

11-19-2013

## Sustainable Transportation for Tourism: Green Certification Programs

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### Recommended Citation

Manning, Robert; Chase, Lisa; Anderson, Laura; Kestenbaum, David; Mastrangelo, Christina; Pettengill, Peter; Reigner, Nathan; and Valliere, William, "Sustainable Transportation for Tourism: Green Certification Programs" (2013). *Transportation Research Center Research Reports*. 201.  
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A Report from the University of Vermont Transportation Research Center

# Sustainable Transportation for Tourism: Green Certification Programs.

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November 19, 2013

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## Acknowledgements

Funding for this work comes from the USDOT through the University Transportation Center at the University of Vermont.

## Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the UVM Transportation Research Center. This report does not constitute a standard, specification, or regulation.

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## 1. Introduction

The overall project goal of guiding planning and management of transportation to serve the needs of sustainable tourism focused on three tourism-related transportation contexts. The first context was selected types of roads important to tourism in the northern New England: park and related roads (e.g., the Loop Road in Acadia National Park, Maine), rural roads/Scenic Byways (e.g., Route 100 in Vermont), and rural sections of interstate highways (e.g., Interstate 89 in Vermont). The second context was selected tourism destinations important in Vermont and other tourism-dependent northern communities: tourism villages (e.g., downtown destinations like Stowe and Burlington). The third context was transit public transit in park settings (e.g., the Island Explorer in Bar Harbor, Maine). Case studies from these three contexts served as the focus for the creation of a level of service framework.

Two tourism-related transportation contexts were the focus for examination of components necessary in a green certification program to affect change in tourist travel. The first context applied to transportation systems within parks and scenic roads. The second context was transportation options in tourism villages and ski resorts. Within these two contexts, “green” alternatives for mass transit and tourism-related motorcoach travel were examined.

### Green Certification Programs for Tourism

In Year One, qualitative research methods were used to examine the extent of green mass transit systems in the two contexts above and the potential of the motorcoach industry to operate more sustainably in New England and across North America. On-site interviews were conducted to assess mass transit systems and motorcoach companies’ willingness to serve as case studies. For example, a motorcoach company was able to participate in a pilot green coach certification program by operating vehicles using biodiesel blends, hydrogen, hybrid technologies, and other alternative fuels as well as participating in carbon-offsetting programs or using particulate filters. Quantitative research techniques augmented qualitative methods during that year to design a pilot certification program protocol. Specifically, surveys were used to collect baseline economic data from participating motorcoach operators and information related to industry attitudes and values.

As a result of the work in Year One, and to examine company receptiveness to green certification, an 18-month pilot certification program was established at the University of Vermont, in collaboration with the American Bus Association (ABA) and the United Motorcoach Association (UMA). Under the name “Green Coach Certification” (GCC), the program was designed to identify standards that promote a high level of environmental sustainability in bus travel. Between January and May 2009, motorcoach operators were recruited to participate in a field test of the certification program. Participating operators received a pilot GCC label for any motorcoach complying with one or more of the pilot program standards. Standards for the pilot program were developed with the input of industry stakeholders, following the International Social and Environmental Accreditation and Labeling Alliance (ISEAL) process. This process resulted in seven pilot certification program standards: a) meeting or exceeding the industry average of 148 passenger miles per gallon, b) running an EPA 2007 compliant engine, c) running an EPA 2010 compliant engine, d) offsetting carbon emissions by 80 percent through an endorsed carbon-offset program, e) running on an alternative fuel such as a blend of biodiesel, f) having a strict, documented, and verifiable energy conservation and recycling program, and g) incorporating other emerging environmental technologies as prescribed by the GCC.

