	$49.97	$384.27	$72.35	$10.81	$83.16
	Greenville	MS	Memphis Int'l, TN (M)	2.16	$121.55	$294.50	$416.05	$32.46	$78.63	$111.09
AIR & BUS TRIPS TO DIFFERENT LOCATIONS	Eau Claire	WI	Chicago O'Hare	2.79	$47.15	$126.00	$173.15	$23.80	$63.59	$87.38
	Prescott	AZ	Los Angeles	3.27	$116.91	$127.92	$244.83	$66.23	$55.62	$121.85
	Prescott	AZ	Denver	4.28	$116.91	$127.92	$244.83	$66.23	$55.62	$121.85
	Merced	CA	McCarran Int'l, Las Vegas, NV	4.25	$478.10	$108.92	$587.02	$70.89	$15.51	$86.41
	Merced	CA	Los Angeles, CA	3.20	$478.10	$108.92	$587.02	$70.89	$15.51	$86.41
	Laurel/Hattiesburg	MS	Memphis Int'l, TN (M)	2.81	$50.81	$423.00	$473.81	$28.26	$235.25	$263.51
	Grand Island	NE	Dallas/Fort Worth	3.23	CANNOT BE DETERMINED [1]			CANNOT BE DETERMINED [1]		
	Paducah	KY	Chicago O'Hare	3.16	$14.32	$104.50	$118.82	$7.83	$57.14	$64.97

[1] Carrier offers subsidized and unsubsidized service from this airport. Given available information, cannot determine the number of passengers on subsidized routes.

See Figure 7 for a comparison of the total cost of current EAS-subsidized flights ($/passenger, including fare and subsidy) to the operating cost ($/passenger) of alternative bus service, not including the cost of incremental trip time. As shown, for all routes in the analysis the operating cost of coach bus service is significantly less than the operating cost of air service. The route with the biggest difference is the route from Muscle Shoals, AL to Memphis airport, where coach bus service would cost $583.89/passenger less to operate than current air service. The route with the smallest difference is Hagerstown, MD to Baltimore airport, where coach bus service would cost $77.34/passenger less to operate than current air service.

For all routes included in the analysis total costs for scheduled coach bus service are at least 24% less than total costs for air service ($/passenger) and are as much as 96% less.

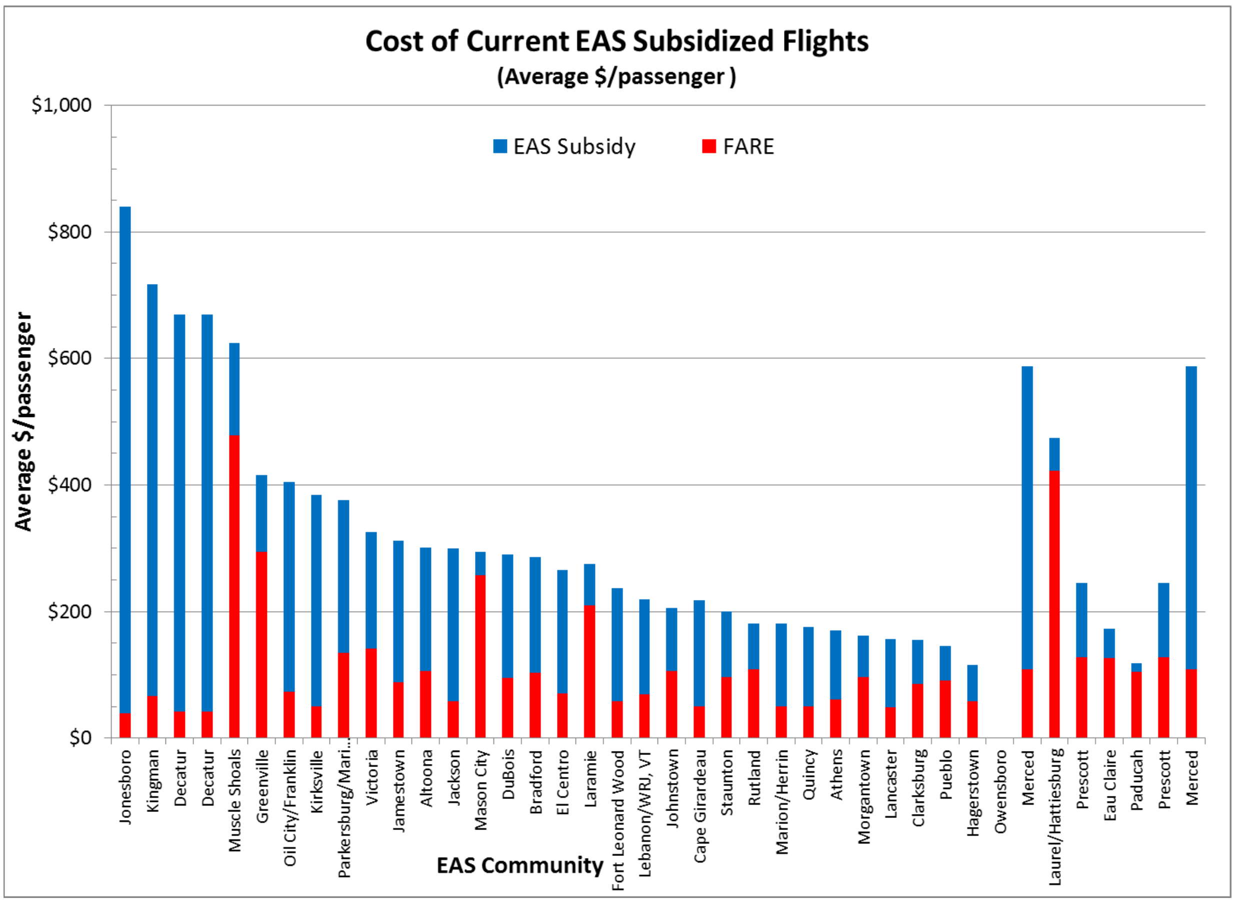

Figure 5 Total Cost of Current EAS-subsidized Air Flights (average $/passenger)

Table 3 Costs for Alternative Coach Bus Service to EAS Communities, by Route

	EAS Community	State	To/from	Alternative Bus Trips: Trip Time [hr]	Cost per Current Passenger: Optg Cost	Cost per Current Passenger: Incr Trip Time	Cost per Current Passenger: TOTAL	Cost per Scheduled Seat: Optg Cost	Cost per Scheduled Seat: Incr Trip Time	Cost per Scheduled Seat: TOTAL
AIR & BUS TRIPS TO SAME LOCATION	Hagerstown	MD	Baltimore Washington Int'l	2.13	$38.06	$0.35	$38.41	$5.07	$0.35	$5.42
	Lancaster	PA	Baltimore Washington Int'l	2.26	$67.64	$7.49	$75.13	$5.41	$7.49	$12.91
	Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	2.34	$38.25	$3.12	$41.37	$5.37	$3.12	$8.49
	Lebanon/WRJ, VT	NH	Boston	2.52	$66.63	$0.14	$66.78	$6.51	$0.14	$6.65
	Jamestown	NY	Cleveland	3.10	$119.54	-$1.01	$118.53	$8.54	-$1.01	$7.53
	Bradford	PA	Cleveland	4.13	$180.84	$54.69	$235.53	$10.41	$54.69	$65.09
	Jonesboro	AR	Memphis Int'l, TN (M)	1.94	$330.37	-$2.03	$328.35	$5.02	-$2.03	$3.00
	Morgantown	WV	Washington Dulles	4.19	$45.65	$46.41	$92.06	$9.97	$46.41	$56.38
	Johnstown	PA	Washington Dulles	3.89	$57.21	$44.05	$101.27	$9.40	$44.05	$53.45
	Jackson	TN	Nashville Int'l	2.86	$166.20	$15.04	$181.24	$7.78	$15.04	$22.83
	Oil City/Franklin	PA	Cleveland	2.57	$203.27	-$27.52	$175.75	$6.54	-$27.52	-$20.98
	Kingman	AZ	Phoenix-Sky Harbor	4.36	$470.81	$73.13	$543.94	$11.36	$73.13	$84.49
	Owensboro	KY	Nashville Int'l	2.86	CANNOT BE DETERMINED [1]			$7.70	$17.43	$25.13
	Altoona	PA	Washington Dulles	3.44	$105.10	$6.40	$111.50	$8.31	$6.40	$14.71
	Quincy	IL	Lambert-St. Louis Int'l, MO (L)	2.89	$92.99	$23.79	$116.78	$7.03	$23.79	$30.82
	Clarksburg	WV	Washington Dulles	4.59	$50.41	$53.70	$104.11	$10.47	$53.70	$64.17
	El Centro	CA	Los Angeles	4.52	$102.10	$78.43	$180.52	$12.12	$78.43	$90.54
	Parkersburg/Marietta	WV	Cleveland	3.53	$111.11	$27.11	$138.22	$8.87	$27.11	$35.98
	Rutland	VT	Boston	3.72	$103.15	$44.37	$147.52	$9.50	$44.37	$53.87
	DuBois	PA	Cleveland	3.33	$101.05	$24.22	$125.27	$8.80	$24.22	$33.02
	Decatur	IL	Lambert-St. Louis Int'l, MO (L)	3.05	$378.95	$25.06	$404.02	$8.17	$25.06	$33.23
	Decatur	IL	Chicago O'Hare	3.89	$378.95	$39.76	$418.71	$9.91	$39.76	$49.67
	Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	2.95	$87.57	$23.12	$110.69	$7.25	$23.12	$30.37
	Muscle Shoals	AL	Memphis Int'l, TN (M)	3.42	$41.19	$39.73	$80.92	$8.93	$39.73	$48.66
	Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	2.77	$98.68	$12.03	$110.71	$6.99	$12.03	$19.02
	Victoria	TX	Houston Bush	3.24	$56.31	$21.28	$77.59	$7.63	$21.28	$28.91
	Pueblo	CO	Denver Int'l, CO (L)	2.78	$41.53	$13.91	$55.44	$7.04	$13.91	$20.96
	Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	2.94	$124.79	$20.19	$144.99	$7.26	$20.19	$27.45
	Mason City	IA	Minneapolis/St. Paul Int'l, MN (L)	2.67	$19.23	$14.49	$33.72	$6.65	$14.49	$21.14
	Staunton	VA	Washington Dulles Int'l, VA (L)	2.93	$37.87	$17.99	$55.86	$7.66	$17.99	$25.64
	Laramie	WY	Denver Int'l, CO (L)	2.99	$47.99	$25.35	$73.33	$8.39	$25.35	$33.73
	Kirksville	MO	Lambert-St. Louis Int'l, MO (L)	4.02	$281.11	$53.45	$334.56	$9.96	$53.45	$63.40
	Greenville	MS	Memphis Int'l, TN (M)	3.37	$54.44	$34.62	$89.06	$8.99	$34.62	$43.61
AIR & BUS TRIPS TO DIFFERENT LOCATIONS	Eau Claire	WI	Minneapolis/St. Paul Int'l, MN (L)	2.30	$11.66	($17.13)	($5.47)	$5.35	($17.13)	($11.78)
	Prescott	AZ	Sky Harbor Mun., Phoenix, AZ (L)	2.59	$52.04	($24.52)	$27.53	$6.79	($24.52)	($17.73)
	Prescott	AZ	Sky Harbor Mun., Phoenix, AZ (L)	2.59	$52.04	($60.68)	($8.63)	$6.79	($60.68)	($53.89)
	Merced	CA	San Jose Int'l, CA (M)	2.78	$218.75	($58.47)	$160.28	$5.60	($58.47)	($52.86)
	Merced	CA	San Jose Int'l, CA (M)	2.78	$218.75	($16.73)	$202.02	$5.60	($16.73)	($11.13)
	Laurel/Hattiesburg	MS	New Orleans Int'l, LA (M)	2.64	$19.52	($4.83)	$14.69	$6.71	($4.83)	$1.88
	Grand Island	NE	Eppley Airfield, Omaha, NE (M)	3.29	CANNOT BE DETERMINED [1]			$7.88	$2.22	$10.10
	Paducah	KY	Nashville Metropolitan, TN (M)	3.02	$14.94	($3.89)	$11.06	$7.43	($3.89)	$3.54

[1] Carrier offers subsidized and unsubsidized service from this airport. Given available information, cannot determine the number of passengers on subsidized routes.

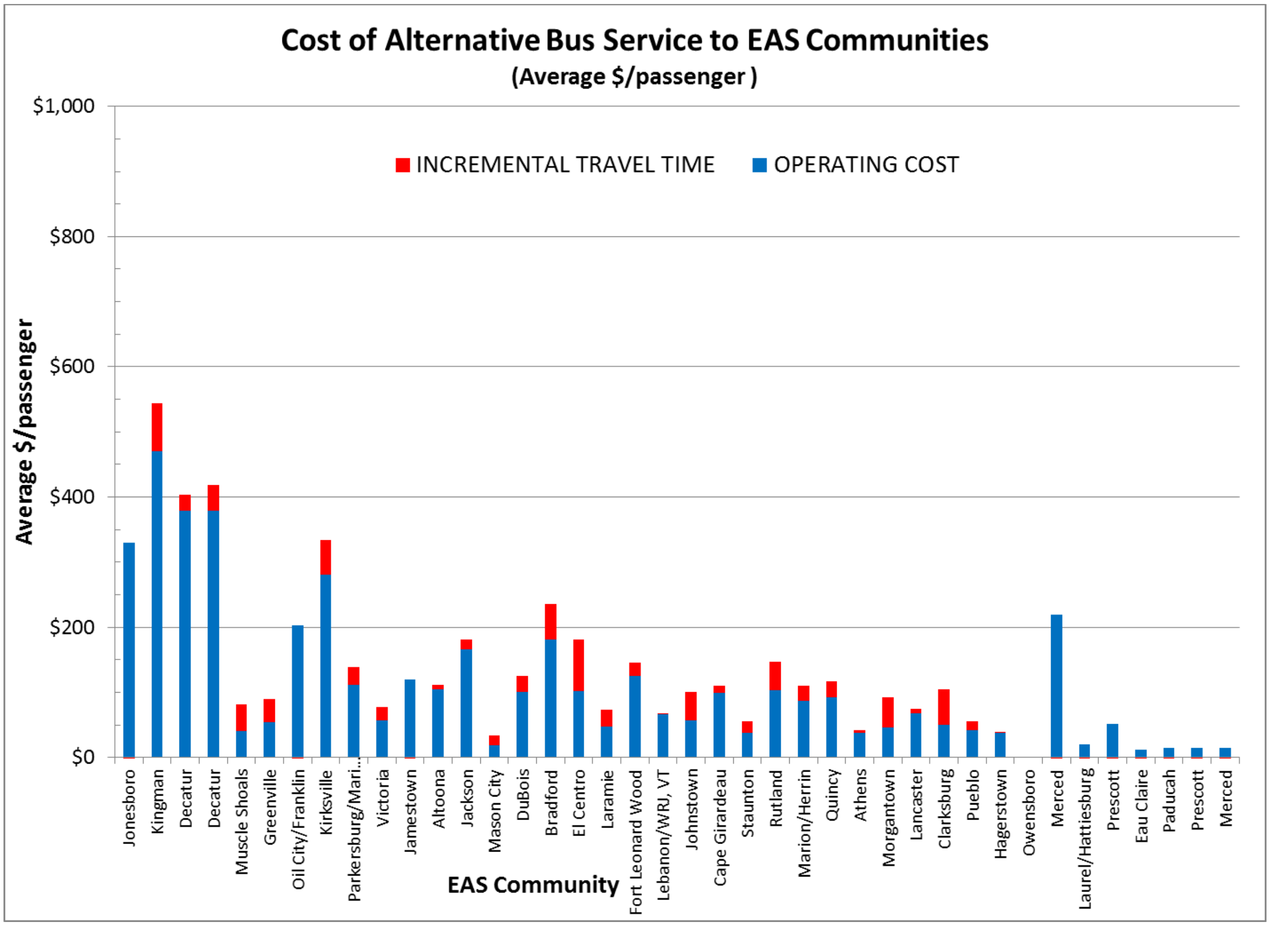

Figure 6 Total Cost of Alternative Coach Bus Service to EAS Communities (average $/passenger)