## 2. Research Methodology

### Green Coach Certification

#### Motorcoach Operators

Motorcoach operators who were members of the American Bus Association and/or United Motorcoach Association were surveyed in the spring and summer of 2009 and in the winter of 2011. Two separate, but similar versions of a questionnaire were administered to pilot program participants ( $n \sim 20$ ) and to the general motorcoach operator population (i.e., nonparticipants,  $n \sim 1,200$ ). Questionnaires were administered through a controlled online survey program in order to reach a large population of motorcoach operators from across North America in an efficient and cost effective manner. For each survey, respondents were recruited through an e-mail message that provided a link to the online questionnaire, and additional e-mail reminders were sent to non-respondents over a period of four weeks. The subject lines and content of these messages were varied to help increase response. Non-respondent follow up calls were conducted in both 2009 and 2011 for the general motorcoach operator survey.

Response rates were as follows. In 2009, 204 operators responded, for a response rate of 18%. In 2011, 128 operators responded, for a response rate of 13%. Among program participants, 21 responded in 2009 and 18 responded in 2011, yielding response rates of 100% and 90%, respectively.

#### Tour Operators

Tour operators were surveyed between May and June of 2009, also via online methods. A list of 228 tour operators from the American Bus Association was used as the sampling frame. As members of this trade organization, these operators are focused on motorcoach tours and may differ from operators using alternative forms of transportation (e.g. boat and trolley tours). The Internet survey was implemented following the guidelines of Dillman, Smyth, & Christian (2009). A first email was sent mid-week, mid-morning to potential respondents. During the following four weeks, follow-up emails were sent to those who had not yet responded, reminding them about the survey. Different subject lines were used to gain the attention of tour operators with different interests. Each time a deadline was provided to encourage response in a timely manner. 72 responses were received, yielding a response rate of 32%.



### 3. Results

#### Green Coach Certification

This section includes selected results from Green Coach Certification research conducted in 2009 and 2011. Complete results from the study can be seen in tabular form in Appendix A.

#### Motorcoach Survey

Over half of motorcoach operators surveyed agree that standardized criteria for labeling a company “green” should be introduced in the motorcoach industry. One-quarter feel neutral about the idea (Figure 1).

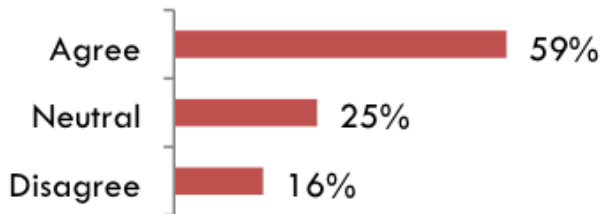


Figure 1: Standardized criteria for labeling a company “green” should be introduced in the motorcoach industry

#### Participant Comparisons

GCC participants and non-participants differed in their views of maintaining passenger miles per gallon, idling policies, EPA compliant engines, and carbon offset purchases. In general, GCC participants expressed greater support for these four environmental practices (Figures 7-10).

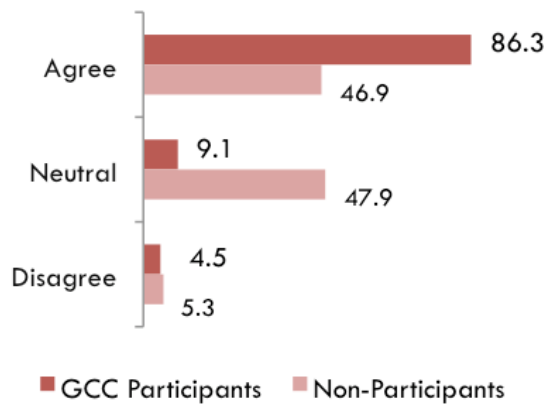


Figure 2: Maintaining an average of more than 148 passenger mpg is a good idea.

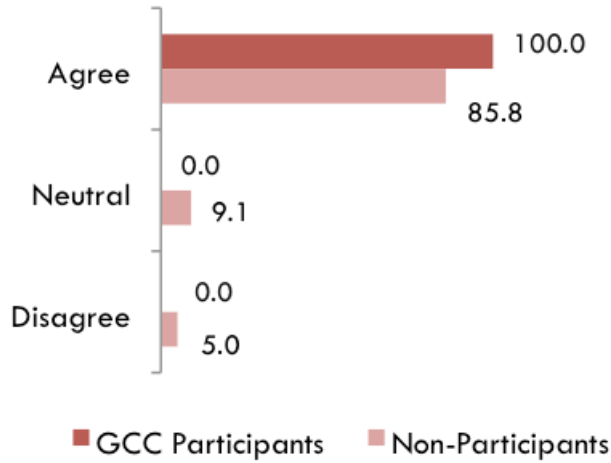


Figure 3: It is important for companies like mine to implement idling policies for protecting environmental quality.