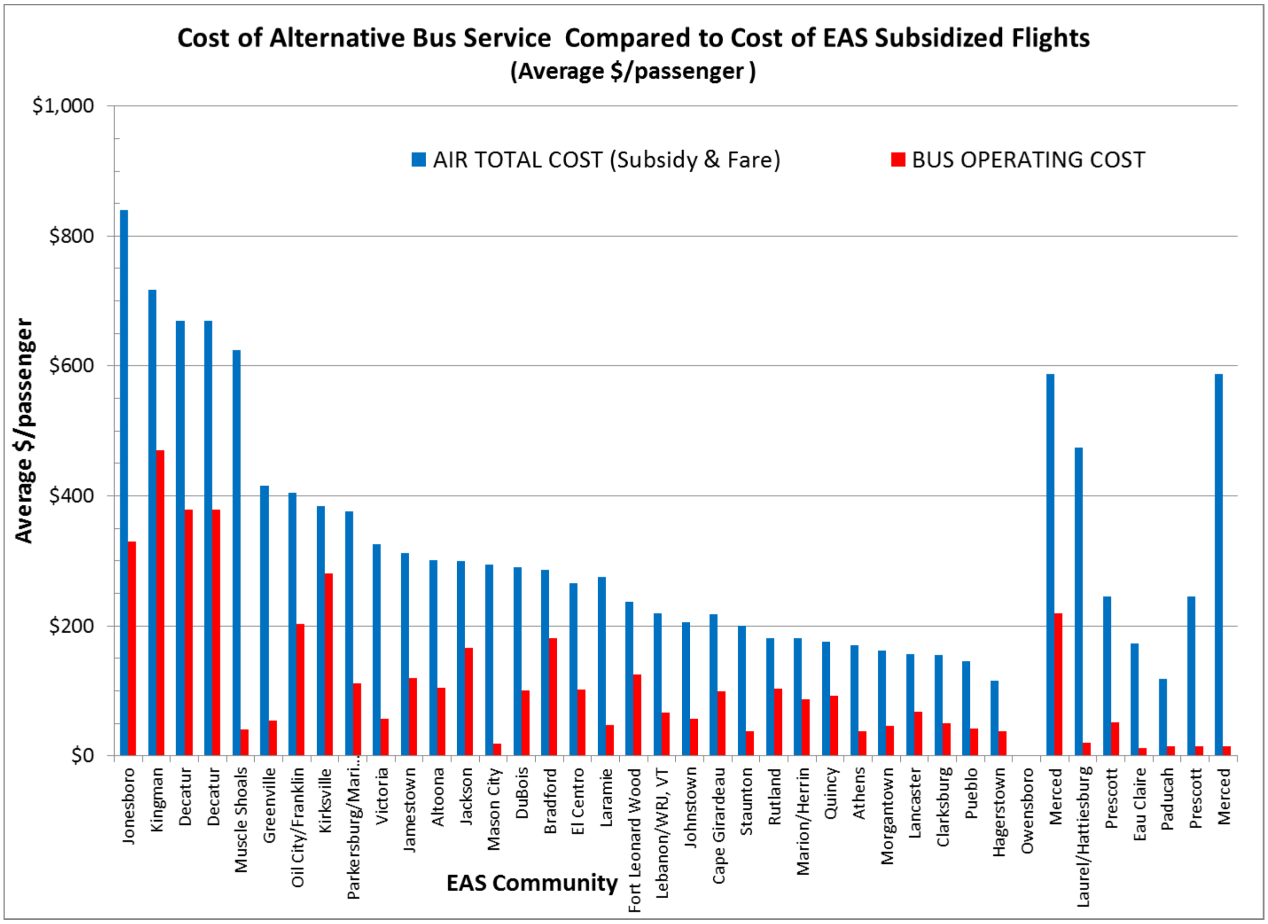

Figure 7 Total Cost of Current EAS-subsidized flights Compared to Operating Cost of Bus Service

See Table 4 for a summary of estimated annual fuel use and exhaust emissions from current EAS-subsidized air flights on each route included in this study. As shown, there is a wide variance in annual fuel use and emissions by route, based on the number of annual flights, route length, and the size of the aircraft operated. In total, EAS-subsidized flights to/from the 38 EAS communities included in this study burn approximately 7.9 million gallons of jet fuel[15] annually, and emit approximately 88,000 tons of CO_2, approximately 28 tons of NOx, approximately 1,188 tons of HC, approximately 2,067 tons of CO, and approximately 28 tons of SO_2[16].

[15] The jet fuel burned by the turbo-prop aircraft used for EAS-subsidized service is essentially identical to highway diesel fuel, but is allowed by EPA to have higher sulfur content.
[16] Aircraft also emit small amounts of particulate matter (PM) but these emissions could not be estimated because PM emission factors were unavailable.

Table 4 Emissions from Current EAS-subsidized Air Flights

	EAS Community	State	To/from	Current EAS Subsidized Air Trips: Annual Fuel (gal)	Annual Emissions from Air Flights: CO_2 (ton)	NOx (ton)	PM (ton)	HC (ton)	CO (ton)	SO_2 (ton)
AIR & BUS TRIPS TO SAME LOCATION	Hagerstown	MD	Baltimore Washington Int'l	75,421	838	0.27	NOT AVAILABLE	11.3	19.7	0.3
	Lancaster	PA	Baltimore Washington Int'l	68,238	758	0.24		10.2	17.8	0.2
	Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	39,312	437	0.14		5.9	10.3	0.1
	Lebanon/WRJ, VT	NH	Boston	98,765	1,098	0.35		14.8	25.8	0.3
	Jamestown	NY	Cleveland	205,920	2,289	0.73		30.9	53.7	0.7
	Bradford	PA	Cleveland	223,080	2,480	0.79		33.4	58.2	0.8
	Jonesboro	AR	Memphis Int'l, TN (M)	46,176	513	0.16		6.9	12.0	0.2
	Morgantown	WV	Washington Dulles	237,463	2,640	0.84		35.6	61.9	0.8
	Johnstown	PA	Washington Dulles	241,488	2,684	0.85		36.2	63.0	0.9
	Jackson	TN	Nashville Int'l	78,381	871	0.28		11.7	20.4	0.3
	Oil City/Franklin	PA	Cleveland	143,000	1,590	0.51		21.4	37.3	0.5
	Kingman	AZ	Phoenix-Sky Harbor	123,933	1,378	0.44		18.6	32.3	0.4
	Owensboro	KY	Nashville Int'l	70,543	784	0.25		10.6	18.4	0.2
	Altoona	PA	Washington Dulles	242,159	2,692	0.86		36.3	63.1	0.9
	Quincy	IL	Lambert-St. Louis Int'l, MO (L)	115,440	1,283	0.41		17.3	30.1	0.4
	Clarksburg	WV	Washington Dulles	269,662	2,997	0.95		40.4	70.3	1.0
	El Centro	CA	Los Angeles	180,093	2,002	0.64		27.0	47.0	0.6
	Parkersburg/Marietta	WV	Cleveland	251,680	2,798	0.89		37.7	65.6	0.9
	Rutland	VT	Boston	79,461	883	0.28		11.9	20.7	0.3
	DuBois	PA	Cleveland	285,047	3,168	1.01		42.7	74.3	1.0
	Decatur	IL	Lambert-St. Louis Int'l, MO (L)	74,256	825	0.26		11.1	19.4	0.3
	Decatur	IL	Chicago O'Hare	111,384	1,238	0.39		16.7	29.0	0.4
	Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	109,027	1,212	0.39		16.3	28.4	0.4
	Muscle Shoals	AL	Memphis Int'l, TN (M)	156,520	1,740	0.55		23.5	40.8	0.6
	Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	251,680	2,798	0.89		37.7	65.6	0.9
	Victoria	TX	Houston Bush	159,874	1,777	0.57		24.0	41.7	0.6
	Pueblo	CO	Denver Int'l, CO (L)	178,464	1,984	0.63		26.7	46.5	0.6
	Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	83,373	927	0.30		12.5	21.7	0.3
	Mason City	IA	Minneapolis/St. Paul Int'l, MN (L)	153,390	1,705	0.54		23.0	40.0	0.5
	Staunton	VA	Washington Dulles Int'l, VA (L)	168,168	1,869	0.60		25.2	43.8	0.6
	Laramie	WY	Denver Int'l, CO (L)	147,576	1,640	0.52		22.1	38.5	0.5
	Kirksville	MO	Lambert-St. Louis Int'l, MO (L)	87,542	973	0.31		13.1	22.8	0.3
	Greenville	MS	Memphis Int'l, TN (M)	159,650	1,775	0.57		23.9	41.6	0.6
AIR & BUS TRIPS TO DIFFERENT LOCATIONS	Eau Claire	WI	Chicago O'Hare	589,680	6,555	2.09	NA	88.4	153.8	2.1
	Prescott	AZ	Los Angeles	253,587	2,819	0.90		38.0	66.1	0.9
	Prescott	AZ	Denver	222,889	2,478	0.79		33.4	58.1	0.8
	Merced	CA	McCarran Int'l, Las Vegas, NV	240,240	2,670	0.85		36.0	62.6	0.9
	Merced	CA	Los Angeles, CA	272,272	3,026	0.96		40.8	71.0	1.0
	Laurel/Hattiesburg	MS	Memphis Int'l, TN (M)	241,041	2,679	0.85		36.1	62.8	0.9
	Grand Island	NE	Dallas/Fort Worth	502,493	5,585	1.78		75.3	131.0	1.8
	Paducah	KY	Chicago O'Hare	691,891	7,691	2.45		103.7	180.4	2.4
			TOTAL	7,930,259	88,149	28.07		1,188.2	2,067.7	28.1

See Table 5 for a summary of estimated annual fuel use and exhaust emissions from alternative coach bus service on each route included in this study. In total, alternative bus service to/from the 38 EAS communities included in this study would burn approximately 2.2 million gallons of diesel fuel annually, and would emit approximately 24,600 tons of CO_2, approximately 14.9 tons of NOx, approximately 0.3 tons of PM, approximately 2.0 tons of HC, approximately 1.2 tons of CO, and approximately 0.2 tons of SO_2. Note that this analysis assumes that because alternative bus service would be "new" service on most, if not all, routes included in this study the emissions calculations assume the use of new model year 2011 buses for all routes.

Based on a significant change in EPA emission regulations over the past few years new coach buses have significantly lower emissions of NOx and PM than buses built prior to model year 2007. If service were operated with existing, older buses actual emissions would be higher than those shown in Table 5.

Table 5 Emissions from Alternative Bus Service to EAS Communities

	Alternative Coach Bus Trips			Annual Emissions from Bus Operations					
	To/from	Annual Miles (mi)	Annual Fuel (gal)	CO_2 (ton)	NOx (ton)	PM (ton)	HC (ton)	CO (ton)	SO_2 (ton)
AIR & BUS TRIPS TO SAME LOCATION	Baltimore Washington Int'l	261,731	48,469	538.8	0.33	0.006	0.043	0.026	0.005
	Baltimore Washington Int'l	282,522	52,319	581.6	0.35	0.006	0.047	0.028	0.006
	Hartsfield Int'l, Atlanta, GA (L)	109,812	20,335	226.0	0.14	0.002	0.018	0.011	0.002
	Boston	376,085	69,645	774.1	0.47	0.008	0.062	0.037	0.008
	Cleveland	306,634	56,784	631.2	0.38	0.007	0.051	0.030	0.006
	Cleveland	389,189	72,072	801.1	0.48	0.009	0.064	0.039	0.008
	Memphis Int'l, TN (M)	105,618	19,559	217.4	0.13	0.002	0.017	0.010	0.002
	Washington Dulles	367,567	68,068	756.6	0.46	0.008	0.061	0.036	0.008
	Washington Dulles	332,186	61,516	683.8	0.41	0.007	0.055	0.033	0.007
	Nashville Int'l	296,696	54,944	610.7	0.37	0.007	0.049	0.029	0.006
	Cleveland	208,026	38,523	428.2	0.26	0.005	0.034	0.021	0.004
	Phoenix-Sky Harbor	288,179	53,366	593.2	0.36	0.006	0.048	0.029	0.006
	Nashville Int'l	290,472	53,791	597.9	0.36	0.006	0.048	0.029	0.006
	Washington Dulles	300,846	55,712	619.3	0.37	0.007	0.050	0.030	0.006
	Lambert-St. Louis Int'l, MO (L)	511,056	94,640	1,052.0	0.64	0.011	0.085	0.051	0.010
	Washington Dulles	385,258	71,344	793.0	0.48	0.008	0.064	0.038	0.008
	Los Angeles	353,153	65,399	726.9	0.44	0.008	0.058	0.035	0.007
	Cleveland	471,744	87,360	971.1	0.59	0.010	0.078	0.047	0.010
	Boston	421,949	78,139	868.6	0.53	0.009	0.070	0.042	0.009
	Cleveland	439,530	81,394	904.7	0.55	0.010	0.073	0.044	0.009
	Lambert-St. Louis Int'l, MO (L)	290,909	53,872	598.8	0.36	0.006	0.048	0.029	0.006
	Chicago O'Hare	375,430	69,524	772.8	0.47	0.008	0.062	0.037	0.008
	Lambert-St. Louis Int'l, MO (L)	493,802	91,445	1,016.5	0.62	0.011	0.082	0.049	0.010
	Memphis Int'l, TN (M)	224,734	41,617	462.6	0.28	0.005	0.037	0.022	0.005
	Lambert-St. Louis Int'l, MO (L)	343,325	63,579	706.7	0.43	0.008	0.057	0.034	0.007
	Houston Bush	210,101	38,908	432.5	0.26	0.005	0.035	0.021	0.004
	Denver Int'l, CO (L)	345,946	64,064	712.1	0.43	0.008	0.057	0.034	0.007
	Lambert-St. Louis Int'l, MO (L)	379,470	70,272	781.1	0.47	0.008	0.063	0.038	0.008
	Minneapolis/St. Paul Int'l, MN (L)	197,215	36,521	406.0	0.25	0.004	0.033	0.020	0.004
	Washington Dulles Int'l, VA (L)	261,425	48,412	538.1	0.33	0.006	0.043	0.026	0.005
	Denver Int'l, CO (L)	306,634	56,784	631.2	0.38	0.007	0.051	0.030	0.006
	Lambert-St. Louis Int'l, MO (L)	458,640	84,933	944.1	0.57	0.010	0.076	0.046	0.009
	Memphis Int'l, TN (M)	229,320	42,467	472.0	0.29	0.005	0.038	0.023	0.005
AIR & BUS TRIPS TO DIFFERENT LOCATIONS	Minneapolis/St. Paul Int'l, MN (L)	140,191	25,961	288.6	0.17	0.003	0.023	0.014	0.003
	Sky Harbor Mun., Phoenix, AZ (L) Sky Harbor Mun., Phoenix, AZ (L)	274,194	50,777	564.4	0.34	0.006	0.045	0.027	0.006
	San Jose Int'l, CA (M) San Jose Int'l, CA (M)	274,194	50,777	564.4	0.34	0.006	0.045	0.027	0.006
	New Orleans Int'l, LA (M)	201,802	37,371	415.4	0.25	0.004	0.033	0.020	0.004
	Eppley Airfield, Omaha, NE (M)	220,038	40,748	452.9	0.27	0.005	0.036	0.022	0.004
	Nashville Metropolitan, TN (M)	227,791	42,184	468.9	0.28	0.005	0.038	0.023	0.005
	TOTAL	11,953,411	2,213,595	24,605	14.89	0.264	1.976	1.186	0.244

See Figure 8 and Figure 9 for a comparison of estimated average emissions (pounds) per passenger and per passenger-mile from the current EAS flights included in this study, to average estimated emissions from alternative coach bus service on the same routes. In these figures NOx and SO_2 emissions are multiplied by 1,000, HC emissions are multiplied by 100, and CO emissions are multiplied by 10 to allow them to be shown on the same graph as CO_2 emissions.

As shown in these figures, the use of new coach buses to operate scheduled service on these routes instead of the current air flights would reduce per passenger CO_2 emissions by 72%, would reduce per passenger NOx emission by 47%, and would reduce per passenger emissions of HC, CO, and SO_2 by over 99%.

The use of new coach buses to operate scheduled service on these routes instead of the current air flights would reduce per passenger-mile CO_2 emissions by 57%, would reduce per passenger-mile NOx emission by 19%, and would reduce per passenger-mile emissions of HC, CO, and SO_2 by over 98%.

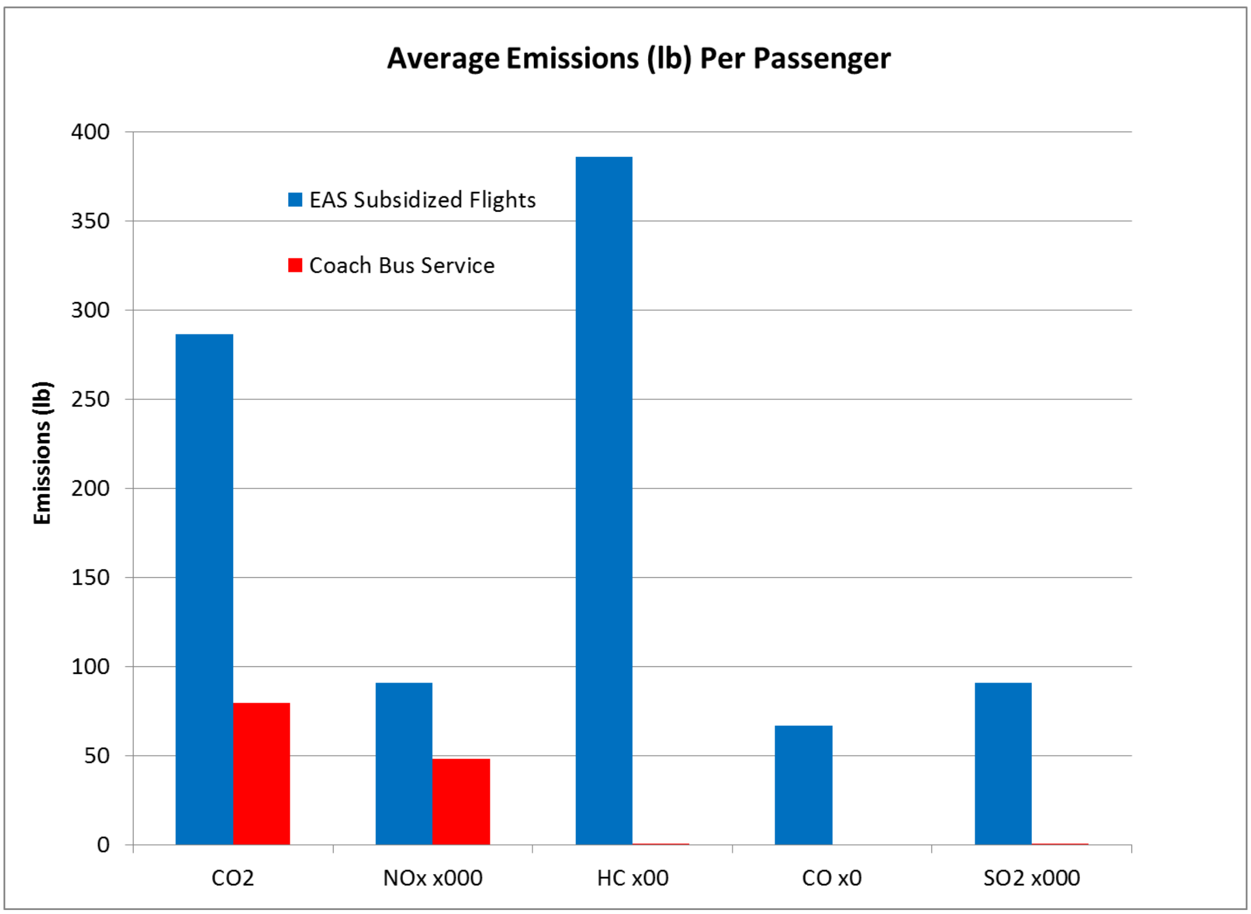

Figure 8 Average Emissions Per passenger from EAS Flights Compared to Coach Bus Service

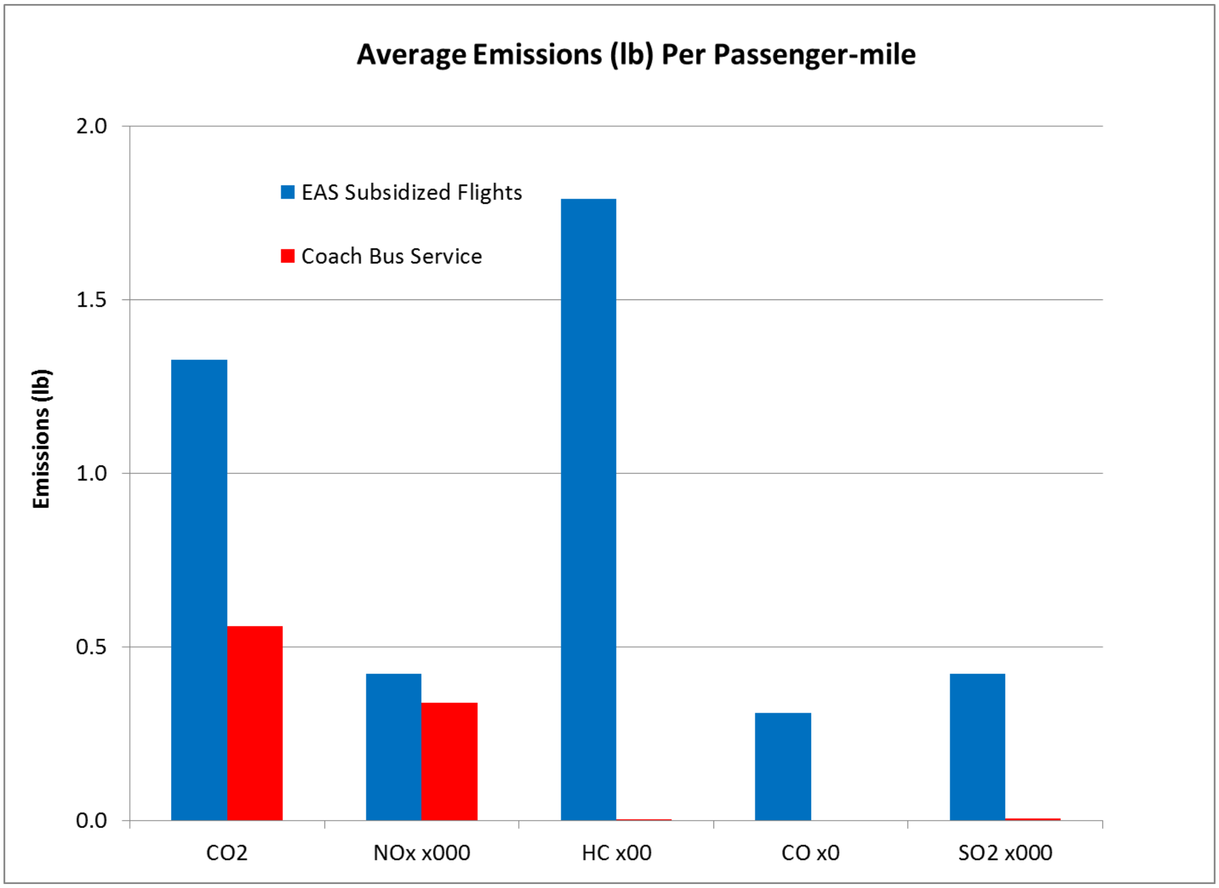

Figure 9 Average Emissions Per passenger-mile from EAS Flights Compared to Coach Bus Service

3.2 Use of Smaller Buses

This analysis compares current EAS-subsidized air flights to equivalent coach bus service. Inter-city coach buses were chosen as the alternative mode for analysis because they are the most common equipment used for long-distance intercity travel and because they provide a higher level of comfort compared to some smaller vehicle options. A typical 45-foot coach bus has 55 passenger seats, though some operators run "premium" or "executive" service with as few as 35 seats and more room per passenger in the coach.

Many of the current EAS-subsidized flights on the routes included in this analysis operate with 9-seat or 19-seat aircraft, and even with these small planes the average load factor on these flights is often less than 50%. In this situation, the use of a smaller vehicle than a 55-seat coach bus to provide alternative on-road service may be more cost effective for some routes. To put bounds on the potential for further savings from better matching vehicle size to passenger demand the authors modeled an alternative bus service on each route using a 12-seat mini-bus.

For this analysis a Mercedes Sprinter™ van was used as the base vehicle for comparison. This vehicle is available from the factory in a 15-seat "commuter bus" version. For this analysis we assumed that the rear three seats would be removed to provide additional luggage space, leaving 12 passenger seats. The manufacturer's suggested retail price for this vehicle is $72,000 (commuter bus version), resulting in an annualized capital cost of $16,700/yr/vehicle (assuming a 5-year life). Annual maintenance costs are assumed to be $0.12/mile, and average fuel economy is assumed to be 20 MPG[17]. All other cost factors (operator labor costs, OH&P, fuel costs) are assumed to be the same as for coach buses.

On a handful of routes current passenger volume is high enough that the use of a 12-seat vehicle would require more daily/weekly trips than the number of currently scheduled EAS flights to provide enough seating capacity – this was accounted for in the analysis.

See Figure 10, which compares the average operating costs ($/passenger) on each route from the use of a 55-seat coach or a 12-seat Sprinter van. Figure 11 plots the same data, but on a $/seat basis.

As shown, on every route average operating costs per seat are much lower for the coach than for the smaller Sprinter van, but on many routes average operating costs per current passenger are higher.

The reality is that the choice of the "best" vehicle to support a particular route will vary by location, and may in fact change over time. Some routes will be best served by coach buses and others will be better served by smaller vehicles.

[17] Based on data from Edmunds.com, product reviews and True Cost of Ownership for 2010 Mercedes Sprinter Van.