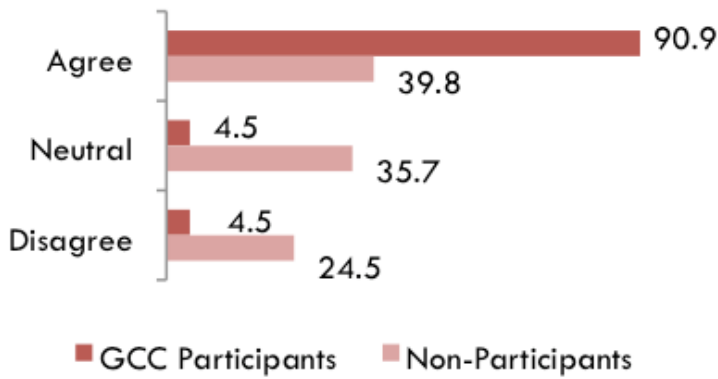


Figure 4: The 2007 EPA compliant engines are a good idea.

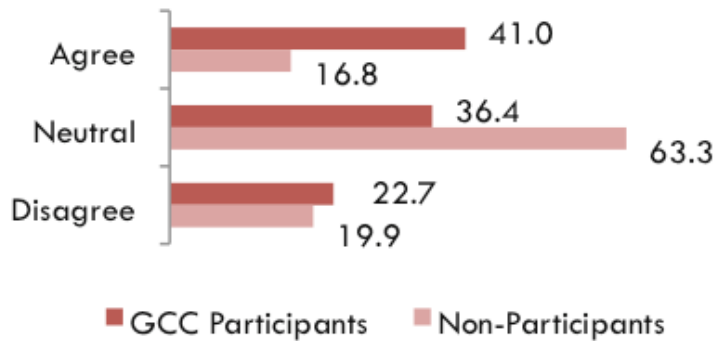


Figure 5: Purchasing carbon offsets is a good way to reduce the environmental impact of my company.

GCC participants and non-participants held similar views towards biodiesel. Over half of respondents in each group agreed that biodiesel would help their company reduce its environmental impact.

The vast majority of GCC participants held positive attitudes towards green certification, while about 70% of non-participants viewed green certification favorably (Figure 6). Nearly all GCC participants, and a slightly smaller majority of non-participants, agreed that their company has a responsibility toward the environment.

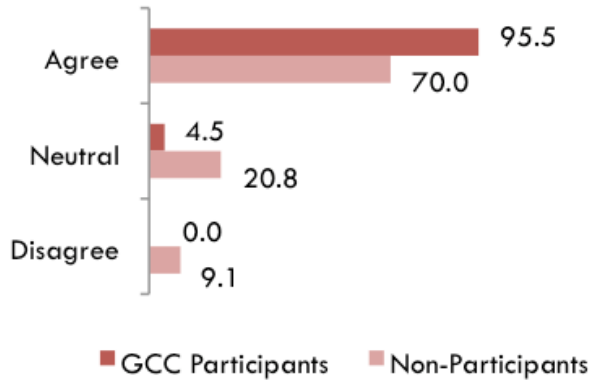


Figure 6: A green coach certification program will be positive for the tour bus industry.

### Tour Operator Survey

Tour operators consider price, safety, and service to be the most important factors to consider when choosing a transportation service provider (Figure 7). While not listed as a primary consideration, environmental practices had some level of importance to almost 75% of tour operators. A third of respondents currently incorporate a green message in their marketing materials. Of the two-thirds that do not, 54% are interested in beginning to do so. Just under half of respondents would not be willing to pay any additional amount for motorcoach services with an eco-label, while about 47% are willing to pay up to 5% more.