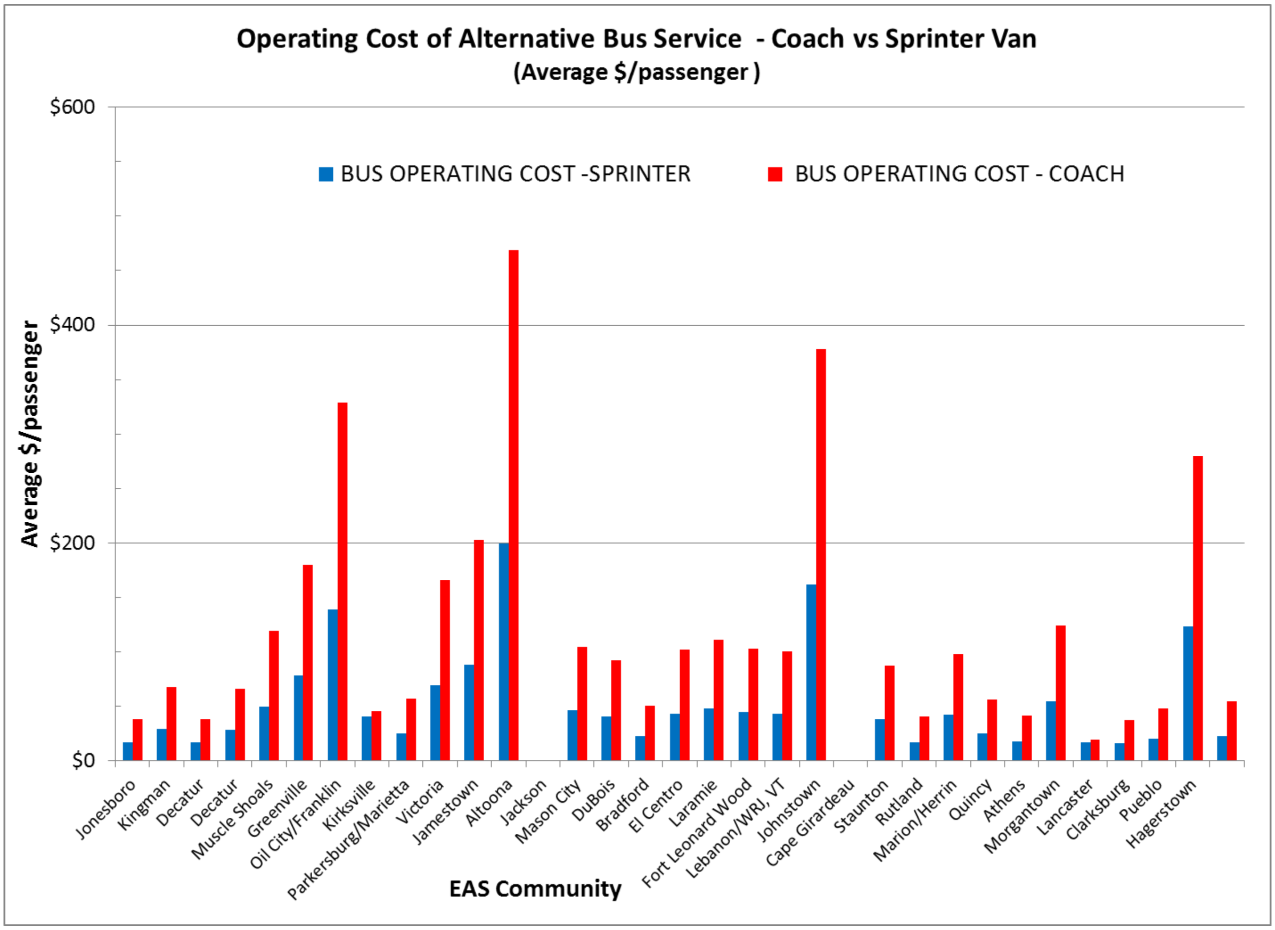

Figure 10 Average Operating Costs per Passenger – Coach Bus versus Sprinter Van

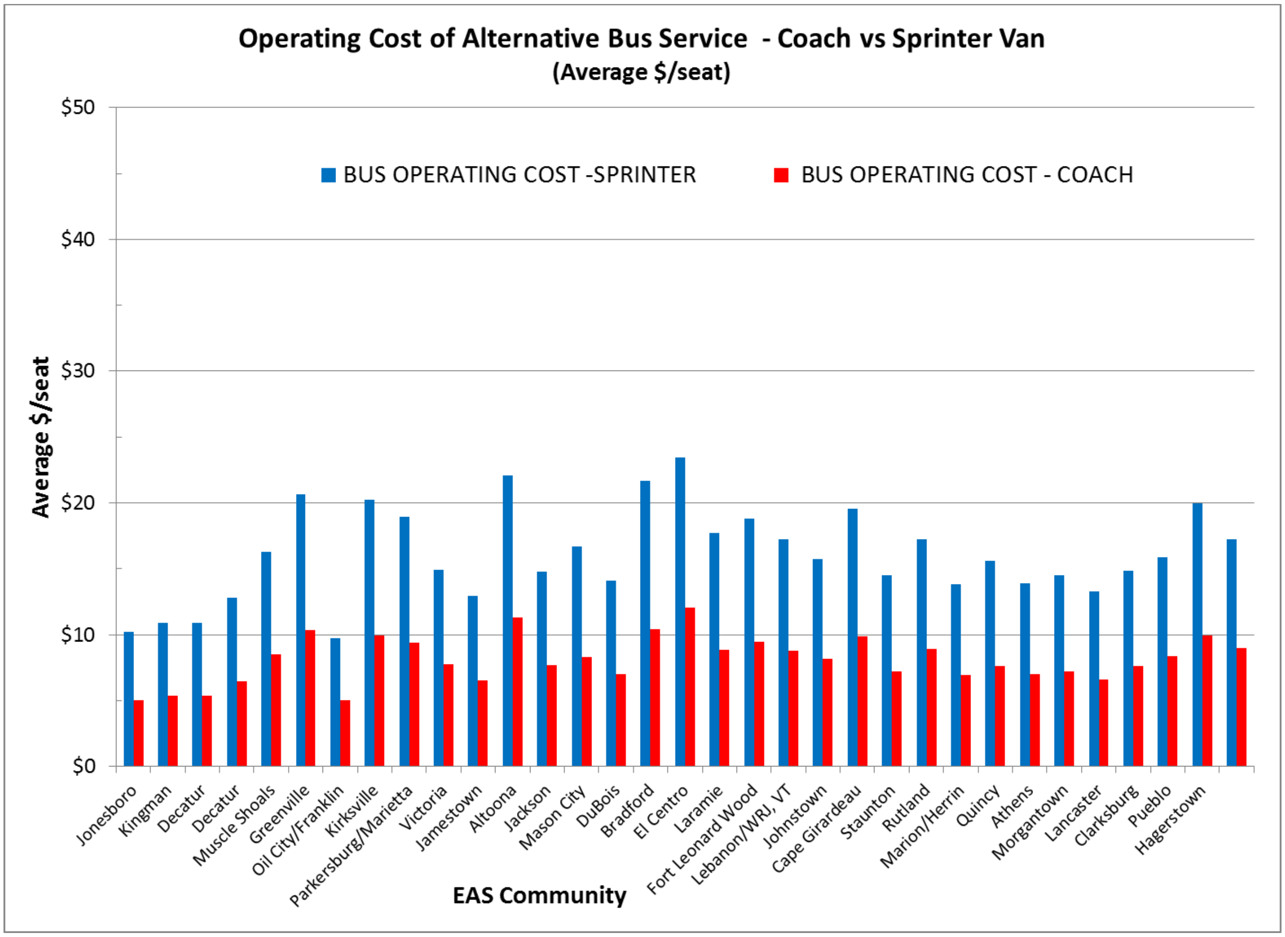

Figure 11 Average Operating Costs per Seat – Coach Bus versus Sprinter Van

APPENDIX A Detailed Analysis

Table 1 CURRENT EAS SUBSIDIZED FLIGHTS TO/FROM COMMUNITIES WITHIN 150 MILES OF A MEDIUM OR LARGE HUB AIRPORT (Lower 48 states only)

EAS Community	State	Nearest L/M Hub	Flight Miles to L/M Hub	Current EAS Subsidized Flights		Annual EAS Subsidy [1]	Annual Passengers, in and out[2]	Average Subsidy per Passenger [3]	Notes
				Flights to/from	Flight Miles				
Hagerstown	MD	Washington Dulles Int'l, VA (L)	64	Baltimore Washington Int'l	67	$1,203,167	21,330	$56.41	Updated 10/1/10
Lancaster	PA	Philadelphia Int'l, PA	70	Baltimore Washington Int'l	67	$1,372,474	12,820	$107.06	Updated 10/1/10
Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	72	Hartsfield Int'l, Atlanta, GA (L)	72	$1,051,386	9,628	$109.20	Updated 10/7/10
Lebanon/WRJ, VT	NH	Manchester Airport, NH (M)	75	Boston	109	$2,347,744	15,654	$149.98	Updated 10/19/10
Jamestown	NY	Greater Buffalo Int'l (M)	76	Cleveland	142	$1,639,254	7,358	$222.79	Updated 9/9/2010
Bradford	PA	Greater Buffalo Int'l (M)	77	Cleveland	168	$1,087,306	5,924	$183.54	Updated 9/9/2010
Jonesboro	AR	Memphis Int'l, TN (M)	79	Memphis Int'l, TN (M)	79	$836,241	1,044	$801.00	
Morgantown	WV	Pittsburgh	79	Washington Dulles	141	$1,488,219	22,498	$66.15	Updated 6/29/2010. Value is half of combined subsidy for Morgantown and Clarksburg service
Johnstown	PA	Greater Pittsburgh Int'l, PA (L)	82	Washington Dulles	120	$1,674,147	16,914	$98.98	Updated 5/10/2010. Value is half of combined subsidy for Johnstown and Altoona service
Jackson	TN	Memphis Int'l, TN (M)	85	Nashville Int'l	131	$1,225,628	5,090	$240.79	
Oil City/Franklin	PA	Greater Pittsburgh Int'l, PA (L)	86	Cleveland	103	$915,101	2,760	$331.56	Updated 9/9/2010
Kingman	AZ	McCarran Int'l, Las Vegas, NV (L)	103	Phoenix-Sky Harbor	168	$1,168,390	1,794	$651.28	Updated 3/1/2011
Owensboro	KY	Louisville-Standiford Field, KY (M)	105	Nashville Int'l	115	$1,068,773	32,386	$33.00	
Altoona	PA	Greater Pittsburgh Int'l, PA (L)	108	Washington Dulles Int'l, VA (L)	104	$1,674,147	8,592	$194.85	Updated 5/10/2010. Value is half of combined subsidy for Johnstown and Altoona service
Quincy	IL	Lambert-St. Louis Int'l, MO (L)	108	Lambert-St. Louis Int'l, MO (L)	108	$1,956,856	15,566	$125.71	Updated 4/11/2011
Clarksburg	WV	Pittsburgh	115	Washington Dulles	151	$1,488,219	21,388	$69.58	Updated 6/29/2010. Value is half of combined subsidy for Morgantown and Clarksburg service
El Centro	CA	San Diego	116	Los Angeles	180	$1,852,091	9,504	$194.87	Updated 12/3/2010
Parkersburg/Marietta	WV	Columbus, OH	116	Cleveland	145	$2,642,237	10,954	$241.21	Updated 6/29/2010.
Rutland	VT	Manchester Airport, NH (M)	118	Boston	127	$797,141	11,060	$72.07	
DuBois	PA	Pittsburgh	119	Cleveland	154	$2,228,996	11,456	$194.57	Updated 9/9/2010
Decatur	IL	Lambert-St. Louis Int'l, MO (L)	120	Lambert-St. Louis Int'l, MO (L) Chicago O'Hare	120 157	$3,082,403	4,912	$627.53	
Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	122	Lambert-St. Louis Int'l, MO (L)	122	$2,104,616	16,094	$130.77	Updated 4/11/2011
Muscle Shoals	AL	Nashville Metropolitan, TN (M)	122	Memphis Int'l, TN (M)	136	$2,553,283	17,360	$147.08	Updated 3/18/2011
Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	123	Lambert-St. Louis Int'l, MO (L)	123	$1,627,966	9,724	$167.42	Updated 4/11/2011
Victoria	TX	San Antonio Int'l, TX (M)	123	Houston Bush	123	$1,856,692	10,076	$184.27	Updated 5/5/2011
Pueblo	CO	Denver Int'l, CO (L)	125	Denver Int'l, CO (L)	125	$1,299,821	23,282	$55.83	
Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	130	Lambert-St. Louis Int'l, MO (L)	130	$1,478,102	8,318	$177.70	Updated 9/8/2010
Mason City	IA	Minneapolis/St. Paul Int'l, MN (L)	132	Minneapolis/St. Paul Int'l, MN (L)	132	$1,017,545	27,704	$36.73	Updated 6/8/2011
Staunton	VA	Washington Dulles Int'l, VA (L)	133	Washington Dulles Int'l, VA (L)	133	$2,180,461	20,816	$104.75	Updated 3/1/2011
Laramie	WY	Denver Int'l, CO (L)	144	Denver Int'l, CO (L)	144	$1,181,572	17,998	$65.65	Updated 8/18/2010
Kirksville	MO	Kansas City Int'l, MO (M)	149	Lambert-St. Louis Int'l, MO (L)	149	$1,422,110	4,254	$334.30	Updated 6/3/2010
Greenville	MS	Memphis Int'l, TN (M)	150	Memphis Int'l, TN (M)	150	$1,606,662	13,218	$121.55	Updated 7/15/2010
Eau Claire	WI	Minneapolis/St. Paul Int'l, MN (L)	91	Chicago O'Hare	268	$1,732,372	36,738	$47.15	
Prescott	AZ	Sky Harbor Mun., Phoenix, AZ (L)	102	Los Angeles Denver	345 557	$1,832,233	15,672	$116.91	Updated 3/1/2011
Merced	CA	San Jose Int'l, CA (M)	114	McCarran Int'l, Las Vegas, NV Los Angeles, CA	309 260	$1,961,174	4,102	$478.10	Updated 9/14/2010
Laurel/Hattiesburg	MS	New Orleans Int'l, LA (M)	137	Memphis Int'l, TN (M)	250	$1,398,798	27,532	$50.81	Updated 5/13/2010
Grand Island	NE	Eppley Airfield, Omaha, NE (M)	140	Dallas/Fort Worth	585	$2,215,582	74,202	$29.86	Updated 1/31/2011
Paducah	KY	Nashville Metropolitan, TN (M)	142	Chicago O'Hare	345	$569,923	39,806	$14.32	
					TOTAL	**$60,838,832**	615,528		

[1] EAS Report (May 1, 2010); updated based on DOT dockets

[2] FAA emplanement data for 2010 (doubled, based on assumption that all passengers who emplane at airport return to airport)

[3] Average subsidy per passenger = Annual Total Subsidy ÷ Annual Passengers

Table 2 DETAILS OF CURRENT EAS SUBSIDIZED FLIGHTS TO/FROM COMMUNITIES WITHIN 150 MILES OF A MEDIUM OR LARGE HUB AIRPORT (Lower 48 states only)

EAS Community	State	Flights to/from	Flight Miles	Carrier	Number of Daily One-way Flights to/from [1]								Equipment [2]	Avg Fuel Use (gal/hr) [3]	Seats per Flight [2]	Weekly Seats [4]	Scheduled Flight Time (hr)[1]	Average Delay on Route (hr) [5]	Total Travel Time [hr] [6]	Typical One-way Ticket Price [1]	Avg Load Factor [7]	AVERAGE ANNUAL COST OF ONE-WAY FLIGHTS: Cost per Current Passenger			Cost per Scheduled Seat			Total Annual Flight Miles [12]	Total Annual Fuel Use [13]
					M	T	W	TH	F	S	SU	Weekly Total										Subsidy [8]	Fare	Total	Subsidy [9]	Fare [10]	Total		
Hagerstown	MD	Baltimore Washington Int'l	67	Cape Air	10	8	8	8	10	6	6	56	C-402	37.0	9	504	0.70	0.25	2.12	$59.00	81%	$56.41	$59.00	**$115.41**	$ 45.91	$ 48.02	**$ 93.93**	195,104	75,421
Lancaster	PA	Baltimore Washington Int'l	67	Cape Air	10	8	8	8	10	6	6	56	C-402	37.0	9	504	0.63	0.26	2.07	$49.00	49%	$107.06	$49.00	**$156.06**	$ 52.37	$ 23.97	**$ 76.34**	195,104	68,238
Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	72	Pacific Wings	4	4	4	4	4	2	2	24	C-208B	42.0	9	216	0.75	0.33	2.25	$61.50	86%	$109.20	$61.50	**$170.70**	$ 93.61	$ 52.72	**$ 146.32**	89,856	39,312
Lebanon/WRJ, VT	NH	Boston	109	Cape Air	8	8	8	8	8	8	8	56	C-402	37.0	9	504	0.92	0.43	2.52	$69.50	60%	$149.98	$69.50	**$219.48**	$ 89.58	$ 41.51	**$ 131.09**	317,408	98,765
Jamestown	NY	Cleveland	142	Gulfstream	6	6	6	6	6	2	4	36	B-1900	110.0	19	684	1.00	0.96	3.13	$89.00	21%	$222.79	$89.00	**$311.79**	$ 46.09	$ 18.41	**$ 64.50**	265,824	205,920
Bradford	PA	Cleveland	168	Gulfstream	6	6	6	6	6	2	4	36	B-1900	110.0	19	684	1.08	0.46	2.71	$103.00	17%	$183.54	$103.00	**$286.54**	$ 30.57	$ 17.16	**$ 47.72**	314,496	223,080
Jonesboro	AR	Memphis Int'l, TN (M)	79	SeaPort	4	4	4	4	4	0	4	24	PC-12	74.0	9	216	0.50	0.33	2.00	$39.00	9%	$801.00	$39.00	**$840.00**	$ 74.45	$ 3.63	**$ 78.08**	98,592	46,176
Morgantown	WV	Washington Dulles	141	Colgan	6	4	6	6	6	4	4	36	SAAB 340	129.0	34	1224	0.98	0.64	2.80	$96.00	35%	$66.15	$96.00	**$162.15**	$ 23.38	$ 33.93	**$ 57.32**	263,952	237,463
Johnstown	PA	Washington Dulles	120	Colgan	6	6	6	6	6	4	2	36	SAAB 340	129.0	34	1224	1.00	0.58	2.75	$106.00	27%	$98.98	$106.00	**$204.98**	$ 26.30	$ 28.17	**$ 54.47**	224,640	241,488
Jackson	TN	Nashville Int'l	131	Pacific Wings	6	6	6	6	6	4	4	38	C-208	47.6	9	342	0.83	0.33	2.33	$59.00	29%	$240.79	$59.00	**$299.79**	$ 68.92	$ 16.89	**$ 85.80**	258,856	78,381
Oil City/Franklin	PA	Cleveland	103	Gulfstream	6	4	4	6	6	2	2	30	B-1900	110.0	19	570	0.83	1.28	3.28	$73.50	9%	$331.56	$73.50	**$405.06**	$ 30.87	$ 6.84	**$ 37.72**	160,680	143,000
Kingman	AZ	Phoenix-Sky Harbor	168	Great Lakes	4	4	4	4	4	2	4	26	B-1900	110.0	19	494	0.83	0.31	2.32	$65.92	7%	$651.28	$65.92	**$717.20**	$ 45.48	$ 4.60	**$ 50.09**	227,136	123,933
Owensboro	KY	Nashville Int'l	115	Pacific Wings	6	6	6	6	6	4	4	38	C-208	47.6	9	342	0.75	0.33	2.25	$59.00	UNK	Cannot be determined [11]			Cannot be determined [11]			227,240	70,543
Altoona	PA	Washington Dulles Int'l, VA (L)	104	Colgan	6	6	6	6	6	3	5	38	SAAB 340	129.0	34	1292	0.95	1.16	3.28	$106.00	13%	$194.85	$106.00	**$300.85**	$ 24.92	$ 13.56	**$ 38.47**	205,504	242,159
Quincy	IL	Lambert-St. Louis Int'l, MO (L)	108	Cape Air	12	12	12	12	12	6	6	72	C-402	37.0	9	648	0.83	0.20	2.20	$49.97	46%	$125.71	$49.97	**$175.68**	$ 58.07	$ 23.08	**$ 81.16**	404,352	115,440
Clarksburg	WV	Washington Dulles	151	Colgan	6	4	6	6	6	4	4	36	SAAB 340	129.0	34	1224	1.12	0.69	2.98	$86.00	34%	$69.58	$86.00	**$155.58**	$ 23.38	$ 28.90	**$ 52.28**	282,672	269,662
El Centro	CA	Los Angeles	180	SkyWest	4	4	4	4	4	4	4	28	BRASILIA	117.8	30	840	1.05	0.33	2.55	$71.00	22%	$194.87	$71.00	**$265.87**	$ 42.40	$ 15.45	**$ 57.85**	262,080	180,093
Parkersburg/Marietta	WV	Cleveland	145	Gulfstream	8	8	8	8	8	4	4	48	B-1900	110.0	19	912	0.92	0.63	2.72	$135.00	23%	$241.21	$135.00	**$376.21**	$ 55.72	$ 31.18	**$ 86.90**	361,920	251,680
Rutland	VT	Boston	127	Cape Air	6	6	6	6	6	6	6	42	C-402	37.0	9	378	0.98	0.52	2.68	$109.00	56%	$72.07	$109.00	**$181.07**	$ 40.55	$ 61.33	**$ 101.89**	277,368	79,461
DuBois	PA	Cleveland	154	Gulfstream	6	8	6	6	8	6	6	46	B-1900	110.0	19	874	1.08	0.45	2.70	$95.00	25%	$194.57	$95.00	**$289.57**	$ 49.04	$ 23.95	**$ 72.99**	368,368	285,047
Decatur	IL	Lambert-St. Louis Int'l, MO (L)	120	Air Choice One	6	6	6	6	6	2	4	36	Caravan	47.6	9	324	0.83	0.33	2.33	$42.00	29%	$627.53	$42.00	**$669.53**	$ 182.95	$ 12.25	**$ 195.20**	224,640	74,256
		Chicago O'Hare	157	Air Choice One	6	6	6	6	6	2	4	36	Caravan	47.6	9	324	1.25	0.33	2.75	$42.00								293,904	111,384
Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	122	Cape Air	12	12	12	12	12	6	2	68	C-402	37.0	9	612	0.83	0.29	2.29	$49.97	51%	$130.77	$49.97	**$180.74**	$ 66.13	$ 25.27	**$ 91.40**	431,392	109,027
Muscle Shoals	AL	Memphis Int'l, TN (M)	136	Mesaba	4	4	4	4	4	4	4	28	SAAB 340	129.0	34	952	0.83	0.03	2.04	$478.00	35%	$147.08	$478.00	**$625.08**	$ 51.58	$ 167.62	**$ 219.20**	198,016	156,520
Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	123	Cape Air	8	8	8	8	8	4	4	48	B-1900	110.0	19	912	0.92	0.34	2.43	$49.97	21%	$167.42	$49.97	**$217.39**	$ 34.33	$ 10.25	**$ 44.57**	307,008	251,680
Victoria	TX	Houston Bush	123	Colgan	4	4	4	4	4	2	4	26	SAAB 340	129.0	34	884	0.92	0.50	2.59	$142.00	22%	$184.27	$142.00	**$326.27**	$ 40.39	$ 31.13	**$ 71.52**	166,296	159,874
Pueblo	CO	Denver Int'l, CO (L)	125	Great Lakes	8	8	8	8	8	4	4	48	B-1900	110.0	19	912	0.65	0.57	2.39	$90.42	49%	$55.83	$90.42	**$146.25**	$ 27.41	$ 44.39	**$ 71.80**	312,000	178,464
Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	130	Cape Air	8	8	8	8	2	8	8	50	C-402	37.0	9	450	0.87	0.33	2.36	$59.00	36%	$177.70	$59.00	**$236.70**	$ 63.17	$ 20.97	**$ 84.14**	338,000	83,373
Mason City	IA	Minneapolis/St. Paul, MN (L)	132	Mesaba	4	4	4	4	4	4	4	28	SAAB 340	129.0	34	952	0.82	0.27	2.26	$257.00	56%	$36.73	$257.00	**$293.73**	$ 20.55	$ 143.83	**$ 164.38**	192,192	153,390
Staunton	VA	Washington Dulles Int'l, VA (L)	133	Colgan	6	6	6	6	6	2	4	36	B-1900	110.0	19	684	0.82	0.40	2.39	$96.00	59%	$104.75	$96.00	**$200.75**	$ 61.30	$ 56.18	**$ 117.49**	248,976	168,168
Laramie	WY	Denver Int'l, CO (L)	144	Great Lakes	6	6	6	6	6	2	4	36	B-1900	110.0	19	684	0.72	0.40	2.29	$210.18	51%	$65.65	$210.18	**$275.83**	$ 33.22	$ 106.35	**$ 139.57**	269,568	147,576
Kirksville	MO	Lambert-St. Louis Int'l, MO (L)	149	Cape Air	6	6	6	6	6	6	6	42	C-402	37.0	9	378	1.08	0.25	2.50	$49.97	22%	$334.30	$49.97	**$384.27**	$ 72.35	$ 10.81	**$ 83.16**	325,416	87,542
Greenville	MS	Memphis Int'l, TN (M)	150	Mesaba	4	4	4	4	4	4	4	28	SAAB 340	129.0	34	952	0.85	0.14	2.16	$294.50	27%	$121.55	$294.50	**$416.05**	$ 32.46	$ 78.63	**$ 111.09**	218,400	159,650
Eau Claire	WI	Chicago O'Hare	268	SkyWest	4	4	4	4	4	4	4	28	CRJ-200	324.0	50	1400	1.25	0.37	2.79	$126.00	50%	$47.15	$126.00	**$173.15**	$ 23.80	$ 63.59	**$ 87.38**	390,208	589,680
Prescott	AZ	Los Angeles	345	Great Lakes	4	4	4	4	4	4	4	28	B-1900	110.0	19	532	1.58	0.52	3.27	$98.18	57%	$116.91	$127.92	**$244.83**	$ 66.23	$ 55.62	**$ 121.85**	502,320	253,587
		Denver	557	Great Lakes	2	2	2	2	2	2	2	14	B-1900	110.0	19	266	2.78	0.33	4.28	$187.40								405,496	222,889
Merced	CA	McCarran Int'l, Las Vegas, NV	309	Great Lakes	4	4	4	4	4	4	4	28	B-1900	110.0	19	532	1.50	1.58	4.25	$104.62	15%	$478.10	$108.92	**$587.02**	$ 70.89	$ 15.51	**$ 86.41**	449,904	240,240
		Los Angeles, CA	260	Great Lakes	4	4	4	4	4	4	4	28	B-1900	110.0	19	532	1.70	0.33	3.20	$113.22								378,560	272,272
Laurel/Hattiesburg	MS	Memphis Int'l, TN (M)	250	Mesaba	4	4	4	4	4	4	4	28	SAAB 340	129.0	34	952	1.28	0.36	2.81	$423.00	56%	$50.81	$423.00	**$473.81**	$ 28.26	$ 235.25	**$ 263.51**	364,000	241,041
Grand Island	NE	Dallas/Fort Worth	585	American Eagle	4	4	4	4	4	2	4	26	EMB-145	223.0	50	1300	1.67	0.39	3.23	$201.00	UNK	Cannot be determined [11]			Cannot be determined [11]			790,920	502,493
Paducah	KY	Chicago O'Hare	345	SkyWest	4	4	4	4	4	4	4	28	CRJ-200	324.0	50	1400	1.47	0.52	3.16	$104.50	55%	$14.32	$104.50	**$118.82**	$ 7.83	$ 57.14	**$ 64.97**	502,320	691,891
																											TOTAL	**12,310,688**	**7,930,259**

TABLE 2 NOTES

[1] Carrier websites, accessed 8/18/2011 and 8/19/2011. Prices and flight times represent lowest price and shortest duration of outbound on 9/19/2011. Prices and durations for direct flights only unless no direct flights exist.

[2] EAS Report (May 1, 2010); updated based on DOT dockets

[3] See Table 11

[4] Weekly seats = Weekly total flights x seats per flight

[5] See Table 10

[6] Total Travel Time = Scheduled Flight time + Average Delay on Route + Pre-flight wait time + Deplaning time
Assume pre-flight wait time 1.0 hour for security clearance per TSA guidelines. Assume deplaning time is 0.17 hour.

[7] Average Load Factor = Annual passengers [Table 1] ÷ (weekly seats x 52 weeks)

[8] Average subsidy per passenger = Annual Total Subsidy [Table 1] ÷ Annual Passengers [Table 1]

[9] Average subsidy per seat = Annual Total Subsidy [Table 1] ÷ (weekly seats x 52 weeks/year)

[10] Average fare per scheduled seat = Typical one-way ticket price x current annual passengers [Table 1] ÷ (weekly seats x 52 weeks/year). Note that this is a minumum number because it assumes no increase in fare revenue as load factor increases.

[11] Carrier offers subsidized and unsubsidized service from this airport. Cannot determine the number of passengers on subsidized routes given available information.

[12] Total Annual Flight Miles = Weekly Flights x 52 weeks/yr x Flight miles per flight

[13] Total Annual Fuel Use (gal) = Weekly Flights x 52 weeks/yr x Flight Time (hr) x Average Fuel Use (gal/hr)