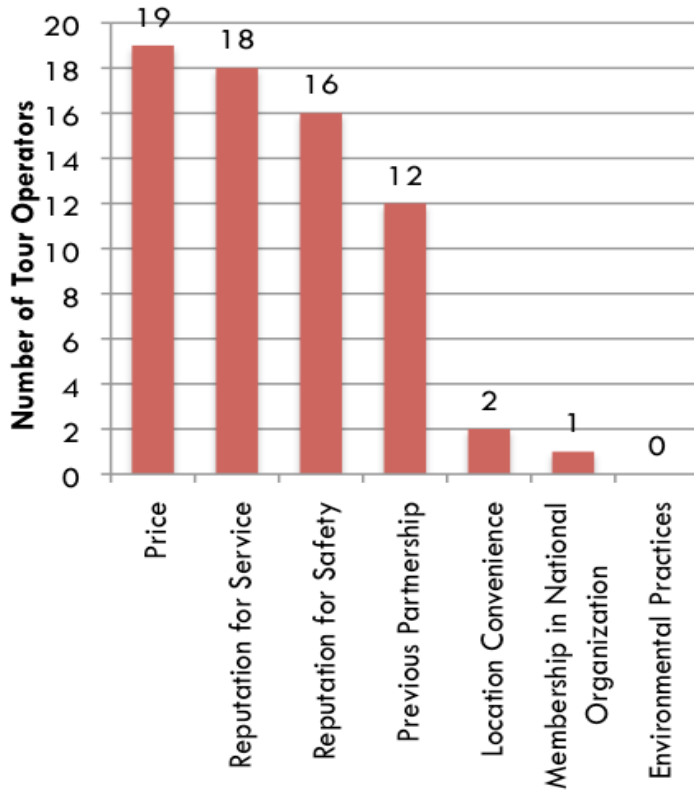


Figure 7: The most important factors considered when choosing a transportation company.

## 4. Implementation/Information Transfer

### Green Coach Certification

The Certification for Sustainable Transportation's (CST) was founded in 2012 to help improve economic, environmental, and energy efficiency within the passenger transportation sector. The CST is a direct outgrowth of work that began at the University of Vermont (UVM) in 2005 and now houses the eRating certification, driver trainings, and an array of awareness and education programs.

CST's mission is to build awareness of, and promote the use of, transportation options that:

- Reduce greenhouse gas and other harmful emissions,
- Increase energy efficiency, and
- Utilize alternative fuels and new technologies.

CST operates out of UVM Extension and helps to directly fulfill the mission of the University by providing research-based educational programs to help improve the quality of life for people living in Vermont and beyond. The CST programs can have positive impacts for communities, families, homes, farms, businesses, and the natural environment.

CST remains anchored in research and innovation through its connection to UVM. In both its formation and its current operation, the CST works closely with stakeholders from the private sector, government agencies, and non-profit organizations. This structure provides CST with academic and financial oversight and a balanced approach to the program, while staying useful to both consumers and suppliers of passenger transportation services.

## 5. Conclusions

### Green Coach Certification

Tourism is a leading industry, providing economic and recreational benefits to communities and tourists in Vermont, the United States and across the globe. However, travel to and from tourism destinations can have significant environmental consequences, including greenhouse gas emissions that contribute to climate change, depletion of petroleum resources, impacts to air quality, and generation of consumer waste. Increasing the use of alternative-fuel technologies and multi-modal transportation systems are national priorities for the United States. Presently, about 70% of the oil consumed in the U.S and more than one-quarter of CO<sub>2</sub> emissions can be attributed to transportation activities, with 73% percent of these emissions from passenger transportation. Technical improvements and behavioral changes (e.g., use of public transit, shorter trip lengths) are needed to address this problem. Eco-labeling or green certification provides one way to encourage behavioral changes, both within companies that provide transportation services and among consumers of those services. Increasing ridership of low impact forms of transportation, such as the motorcoach, has the potential to address many of the major concerns of sustainable transportation, including reducing greenhouse gas emissions associated with climate change, lowering road congestion, using fewer petroleum resources, and increasing road safety. However, doing so requires that travelers recognize the advantages of these more sustainable modes of travel.

To promote sustainable travel, a pilot eco-certification program for the motorcoach industry was conducted during an 18-month period between 2009 and 2011. The goals of the program were to increase awareness of the motorcoach as a relatively sustainable form of travel and to promote efficiency and environmental sustainability within the industry. To gauge the impact of the pilot program, surveys of motorcoach company leaders were conducted at the beginning and conclusion of the program. Survey results indicated that over half of motorcoach operators would be willing to change their operating procedures to meet agreed upon criteria and be recognized as “green”. During the first two months of the pilot program, we learned that a large percentage of the participants introduced new environmental programs and practices to their operations in order to garner a higher level of certification. Examples of this include a company in Connecticut that owns over 1000 school buses and 100 luxury motorcoaches instituting a plan and program to ensure that trash left behind by customers on its vehicles was sorted and recycled. Another company in NJ that owns over 500 luxury motorcoaches began recycling all waste at its central office and developed a 9 month plan to start training its wash crews to sort and recycle all waste left behind by customers on their vehicles.

Overall, twenty-three companies and approximately 1000 motorcoaches participated in the Green Coach Certification pilot program. Survey results indicate that the percentage of participant companies engaging in sustainable practices increased markedly during the time period of the program. Specifically, the percentage of participant companies engaging in green behavior increased for 9 of the 11 practices measured. Recycling on buses, green marketing, reduced idling, and tracking of passenger miles per gallon increased among more than a third of companies. In contrast, relatively small changes in company behaviors occurred among the nonparticipant group during the time period of the pilot program. These findings suggest that eco-certification programs for passenger transportation have the potential to motivate businesses to adopt environmentally sustainable practices.

As a result of the findings from the Green Coach Certification research, the Certification for Sustainable Transportation's (CST) was founded in 2012 to help improve economic, environmental, and energy efficiency within the passenger transportation sector. The CST, which is a program of University of

Vermont Extension, houses the eRating certification, driver trainings, and an array of awareness and education programs. CST's mission is to build awareness of, and promote the use of, transportation options that:

- Reduce greenhouse gas and other harmful emissions,
- Increase energy efficiency, and
- Utilize alternative fuels and new technologies.

CST remains anchored in research and innovation through its connection to UVM. In both its formation and its current operation, the CST works closely with stakeholders from the private sector, government agencies, and non-profit organizations. This structure provides CST with academic and financial oversight and a balanced approach to the program, while staying useful to both consumers and suppliers of passenger transportation services.

## References

Dillman, D., Smyth, J. & Christian, L. (2009). *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. New York: Wiley.



## Appendix A

## Green Coach Certification Project Results

### A1. Motorcoach Operators

#### -GCC Participants

-Pre- GCC program

-Post- GCC program

#### -General Motorcoach Operators (Non-GCC Participants)

-Pre- GCC program

-Post- GCC program

### A2. Tour Operators

## Appendix A1

### Motorcoach Operators

For what purpose(s) does your company operate motorcoaches? (Click all that apply.)

<i>Purpose</i>	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Charter	20	95.2%	17	94.4
Tour	21	100.0	15	83.3
Sightseeing	8	38.1	6	33.3
Airport shuttle	8	38.1	8	44.4
Commuter	9	42.9	6	33.3
Scheduled	11	52.4	8	44.4

<i>Purpose</i>	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Charter	198	98.0	124	96.9
Tour	155	76.7	82	64.1
Sightseeing	99	49.0	47	36.7
Airport shuttle	86	42.6	41	32.0
Commuter	21	10.4	17	13.3
Scheduled	53	26.2	26	20.3

How many of each of the vehicles listed below does your company own or lease?