TABLE 3: ALTERNATE BUS SERVICE TO/FROM CURRENT AIRPORTS SERVICED BY EAS-SUBSIDIZED FLIGHTS

EAS Community	State	Current EAS Flights to/from	Alternate Bus Service							Minimum Service - Current Flight Frequency				
					One-way Trip [1]									
			Bus service to/from	Route	Distance (mi)	Drive Time (hr)	Avg Congestion Delay (hr) [2]	Total Trip Time (hr) [3]	Incr Trip Time (hr) [4]	Weekly one-way Trips to/from [5]	Min Buses Required [6]	Utilization Factor [7]	Annual Miles [8]	Weekly Seats [9]
Hagerstown	MD	Baltimore Washington Int'l	Baltimore Washington Int'l	I-70 E	86	1.60	0.027	2.13	0.01	56	2	56.7%	261,731	3,080
Lancaster	PA	Baltimore Washington Int'l	Baltimore Washington Int'l	I-83 S	92	1.73	0.027	2.26	0.19	56	2	60.3%	282,522	3,080
Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	Hartsfield Int'l, Atlanta, GA (L)	GA-316 W and I-85 S	84	1.80	0.044	2.34	0.09	24	1	53.6%	109,812	1,320
Lebanon/WRJ, VT	NH	Boston	Boston	I-89 S and I-93 S	123	1.98	0.040	2.52	0.00	56	2	67.3%	376,085	3,080
Jamestown	NY	Cleveland	Cleveland	I-90 W	156	2.58	0.016	3.10	-0.03	36	2	53.1%	306,634	1,980
Bradford	PA	Cleveland	Cleveland	I-90 W	198	3.62	0.016	4.13	1.42	36	2	70.8%	389,189	1,980
Jonesboro	AR	Memphis Int'l, TN (M)	Memphis Int'l, TN (M)	US-63 S and I-55 S	81	1.42	0.021	1.94	-0.06	24	1	44.3%	105,618	1,320
Morgantown	WV	Washington Dulles	Washington Dulles	I-68 E	187	3.62	0.078	4.19	1.40	36	2	71.9%	367,567	1,980
Johnstown	PA	Washington Dulles	Washington Dulles	I-70 E	169	3.32	0.078	3.89	1.14	36	2	66.8%	332,186	1,980
Jackson	TN	Nashville Int'l	Nashville Int'l	I-40 E	143	2.33	0.024	2.86	0.52	38	2	51.7%	296,696	2,090
Oil City/Franklin	PA	Cleveland	Cleveland	I-80 W	127	2.05	0.016	2.57	-0.72	30	1	73.3%	208,026	1,650
Kingman	AZ	Phoenix-Sky Harbor	Phoenix-Sky Harbor	US-93 S	203	3.82	0.040	4.36	2.04	26	2	53.9%	288,179	1,430
Owensboro	KY	Nashville Int'l	Nashville Int'l	KY-9007 S	140	2.33	0.024	2.86	0.61	38	2	51.7%	290,472	2,090
Altoona	PA	Washington Dulles	Washington Dulles	I-70 E	145	2.87	0.078	3.44	0.17	38	2	62.3%	300,846	2,090
Quincy	IL	Lambert-St. Louis Int'l, MO (L)	Lambert-St. Louis Int'l, MO (L)	US-61 S	130	2.37	0.019	2.89	0.68	72	3	66.0%	511,056	3,960
Clarksburg	WV	Washington Dulles	Washington Dulles	US-50 E	196	4.02	0.078	4.59	1.62	36	2	78.8%	385,258	1,980
El Centro	CA	Los Angeles	Los Angeles	I-8 W	231	3.90	0.122	4.52	1.97	28	2	60.3%	353,153	1,540
Parkersburg/Marietta	WV	Cleveland	Cleveland	I-77 N	180	3.02	0.016	3.53	0.82	48	2	80.7%	471,744	2,640
Rutland	VT	Boston	Boston	I-89 S and I-93 S	184	3.18	0.040	3.72	1.05	42	2	74.5%	421,949	2,310
DuBois	PA	Cleveland	Cleveland	I-80 W	175	2.82	0.016	3.33	0.63	46	2	73.0%	439,530	2,530
Decatur	IL	Lambert-St. Louis Int'l, MO (L)	Lambert-St. Louis Int'l, MO (L)	I-55 S	148	2.53	0.019	3.05	0.72	36	2	52.3%	290,909	1,980
		Chicago O'Hare	Chicago O'Hare	I-55 N	191	3.33	0.058	3.89	1.14	36	2	66.7%	375,430	1,980
Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	Lambert-St. Louis Int'l, MO (L)	I-57 N and I-64 W	133	2.43	0.019	2.95	0.66	68	3	63.7%	493,802	3,740
Muscle Shoals	AL	Memphis Int'l, TN (M)	Memphis Int'l, TN (M)	US-72 W	147	2.90	0.021	3.42	1.38	28	2	45.6%	224,734	1,540
Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	Lambert-St. Louis Int'l, MO (L)	I-55 N	131	2.25	0.019	2.77	0.34	48	2	63.3%	343,325	2,640
Victoria	TX	Houston Bush	Houston Bush	US-59 N	148	2.68	0.060	3.24	0.66	26	1	80.3%	210,101	1,430
Pueblo	CO	Denver Int'l, CO (L)	Denver Int'l, CO (L)	I-25 N	132	2.23	0.044	2.78	0.39	48	2	63.5%	345,946	2,640
Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	Lambert-St. Louis Int'l, MO (L)	I-44 E	139	2.42	0.019	2.94	0.57	50	2	69.9%	379,470	2,750
Mason City	IA	Minneapolis/St. Paul Int'l, MN (L)	Minneapolis/St. Paul Int'l, MN (L)	I-35 N	129	2.13	0.036	2.67	0.41	28	1	71.2%	197,215	1,540
Staunton	VA	Washington Dulles Int'l, VA (L)	Washington Dulles Int'l, VA (L)	I-81 N and I-66 E	133	2.35	0.078	2.93	0.54	36	2	50.2%	261,425	1,980
Laramie	WY	Denver Int'l, CO (L)	Denver Int'l, CO (L)	I-80 E and I-25 S	156	2.45	0.044	2.99	0.71	36	2	51.3%	306,634	1,980
Kirksville	MO	Lambert-St. Louis Int'l, MO (L)	Lambert-St. Louis Int'l, MO (L)	US-63 S and I-70 E	200	3.50	0.019	4.02	1.52	42	2	80.4%	458,640	2,310
Greenville	MS	Memphis Int'l, TN (M)	Memphis Int'l, TN (M)	US-61 N	150	2.85	0.021	3.37	1.21	28	2	44.9%	229,320	1,540

TABLE 4: ALTERNATE BUS SERVICE TO/FROM A DIFFERENT AIRPORT THAN THOSE CURRENTLY SERVICED BY EAS-SUBSIDIZED FLIGHTS

EAS Community	State	Current EAS Flights to/from	Alternate Bus Service: Bus service to/from	One-way Trip [1]: Route	Distance (mi)	Drive Time (hr)	Avg Congestion Delay (hr) [2]	Total Trip Time (hr) [3]	Incr Trip Time (hr) [4]	Minimum Service - Current Flight Frequency: Weekly one-way Trips to/from [5]	Min Buses Required [6]	Utilization Factor [7]	Annual Miles [8]	Weekly Seats [9]
Eau Claire	WI	Chicago O'Hare	Minneapolis/St. Paul Int'l, MN (L)	I-94 W	92	1.77	0.036	2.30	-0.49	28	1	61.4%	140,191	1,540
Prescott	AZ	Los Angeles	Sky Harbor Mun., Phoenix, AZ (L)	I-17 S	106	2.05	0.040	2.59	-0.68	42	2	51.8%	274,194	2,310
		Denver	Sky Harbor Mun., Phoenix, AZ (L)	I-17 S	106	2.05	0.040	2.59	-1.69					
Merced	CA	McCarran Int'l, Las Vegas, NV	San Jose Int'l, CA (M)	CA-99 N	124	2.23	0.046	2.78	-1.47	56	2	74.1%	274,194	3,080
		Los Angeles, CA	San Jose Int'l, CA (M)	CA-99 N	124	2.23	0.046	2.78	-0.42					
Laurel/Hattiesburg	MS	Memphis Int'l, TN (M)	New Orleans Int'l, LA (M)	I-59 S and I-10 W	132	2.12	0.024	2.64	-0.17	28	1	70.4%	201,802	1,540
Grand Island	NE	Dallas/Fort Worth	Eppley Airfield, Omaha, NE (M)	I-80 E	155	2.78	0.008	3.29	0.06	26	1	81.5%	220,038	1,430
Paducah	KY	Chicago O'Hare	Nashville Metropolitan, TN (M)	I-24 E	149	2.50	0.024	3.02	-0.14	28	1	80.6%	227,791	1,540

TABLE 3 & 4 NOTES

[1] Route, distance, and drive time from Google Maps, for trip from local airport to airport serviced. Assumes free-flow traffic without rush-hour congestion in urban areas.

[2] Assumed average delay based on congeston in urban area around hub airport during rush hours. See Table 12.

[3] Total Trip Time = Drive Time + Average Congestion Delay + 0.25 hour wait pre-trip + 0.25 hour for debarking at destination

[4] Incremental Trip time = Total bus trip time - Total travel time for current EAS subsidized flights [Table 2]

[5] This is the same number of weekly one-way trips as current EAS-subsidized flights (see Table 2)

[6] Assumes 15 hours per day and 85% availability per bus

[7] Utilization Factor = (Weekly trips x total trip Time) ÷ (Available Hours per Day x 7 days/wk x Minimum Number of Buses Required)

[8] Annual Miles = Trip distance x weekly one-way trips x 52 weeks/year x (1 + % deadhead miles). Assumed % deadhead miles = 5%

[9] Weekly seats = Weeklyone-way trips x 55 seats per bus

TABLE 5 COST OF ALTERNATE BUS SERVICE TO/FROM CURRENT AIRPORTS SERVICED BY EAS-SUBSIDIZED FLIGHTS

				Annual Operating Costs										Average Costs			
EAS Community	State	Bus Trip to/from	Census Region	Annual Bus Miles [1]	Annual Bus Hours [2]	Annual Operator Hours [3]	Annual Fuel (gal) [4]	Bus Lease [5]	Bus Maintenance [6]	Operator Labor [7]	Fuel [8]	OH&P [9]	TOTAL ANNUAL OPERATING COST	Avg cost per passenger [10]	Load Factor [11]	Average Cost per Seat [12]	Cost (value) of Incremental Travel Time per Passenger [13]
Hagerstown	MD	Baltimore Washington Int'l	SA	261,731	6,504	7,075	48,469	$151,919	$102,075	$143,477	$183,696	$230,723	$811,890	$38.06	13%	$5.07	$0.35
Lancaster	PA	Baltimore Washington Int'l	MA	282,522	6,912	7,518	52,319	$151,919	$110,184	$152,470	$206,137	$246,422	$867,131	$67.64	8%	$5.41	$7.49
Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	SA	109,812	3,072	3,341	20,335	$75,960	$42,826	$67,757	$77,071	$104,655	$368,269	$38.25	14%	$5.37	$3.12
Lebanon/WRJ, VT	NH	Boston	NE	376,085	7,715	8,392	69,645	$151,919	$146,673	$170,196	$277,885	$296,429	$1,043,102	$66.63	10%	$6.51	$0.14
Jamestown	NY	Cleveland	MA	306,634	6,092	6,627	56,784	$151,919	$119,587	$134,387	$223,729	$249,960	$879,582	$119.54	7%	$8.54	-$1.01
Bradford	PA	Cleveland	MA	389,189	8,123	8,836	72,072	$151,919	$151,784	$179,192	$283,964	$304,443	$1,071,301	$180.84	6%	$10.41	$54.69
Jonesboro	AR	Memphis Int'l, TN (M)	WSC	105,618	2,539	2,762	19,559	$75,960	$41,191	$56,006	$73,737	$98,017	$344,910	$330.37	2%	$5.02	-$2.03
Morgantown	WV	Washington Dulles	SA	367,567	8,245	8,968	68,068	$151,919	$143,351	$181,880	$257,978	$291,846	$1,026,974	$45.65	22%	$9.97	$46.41
Johnstown	PA	Washington Dulles	MA	332,186	7,655	8,327	61,516	$151,919	$129,553	$168,872	$242,373	$275,009	$967,726	$57.21	16%	$9.40	$44.05
Jackson	TN	Nashville Int'l	ESC	296,696	5,928	6,449	54,944	$151,919	$115,712	$130,777	$207,138	$240,402	$845,947	$166.20	5%	$7.78	$15.04
Oil City/Franklin	PA	Cleveland	MA	208,026	4,203	4,572	38,523	$75,960	$81,130	$92,718	$151,782	$159,431	$561,021	$203.27	3%	$6.54	-$27.52
Kingman	AZ	Phoenix-Sky Harbor	MTN	288,179	6,185	6,727	53,366	$151,919	$112,390	$136,431	$203,860	$240,026	$844,626	$470.81	2%	$11.36	$73.13
Owensboro	KY	Nashville Int'l	ESC	290,472	5,928	6,449	53,791	$151,919	$113,284	$130,777	$202,792	$237,713	$836,485	NA [14]		$7.70	$17.43
Altoona	PA	Washington Dulles	MA	300,846	7,147	7,774	55,712	$151,919	$117,330	$157,658	$219,506	$256,626	$903,039	$105.10	8%	$8.31	$6.40
Quincy	IL	Lambert-St. Louis Int'l, MO (L)	ENC	511,056	11,345	12,340	94,640	$227,879	$199,312	$250,262	$358,686	$411,347	$1,447,485	$92.99	8%	$7.03	$23.79
Clarksburg	WV	Washington Dulles	SA	385,258	9,031	9,824	71,344	$151,919	$150,250	$199,224	$270,394	$306,400	$1,078,187	$50.41	21%	$10.47	$53.70
El Centro	CA	Los Angeles	PAC	353,153	6,913	7,519	65,399	$151,919	$137,730	$152,488	$252,439	$275,747	$970,322	$102.10	12%	$12.12	$78.43
Parkersburg/Marietta	WV	Cleveland	SA	471,744	9,258	10,071	87,360	$151,919	$183,980	$204,235	$331,094	$345,878	$1,217,106	$111.11	8%	$8.87	$27.11
Rutland	VT	Boston	NE	421,949	8,538	9,288	78,139	$151,919	$164,560	$188,351	$311,773	$324,191	$1,140,794	$103.15	9%	$9.50	$44.37
DuBois	PA	Cleveland	MA	439,530	8,370	9,105	81,394	$151,919	$171,417	$184,644	$320,694	$328,984	$1,157,658	$101.05	9%	$8.80	$24.22
Decatur	IL	Lambert-St. Louis Int'l, MO (L)	ENC	290,909	6,000	6,527	53,872	$151,919	$113,454	$132,358	$204,175	$238,957	$840,863	$378.95	2%	$8.17	$25.06
		Chicago O'Hare	ENC	375,430	7,648	8,319	69,524	$151,919	$146,418	$168,706	$263,496	$290,024	$1,020,563			$9.91	$39.76
Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	ENC	493,802	10,962	11,924	91,445	$227,879	$192,583	$241,819	$346,576	$400,516	$1,409,372	$87.57	8%	$7.25	$23.12
Muscle Shoals	AL	Memphis Int'l, TN (M)	ESC	224,734	5,230	5,689	41,617	$151,919	$87,646	$115,364	$156,897	$203,195	$715,022	$41.19	22%	$8.93	$39.73
Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	WNC	343,325	7,258	7,894	63,579	$151,919	$133,897	$160,096	$240,963	$272,689	$959,565	$98.68	7%	$6.99	$12.03
Victoria	TX	Houston Bush	WSC	210,101	4,604	5,008	38,908	$75,960	$81,939	$101,567	$146,681	$161,240	$567,387	$56.31	14%	$7.63	$21.28
Pueblo	CO	Denver Int'l, CO (L)	MTN	345,946	7,279	7,917	64,064	$151,919	$134,919	$160,567	$244,724	$274,775	$966,904	$41.53	17%	$7.04	$13.91
Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	WNC	379,470	8,015	8,718	70,272	$151,919	$147,993	$176,804	$266,332	$294,990	$1,038,038	$124.79	6%	$7.26	$20.19
Mason City	IA	Minneapolis/St. Paul Int'l, MN (L)	WNC	197,215	4,080	4,438	36,521	$75,960	$76,914	$90,011	$138,416	$151,376	$532,677	$19.23	35%	$6.65	$14.49
Staunton	VA	Washington Dulles Int'l, VA (L)	SA	261,425	5,755	6,260	48,412	$151,919	$101,956	$126,958	$183,481	$224,033	$788,347	$37.87	20%	$7.66	$17.99
Laramie	WY	Denver Int'l, CO (L)	MTN	306,634	5,885	6,401	56,784	$151,919	$119,587	$129,820	$216,915	$245,442	$863,682	$47.99	17%	$8.39	$25.35
Kirksville	MO	Lambert-St. Louis Int'l, MO (L)	WNC	458,640	9,217	10,026	84,933	$151,919	$178,870	$203,317	$321,897	$339,833	$1,195,837	$281.11	4%	$9.96	$53.45
Greenville	MS	Memphis Int'l, TN (M)	ESC	229,320	5,153	5,605	42,467	$151,919	$89,435	$113,678	$160,099	$204,507	$719,638	$54.44	17%	$8.99	$34.62
												TOTAL	$30,001,450				