<i>Vehicle Type</i>	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Sedan	17.6	42.6	2.9	3.4
Limousine	0.6	1.5	0.9	1.8
Van (up to 15 passenger)	7.7	14.9	5.8	13.5
Body on chassi/cut away	21.8	43.5	9.0	13.4
School bus (all sizes)	281.2	356.9	138.6	250.8
Motorcoach (all sizes, passenger deck over luggage bay)	185.6	418.1	92.4	188.5

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
<i>Vehicle Type</i>	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Sedan	6.5	24.5	8.5	26.2
Limousine	2.7	6.5	2.5	6.9
Van (up to 15 passenger)	4.4	8.8	4.3	9.3
Body on chassi/cut away	6.4	14.2	7.0	23.0
School bus (all sizes)	91.7	264.1	29.7	80.8
Motorcoach (all sizes, passenger deck over luggage bay)	24.8	104.2	20.4	43.7

If your company collects data on the following, please provide a value for each item.

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Gallons of fuel consumed during the past year	1,474,292.8	3,688,854.2	589,508.9	1,253,077.3
Miles traveled during the past year	8,071,439.2	18,387,499.3	4,254,766.5	6,917,218.9
Number of passengers carried during the past year	3,979,027.9	10,113,588.6	959,057.9	1,391,081.1
Deadhead mile	776,119.5	1,608,124.2	236,448.6	253,419.4

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Gallons of fuel consumed during the past year	219,081.2	660,337.6	549,387.1	3,37,588.5
Miles traveled during the past year	9,058,166.3	87,047,625.5	1,502,317.2	3,756,189.5
Number of passengers carried during the past year	706,421.2	3,643,627.1	820,375.7	2,613,236.6
Deadhead mile	190,378.3	609,054.7	58,842.4	85,826.7

How many people did your company employ in 2008/2010?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
<i>Employee Type</i>	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Full-time	280.1	605.3	295.0	632.0
Part-time	125.0	237.7	94.9	155.1
Seasonal	41.2	87.9	45.7	100.6

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
<i>Employee Type</i>	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Full-time	51.0	238.8	47.7	168.6
Part-time	31.7	92.6	33.8	75.6
Seasonal	556.3	4,663.9	13.1	57.4

How familiar are you with each of the following practices?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>Mean*</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Using biodiesel as a fuel in your vehicles	4.6	0.6	4.7	0.5
Policies that limit the amount of time vehicles spend idling	4.2	1.1	3.9	-1.4
Calculating your company's carbon footprint	3.6	1.3	3.1	1.4
Purchasing carbon offsets to mitigate your company's emissions	2.1	1.2	2.2	1.2
The use of 2007 United States Environmental Protection Agency's (EPA) compliant engines	2.1	1.2	2.4	1.1
Tax credits/rebates for using ultra low sulfur diesel fuel (ULSD)	2.2	1.4	1.9	0.9

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Using biodiesel as a fuel in your vehicles	3.9	1.0	3.9	1.0
Policies that limit the amount of time vehicles spend idling	3.1	1.2	3.1	1.4
Calculating your company's carbon footprint	2.8	1.4	2.8	1.3
Purchasing carbon offsets to mitigate your company's emissions	2.0	1.2	1.9	1.3
The use of 2007 United States Environmental Protection Agency's (EPA) compliant engines	1.6	0.9	1.7	1.1
Tax credits/rebates for using ultra low sulfur diesel fuel (ULSD)	1.5	0.7	1.6	0.9

\*Mean values based on a scale of 1 = not at all familiar, 2 = somewhat familiar, 3 = moderately familiar, 4 = very familiar, and 5 = extremely familiar.