TABLE 6 COST OF ALTERNATE BUS SERVICE TO/FROM A DIFFERENT AIRPORT THAN THOSE CURRENTLY SERVICED BY EAS-SUBSIDIZED FLIGHTS

				Annual Operating Costs										Average Costs			
EAS Community	**State**	**Bus Trip to/from**	**Census Region**	**Annual Bus Miles [1]**	**Annual Bus Hours [2]**	**Annual Operator Hours [3]**	**Annual Fuel (gal)[4]**	**Bus Lease [5]**	**Bus Maintenance [6]**	**Operator Labor [7]**	**Fuel [8]**	**OH&P [9]**	**TOTAL ANNUAL OPERATING COST**	**Avg cost per passenger [10]**	**Load Factor [11]**	**Average Cost per Seat [12]**	**Cost (value) of Incremental Travel Time per Passenger [13]**
Eau Claire	WI	Minneapolis/St. Paul Int'l, MN (L)	ENC	140,191	3,520	3,829	25,961	$75,960	$54,674	$77,646	$98,393	$121,749	$428,422	$11.66	46%	$5.35	($17.13)
Prescott	AZ	Sky Harbor Mun., Phoenix, AZ (L)	MTN	274,194	5,939	6,461	50,777	$151,919	$106,936	$131,019	$193,967	$231,785	$815,625	$52.04	13%	$6.79	($24.52) vs trip to LA ($60.68) vs trip to Denver
Merced	CA	San Jose Int'l, CA (M)	PAC	274,194	8,498	9,244	50,777	$151,919	$106,936	$187,463	$195,998	$254,999	$897,314	$218.75	3%	$5.60	($58.47) vs trip to LV ($16.73) vs trip to LA
Laurel/Hattiesburg	MS	New Orleans Int'l, LA (M)	ESC	201,802	4,037	4,391	37,371	$75,960	$78,703	$89,055	$140,887	$152,688	$537,292	$19.52	34%	$6.71	($4.83)
Grand Island	NE	Eppley Airfield, Omaha, NE (M)	WNC	220,038	4,672	5,082	40,748	$75,960	$85,815	$103,070	$154,434	$166,453	$585,732	NA [14]		$7.88	$2.22
Paducah	KY	Nashville Metropolitan, TN (M)	ESC	227,791	4,623	5,029	42,184	$75,960	$88,839	$101,983	$159,032	$169,048	$594,860	$14.94	50%	$7.43	($3.89)
												TOTAL	**$3,859,246**				

NOTES FOR TABLE 5 & 6

[1] Annual bus miles = # weekly trips x one-way trip distance [mi] x 52 weeks/yr (See Tables 3 and 4)

[2] Annual bus hours = # weekly trips x total trip time [hr] x 52 weeks/yr x (1 + % deadhead hours) [see Tables 3 and 4 for weekly trips and total trip time]. % deadhead hours assumed to be: 5%

[3] Annual operator hours = Annual bus hours + 0.5 hr/day x 365 day/yr x (Bus hours ÷ 2080)

[4] Annual fuel [gal] = Annual bus miles ÷ MPG (see Table 8 for average MPG by region)

[5] Bus lease Cost = # buses (Tables 3 and 4) x Annual equivalent lease cost per bus (Table 8)

[6] Bus Maintenance cost = Annual Bus miles x Bus Maintence Cost Factor [$/mi] (Table 8)

[7] Operator labor cost = Annual Operator hours x (Direct Labor cost [$/hr] + Indirect Labor Cost [$/hr]) (See Table 8)

[8] Fuel Cost = Annual Fuel [gal] x Fuel Cost [$/gal] (see Table 8)

[9] OH&P [$] = (Overhead [%] + Profit [%]) x (Bus Lease Cost + Bus Maintenance Cost + Operator Labor Cost + Fuel Cost). See Table 8 for OH&P factors

[10] Average Cost per passenger = Total annual operating cost ÷ Annual passengers [Table 1]

[11] Load Factor = Annual Passengers [Table 1] ÷ (Weekly seats [Table 3 & 4] x 52 weeks/year)

[12] Average Cost per seat = Total annual operating cost ÷ (Weekly seats [Table 3 & 4] x 52 weeks/year)

[13] Cost of Incremental Travel time = Incremental Trip Time(hr) [Table 3 & 4] x Time Valuation For All Purposes ($/hr) [Table 9]

[14] Carrier offers subsidized and unsubsidized service from this airport. Cannot determine the number of passengers on subsidized routes.

TABLE 7: ANNUAL EMISSIONS FROM EAS-SUBSIDIZED AIR FLIGHTS AND ALTERNATIVE BUS SERVICE

			Current EAS Subsidized Air Trips								Alternative Coach Bus Trips								
					Annual Emissions from Air Flights [2]									Annual Emissions from Bus Operations [4]					
	EAS Community	State	To/from	Annual Fuel [1] (gal)	CO_2 (ton)	NOx (ton)	PM (ton)	HC (ton)	CO (ton)	SO_2 (ton)	To/from	Annual Miles [3] (mi)	Annual Fuel [3] (gal)	CO_2 (ton)	NOx (ton)	PM (ton)	HC (ton)	CO (ton)	SO_2 (ton)
AIR & BUS TRIPS TO SAME LOCATION	Hagerstown	MD	Baltimore Washington Int'l	75,421	838	0.27	NOT AVAILABLE	11.3	19.7	0.3	Baltimore Washington Int'l	261,731	48,469	538.8	0.33	0.006	0.043	0.026	0.005
	Lancaster	PA	Baltimore Washington Int'l	68,238	758	0.24		10.2	17.8	0.2	Baltimore Washington Int'l	282,522	52,319	581.6	0.35	0.006	0.047	0.028	0.006
	Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	39,312	437	0.14		5.9	10.3	0.1	Hartsfield Int'l, Atlanta, GA (L)	109,812	20,335	226.0	0.14	0.002	0.018	0.011	0.002
	Lebanon/WRJ, VT	NH	Boston	98,765	1,098	0.35		14.8	25.8	0.3	Boston	376,085	69,645	774.1	0.47	0.008	0.062	0.037	0.008
	Jamestown	NY	Cleveland	205,920	2,289	0.73		30.9	53.7	0.7	Cleveland	306,634	56,784	631.2	0.38	0.007	0.051	0.030	0.006
	Bradford	PA	Cleveland	223,080	2,480	0.79		33.4	58.2	0.8	Cleveland	389,189	72,072	801.1	0.48	0.009	0.064	0.039	0.008
	Jonesboro	AR	Memphis Int'l, TN (M)	46,176	513	0.16		6.9	12.0	0.2	Memphis Int'l, TN (M)	105,618	19,559	217.4	0.13	0.002	0.017	0.010	0.002
	Morgantown	WV	Washington Dulles	237,463	2,640	0.84		35.6	61.9	0.8	Washington Dulles	367,567	68,068	756.6	0.46	0.008	0.061	0.036	0.008
	Johnstown	PA	Washington Dulles	241,488	2,684	0.85		36.2	63.0	0.9	Washington Dulles	332,186	61,516	683.8	0.41	0.007	0.055	0.033	0.007
	Jackson	TN	Nashville Int'l	78,381	871	0.28		11.7	20.4	0.3	Nashville Int'l	296,696	54,944	610.7	0.37	0.007	0.049	0.029	0.006
	Oil City/Franklin	PA	Cleveland	143,000	1,590	0.51		21.4	37.3	0.5	Cleveland	208,026	38,523	428.2	0.26	0.005	0.034	0.021	0.004
	Kingman	AZ	Phoenix-Sky Harbor	123,933	1,378	0.44		18.6	32.3	0.4	Phoenix-Sky Harbor	288,179	53,366	593.2	0.36	0.006	0.048	0.029	0.006
	Owensboro	KY	Nashville Int'l	70,543	784	0.25		10.6	18.4	0.2	Nashville Int'l	290,472	53,791	597.9	0.36	0.006	0.048	0.029	0.006
	Altoona	PA	Washington Dulles	242,159	2,692	0.86		36.3	63.1	0.9	Washington Dulles	300,846	55,712	619.3	0.37	0.007	0.050	0.030	0.006
	Quincy	IL	Lambert-St. Louis Int'l, MO (L)	115,440	1,283	0.41		17.3	30.1	0.4	Lambert-St. Louis Int'l, MO (L)	511,056	94,640	1,052.0	0.64	0.011	0.085	0.051	0.010
	Clarksburg	WV	Washington Dulles	269,662	2,997	0.95		40.4	70.3	1.0	Washington Dulles	385,258	71,344	793.0	0.48	0.008	0.064	0.038	0.008
	El Centro	CA	Los Angeles	180,093	2,002	0.64		27.0	47.0	0.6	Los Angeles	353,153	65,399	726.9	0.44	0.008	0.058	0.035	0.007
	Parkersburg/Marietta	WV	Cleveland	251,680	2,798	0.89		37.7	65.6	0.9	Cleveland	471,744	87,360	971.1	0.59	0.010	0.078	0.047	0.010
	Rutland	VT	Boston	79,461	883	0.28		11.9	20.7	0.3	Boston	421,949	78,139	868.6	0.53	0.009	0.070	0.042	0.009
	DuBois	PA	Cleveland	285,047	3,168	1.01		42.7	74.3	1.0	Cleveland	439,530	81,394	904.7	0.55	0.010	0.073	0.044	0.009
	Decatur	IL	Lambert-St. Louis Int'l, MO (L)	74,256	825	0.26		11.1	19.4	0.3	Lambert-St. Louis Int'l, MO (L)	290,909	53,872	598.8	0.36	0.006	0.048	0.029	0.006
	Decatur	IL	Chicago O'Hare	111,384	1,238	0.39		16.7	29.0	0.4	Chicago O'Hare	375,430	69,524	772.8	0.47	0.008	0.062	0.037	0.008
	Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	109,027	1,212	0.39		16.3	28.4	0.4	Lambert-St. Louis Int'l, MO (L)	493,802	91,445	1,016.5	0.62	0.011	0.082	0.049	0.010
	Muscle Shoals	AL	Memphis Int'l, TN (M)	156,520	1,740	0.55		23.5	40.8	0.6	Memphis Int'l, TN (M)	224,734	41,617	462.6	0.28	0.005	0.037	0.022	0.005
	Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	251,680	2,798	0.89		37.7	65.6	0.9	Lambert-St. Louis Int'l, MO (L)	343,325	63,579	706.7	0.43	0.008	0.057	0.034	0.007
	Victoria	TX	Houston Bush	159,874	1,777	0.57		24.0	41.7	0.6	Houston Bush	210,101	38,908	432.5	0.26	0.005	0.035	0.021	0.004
	Pueblo	CO	Denver Int'l, CO (L)	178,464	1,984	0.63		26.7	46.5	0.6	Denver Int'l, CO (L)	345,946	64,064	712.1	0.43	0.008	0.057	0.034	0.007
	Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	83,373	927	0.30		12.5	21.7	0.3	Lambert-St. Louis Int'l, MO (L)	379,470	70,272	781.1	0.47	0.008	0.063	0.038	0.008
	Mason City	IA	Minneapolis/St. Paul Int'l, MN (L)	153,390	1,705	0.54		23.0	40.0	0.5	Minneapolis/St. Paul Int'l, MN (L)	197,215	36,521	406.0	0.25	0.004	0.033	0.020	0.004
	Staunton	VA	Washington Dulles Int'l, VA (L)	168,168	1,869	0.60		25.2	43.8	0.6	Washington Dulles Int'l, VA (L)	261,425	48,412	538.1	0.33	0.006	0.043	0.026	0.005
	Laramie	WY	Denver Int'l, CO (L)	147,576	1,640	0.52		22.1	38.5	0.5	Denver Int'l, CO (L)	306,634	56,784	631.2	0.38	0.007	0.051	0.030	0.006
	Kirksville	MO	Lambert-St. Louis Int'l, MO (L)	87,542	973	0.31		13.1	22.8	0.3	Lambert-St. Louis Int'l, MO (L)	458,640	84,933	944.1	0.57	0.010	0.076	0.046	0.009
	Greenville	MS	Memphis Int'l, TN (M)	159,650	1,775	0.57		23.9	41.6	0.6	Memphis Int'l, TN (M)	229,320	42,467	472.0	0.29	0.005	0.038	0.023	0.005
AIR & BUS TRIPS TO DIFFERENT LOCATIONS	Eau Claire	WI	Chicago O'Hare	589,680	6,555	2.09	NA	88.4	153.8	2.1	Minneapolis/St. Paul Int'l, MN (L)	140,191	25,961	288.6	0.17	0.003	0.023	0.014	0.003
	Prescott	AZ	Los Angeles	253,587	2,819	0.90		38.0	66.1	0.9	Sky Harbor Mun., Phoenix, AZ (L)	274,194	50,777	564.4	0.34	0.006	0.045	0.027	0.006
	Prescott	AZ	Denver	222,889	2,478	0.79		33.4	58.1	0.8	Sky Harbor Mun., Phoenix, AZ (L)								
	Merced	CA	McCarran Int'l, Las Vegas, NV	240,240	2,670	0.85		36.0	62.6	0.9	San Jose Int'l, CA (M)	274,194	50,777	564.4	0.34	0.006	0.045	0.027	0.006
	Merced	CA	Los Angeles, CA	272,272	3,026	0.96		40.8	71.0	1.0	San Jose Int'l, CA (M)								
	Laurel/Hattiesburg	MS	Memphis Int'l, TN (M)	241,041	2,679	0.85		36.1	62.8	0.9	New Orleans Int'l, LA (M)	201,802	37,371	415.4	0.25	0.004	0.033	0.020	0.004
	Grand Island	NE	Dallas/Fort Worth	502,493	5,585	1.78		75.3	131.0	1.8	Eppley Airfield, Omaha, NE (M)	220,038	40,748	452.9	0.27	0.005	0.036	0.022	0.004
	Paducah	KY	Chicago O'Hare	691,891	7,691	2.45		103.7	180.4	2.4	Nashville Metropolitan, TN (M)	227,791	42,184	468.9	0.28	0.005	0.038	0.023	0.005
			TOTAL	7,930,259	88,149	28.07		1,188.2	2,067.7	28.1	**TOTAL**	11,953,411	2,213,595	24,605	14.89	0.264	1.976	1.186	0.244

NOTES TO TABLE 7

[1] See Table 2

[2] CO_2 emissions [ton] = Annual fuel use [gal] x 10,084 g CO_2/gallon ÷ 907,200 g/ton. [CO_2 g/gallon from: EPA420-F-05-001 February 2005]

NOx, HC, CO, SO_2 emissions [ton] = Annual Fuel Use [gal] x Emission Factor [g/gal] ÷ 907,200 g/ton.

Emission factors [g/gal] are based on LTO emission factors and fuel use for SAAB 340, taken from: *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual* , Table 1-50, pg 1.96

An LTO is a landing and take-off cycle, and encompasses aircraft operations on the ground and up to 3,000 ft altitude. LTO emission factors represent emissions over a standardized LTO test cycle.

	Unit	**NOx**	**HC**	**CO**	**SO_2**	*Source*
LTO Emission Factor	kg/LTO	0.3	12.7	22.1	0.3	*IPPC, SAAB 340*
LTO Fuel Use	kg/LTO	300	300	300	300	*IPPC, SAAB 340*
= Kg Emissions per Kg Fuel		0.001	0.042	0.074	0.001	
x Fuel density (kg/gal) x 1000 g/kg		3,211	3,211	3,211	3,211	www.afdc.energy.gov/afdc/pdfs/fueltable.pdf
= Emission Factor	g/gal	3.2	135.9	236.5	3.2	

[3] See Tables 5 and 6 for calculation of total annual miles and fuel by route.

[4] CO_2 emissions [ton] = Annual fuel use [gal] x 10,084 g CO_2/gallon ÷ 907,200 g/ton. [CO_2 g/gallon from: EPA420-F-05-001 February 2005]

NOx, PM, HC, CO emissions [ton] = Annual miles x Emission Factor [g/mi] ÷ 907,200 g/ton.

Emission factors are from EPA MOVES model; vehicle type - Intercity Bus; model year 2011; roadway type - composite road		NOx	PM	HC	CO
	Emissions (g/mi)	1.13	0.02	0.15	0.09

SO_2 emissions [ton] = Annual fuel use [gal] x 0.10 g SO_2/gallon ÷ 907,200 g/ton. This assumes 15 ppm sulfur fuel (EPA max allowable) and that all fuel-borne sulfur is converted to SO_2 during combustion

Table 8 BUS SERVICE COST FACTORS

COST FACTOR	unit	REGION New England [NE]	Middle Atlantic [MA]	East North Central [ENC]	South Atlantic [SA]	East South Central [ESC]	West North Central [WNC]	West South Central [WSC]	Mountain [MTN]	Pacific [PAC]	*Source*
Bus purchase cost	$	$ 500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	*ABA bus operator cost survey*
Bus equivalent lease Cost	$/yr	$75,960	$75,960	$75,960	$75,960	$75,960	$75,960	$75,960	$75,960	$75,960	*Assumes 8 year lease & cost of capital below*
Bus Maintenance Cost	$/mi	$0.39	$0.39	$0.39	$0.39	$0.39	$0.39	$0.39	$0.39	$0.39	*ABA bus operator cost survey*
Direct Driver Labor Cost	$/hr	$15.78	$15.78	$15.78	$15.78	$15.78	$15.78	$15.78	$15.78	$15.78	*ABA bus operator cost survey*
Indirect Driver Labor Cost	$/hr	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	*ABA bus operator cost survey*
Overhead Costs	% of direct operating costs	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	*ABA bus operator cost survey*
Profit Margin	%	9.7%	9.7%	9.7%	9.7%	9.7%	9.7%	9.7%	9.7%	9.7%	*ABA bus operator cost survey*
Coach Bus Fuel Economy	MPG	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	*ABA bus operator cost survey*
Diesel Fuel Cost	$/gal	$3.99 PADD 1A	$3.94 PADD 1B	$3.79 PADD 2	$3.79 PADD 1C	$3.77 PADD 3	$3.79 PADD 2	$3.77 PADD 3	$3.82 PADD 4	$3.86 PADD 5	*Energy Information Administration, Weekly Retail Gasoline and Diesel Prices, 8/22/11, Diesel (on highway) all types*
Cost of Capital	%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	*ABA bus operator cost survey*

TABLE 9: VALUATION OF TRAVEL TIME

REGION/DIVISION	Median household income [1]	Hourly income [2]	Valuation for personal travel (surface) [3]	Valuation for personal travel - air [4]	Hourly compensation [5]	Valuation for business travel (surface) [6]	Valuation for business travel (air) [7]	Valuation for all purposes (air) [8]
Northeast	$53,073	$26.54	$18.58	$29.24	$32.16	$32.16	$60.83	$39.37
New England [NE]	$58,709	$29.35	$20.55	$32.35	$33.56	$33.56	$63.48	$42.35
Middle Atlantic [MA]	$51,583	$25.79	$18.05	$28.42	$31.62	$31.62	$59.81	$38.49
Midwest	$48,877	$24.44	$17.11	$26.93	$27.47	$27.47	$51.96	$34.97
East North Central [ENC]	$48,137	$24.07	$16.85	$26.52	$27.73	$27.73	$52.45	$34.85
West North Central [WNC]	$50,408	$25.20	$17.64	$27.78	$26.90	$26.90	$50.88	$35.21
South	$45,615	$22.81	$15.97	$25.13	$24.93	$24.93	$47.16	$32.22
South Atlantic [SA]	$47,408	$23.70	$16.59	$26.12	$25.48	$25.48	$48.20	$33.22
East South Central [ESC]	$39,958	$19.98	$13.99	$22.02	$22.65	$22.65	$42.84	$28.71
West South Central [WSC]	$45,905	$22.95	$16.07	$25.29	$25.07	$25.07	$47.42	$32.41
West	$53,833	$26.92	$18.84	$29.66	$29.95	$29.95	$56.65	$38.34
Mountain [MTN]	$50,419	$25.21	$17.65	$27.78	$27.93	$27.93	$52.83	$35.83
Pacific [PAC]	$56,232	$28.12	$19.68	$30.98	$30.84	$30.84	$58.33	$39.78

[1] Census data, 2009 (Current Population Reports: Income)
[2] Median household income / 2000 hours
[3] 70% of hourly income (DOT recommendation for personal travel)
[4] Valuation of personal surface travel multiplied by 2003 ratio of personal surface travel valuation to personal air travel valuation

	Valuation for	Valuation for	Multiplication
Personal	$14.80	$23.30	1.574
Business	$21.20	$40.10	1.892

[5] Total employer cost for employee compensation, 2009 (Bureau of Labor Statistics)
[6] Same as hourly compensation.
[7] Valuation of business surface travel multiplied by 2003 ratio of business surface travel valuation to business air travel valuation
[8] Based on DOT's assumptions of 68.7% personal and 31.3% business for air travel

TABLE 10: AVERAGE FLIGHT DELAYS ON EAS-SUBSIDIZED FLIGHTS

EAS Community	State	Current EAS Subsidized Flights Flights to/from	Flight Miles	Average Delay for listed flight numbers on the route (min) [1]																														AVG ROUTE DELAY (hr)
Hagerstown	MD	Baltimore Washington Int'l	67	17	11	20	18	8																										0.25
Lancaster	PA	Baltimore Washington Int'l	67	9	13	12	8	17	21	22	24																							0.26
Athens	GA	Hartsfield Int'l, Atlanta, GA (L)	72	N/A																														0.33
Lebanon/WRJ, VT	NH	Boston	109	21	22	23	38																											0.43
Jamestown	NY	Cleveland	142	20	20	80	72	80	72																									0.96
Bradford	PA	Cleveland	168	0	0	55	55																											0.46
Jonesboro	AR	Memphis Int'l, TN (M)	79	N/A																														0.33
Morgantown	WV	Washington Dulles	141	9	9	4	4	18	18	29	29	36	36	136	136																			0.64
Johnstown	PA	Washington Dulles	120	3	3	0	0	43	43	66	66	62	62																					0.58
Jackson	TN	Nashville Int'l	131	N/A																														0.33
Oil City/Franklin	PA	Cleveland	103	5	5	43	43	182	182																									1.28
Kingman	AZ	Phoenix-Sky Harbor	168	20	20	20	22	22	22	14	14	14	19	19	19																			0.31
Owensboro	KY	Nashville Int'l	115	N/A																														0.33
Altoona	PA	Washington Dulles Int'l, VA (L)	104	64	64	75	75																											1.16
Quincy	IL	Lambert-St. Louis Int'l, MO (L)	108	9	4	9	4	10	9	11	16	11	16	7	17	17	28																	0.20
Clarksburg	WV	Washington Dulles	151	20	20	9	9	0	0	56	56	97	97	67	67																			0.69
El Centro	CA	Los Angeles	180	N/A																														0.33
Parkersburg/Marietta	WV	Cleveland	145	2	2	19	19	23	23	66	66	79	79																					0.63
Rutland	VT	Boston	127	26	26	27	27	41	41																									0.52
DuBois	PA	Cleveland	154	18	18	0	0	37	37	53	53																							0.45
Decatur	IL	Lambert-St. Louis Int'l, MO (L)	120	N/A																														0.33
		Chicago O'Hare	157	N/A																														0.33
Marion/Herrin	IL	Lambert-St. Louis Int'l, MO (L)	122	13	13	7	11	11	18	18	13	13	17	17	20	19	50																	0.29
Muscle Shoals	AL	Memphis Int'l, TN (M)	136	5	5	0	0	0																										0.03
Cape Girardeau	MO	Lambert-St. Louis Int'l, MO (L)	123	7	7	9	9	15	22	22	30	63																						0.34
Victoria	TX	Houston Bush	123	21	21	39	39																											0.50
Pueblo	CO	Denver Int'l, CO (L)	125	5	5	5	17	17	17	35	35	35	24	24	24	33	33	33	89	89	89	36	36	36										0.57
Fort Leonard Wood	MO	Lambert-St. Louis Int'l, MO (L)	130	11	11	17	17	19	19	26	25	18	26	26																				0.33
Mason City	IA	Minneapolis/St. Paul Int'l, MN (L)	132	3	3	18	18	10	10	19	19	5	1	5	1	31	24	24	24	0	0	55	55											0.27
Staunton	VA	Washington Dulles Int'l, VA (L)	133	17	21	17	21	13	13	4	4	15	15	24	24	74	74																	0.40
Laramie	WY	Denver Int'l, CO (L)	144	18	18	18	5	5	5	20	20	20	17	17	17	38	38	38	34	34	34	36	36	36										0.40
Kirksville	MO	Lambert-St. Louis Int'l, MO (L)	149	7	7	7	7	2	10	35	44																							0.25
Greenville	MS	Memphis Int'l, TN (M)	150	1	1	11	3	3	9	9	14	14	6	6	18	18																		0.14
Eau Claire	WI	Chicago O'Hare	268	15	4	4	0	0	3	3	3	3	9	20	9	20	8	8	0	0	0	0	0	0	31	31	38	38	92	92	52	95	95	0.37
Prescott	AZ	Los Angeles	345	16	16	16	15	15	15	35	35	35	59	59	59																			0.52
		Denver	557	N/A																														0.33
Merced	CA	McCarran Int'l, Las Vegas, NV	309	34	34	56	56	239	239	50	50																							1.58
		Los Angeles, CA	260	N/A																														0.33
Laurel/Hattiesburg	MS	Memphis Int'l, TN (M)	250	13	13	22	22	20	20	36	36	37	37	0	0																			0.36
Grand Island	NE	Dallas/Fort Worth	585	18	18	29	29																											0.39
Paducah	KY	Chicago O'Hare	345	5	5	3	3	0	0	37	37	0	0	37	29	29	33	33	43	43	45	45	103	103	57									0.52

[1] Data from Flights Stats, accessed 8/25/11, on-time ratings by route (http://www.flightstats.com/go/FlightRating/flightRatingByRoute.do)
If no data available, assume 0.33 hour average delay on route

TABLE 11: AVERAGE FUEL USE FOR AIRCRAFT USED ON EAS-SUBSIDIZED ROUTES

Equipment	Full name	Average Fuel Burn (gal/hr)	Source
C-402	Cessna 402	37.0	http://www.planequest.com/operationcosts/op_cost_info.asp?id=55
C-208B	Cessna 208B Grand Carava	42.0	http://www.zimex.ch/media/4411/aircraft_spec_caravan.pdf
B-1900	Beechcraft 1900	110.0	http://www.ameriflight.com/Aircraft/be1900.asp
PC-12	Pilatus PC12	74.0	http://www.jetfly.com/english/advantages/flyGreen.html
SAAB 340	SAAB 340	129.0	http://www.azfreighters.com/planes/saab340b.pdf
C-208	Cessna 208 Caravan	47.6	http://www.airbornesolutions.com/AircraftFleet/FixedWing/tabid/81/Default.aspx
CRJ-200	Bombadier CRJ-200	324.0	http://www.globalsecurity.org/military/world/canada/crj200-specs.htm
BRASILIA	Embraer EMB 120 Brasilia	117.8	http://www.thinkairplanes.com/embraer-for-sale/embraer-emb-120-er-for-sale/32/
Caravan	Cessna 208 Caravan	47.6	http://www.airbornesolutions.com/AircraftFleet/FixedWing/tabid/81/Default.aspx
EMB-145 [1]	Embraer ERJ 145	223.0	http://azureairways.com/erj145.php

[1] Based on published data: 0.637 gal/mi x 350 mi/hr (based on scheduled flight time and flight miles for Grand Island NE to Dallas TX

TABLE 12: AVERAGE DRIVE TIME DELAY FOR BUS TRIPS WITHIN URBAN AREAS

Urban Area	Travel Time Index (2009) [1]	Daily Congested Time (hr) [1]	Congestion Time Percentage [2]	Average Bus Trip Delay (hr) [3]
Baltimore, MD	1.17	4.00	27%	0.027
Boston, MA	1.20	5.00	33%	0.040
Chicago, IL	1.25	5.75	38%	0.058
Cleveland, OH	1.10	4.00	27%	0.016
Denver, CO	1.22	5.00	33%	0.044
Omaha, NE	1.08	2.50	17%	0.008
Atlanta, GA	1.22	5.00	33%	0.044
Houston, TX	1.25	6.00	40%	0.060
St Loius, MO	1.12	4.00	27%	0.019
Los Angeles, CA	1.38	8.00	53%	0.122
Memphis, TN	1.13	4.00	27%	0.021
Minneapolis, MN	1.21	4.25	28%	0.036
Nashville, TN	1.15	4.00	27%	0.024
New Orleans, LA	1.15	4.00	27%	0.024
Phoenix, AZ	1.20	5.00	33%	0.040
San Jose, CA	1.23	5.00	33%	0.046
Washington, DC	1.30	6.50	43%	0.078

[1] Texas Transportation Institute, 2010 Annual Urban Mobility Report, Congestion Data for Your City (http://mobility.tamu.edu/ums/congestion_data/)
Travel Time Index is the ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates
a 20-minute free-flow trip takes 26 minutes in the peak.
[2] Congestion Time Percentage = Daily Congested Time [hr] ÷ 15 hrs/day available for bus trips (6 AM - 9PM)
[3] Avg Bus Trip Delay [hr] = (Travel Time Index - 1) x Free Flow Trip Time [hr] x Congestion Time Percentage
Free Flow Trip Time [hr] 30 miles travel in urban area ÷ 50 MPH free flow traffic speed = 0.60 hour