How many of your company's vehicles are running on 2007/2010 EPA compliant engines?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
<i>Number of vehicles</i>	<i>Mean*</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
2007	55.6	121.1	59.9	109.1
2010	--	--	12.4	23.4

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>Mean*</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
2007	7.5	26.5	3.1	1.5
2010	--	--	3.9	1.5

How important are the following as reasons that you do not use biodiesel (or that you do not use biodiesel more often) at your company?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>Mean*</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Biodiesel is more expensive than regular diesel	2.9	1.3	--	--
Biodiesel is not widely available	3.9	1.2	--	--
Concerns that use of biodiesel may damage my equipment	3.6	1.2	--	--
It is not economically feasible to use biodiesel	3.0	1.2	--	--
It is easier to use petroleum-based fuels than to use biodiesel	3.5	1.4	--	--
I did not know that using biodiesel was an option	1.0	0.0	--	--

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>Mean*</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
Biodiesel is more expensive than regular diesel	3.4	1.3	--	--
Biodiesel is not widely available	3.9	1.1	--	--
Concerns that use of biodiesel may damage my equipment	3.6	1.3	--	--
It is not economically feasible to use biodiesel	3.5	1.2	--	--
It is easier to use petroleum-based fuels than to use biodiesel	3.5	1.2	--	--
I did not know that using biodiesel was an option	2.8	1.4	--	--

\*Mean values based on scale of 1 = not at all important, 2 = somewhat important, 3 = moderately important, 4 = very important, and 5 = extremely important

Does your company?

	<i>GCC Participants</i>		<i>General Motorcoach Operators</i>	
	<i>Pre-GCC</i>	<i>Post-GCC</i>	<i>Pre-GCC</i>	<i>Post-GCC</i>
	<i>%</i>	<i>%</i>	<i>%</i>	<i>%</i>
Recycle at headquarters	86.7	93.3	55.8	55.6
Recycle on buses	33.3	66.7	40.7	40.7
Engage in green marketing	46.7	86.7	32.1	30.2
Have an environmental policy	40.0	53.3	11.5	23.1
Calculate its carbon footprint	7.1	6.7	1.9	5.6
Purchase carbon offsets	6.7	6.7	1.9	3.8
Have an integrated environmental message in its sales and marketing materials	73.3	93.3	--	--
Take steps to reduce idling	53.3	86.7	--	--
Track passenger miles per gallon	25.7	66.7	--	--
Monitor loads	60.0	73.3	--	--
Calculate deadhead miles	46.7	60.0	--	--

Please describe any positive or negative experiences that your company has had with 2007 and/or 2010 EPA compliant engines.

<i>GCC Participants (Post-GCC)</i>
2007 engines had problems with EGR valves that lead to black smoke in exhaust.
Constant service interruption issues due to forced regeneration. The 2007 engines are very problematic in a local urban duty cycle.
Love advertising the green aspects of them and love the particulate filters in my MCI's.
Our 2010 emission engines are very new and have thus far been problem free. The 2007 EPA engines have been a nightmare causing major customer service issues with re-generation being required at the most inconvenient times and with the technology in general being very faulty and requiring a lot of maintenance and downtime.
Our engines are Detroit Diesel Series 60. All buses have had to go to the Detroit dealer for work on problems such as the EGR valves or engine codes.
Our opinion is that the 2007 EPA compliant engines were not ready for the market. We have had numerous on the road failures related to this technology and have spent countless hours changing failed parts (that the manufacturer keeps updating to try to fix existing problems) such as EGR coolers, etc. Now, the engines are out of warranty and the manufacturer is no longer covering replacement parts or the hundreds of hours of labor that it has taken and will likely continue to take to maintain these engines. In the meantime, part numbers continue to change as the manufacturer continues to try to find a solution that will work for an acceptable period.



Problems with regeneration system DPF cracking, control modules failing, egr related failures. However they do run clean and use less fuel. Customers have noted lack of smell. Prevost has routed exhaust thru roof eliminating passenger contact with all exhaust. Have had minor passenger inconvenience with having to do manual regenerations.
Recent issues on the road and numerous fault lights and codes that affect driver operation of vehicle.
Unreliability. Unstable technology. On road failures have created added expenses and passenger dissatisfaction.

<i>General Motorcoach Operators (Post-GCC)</i>
2007 - The re-gen process CAT engines doesn't work very well. 40% of my new buses died on the way home from the dealer. Two years later and I am still trying to get the latest upgrade so they will run. I am afraid to send one very far from home
2007 engines do not always regenerate automatically
2010 engines are getting better fuel mileage that earlier engines
Bus need to be re-gined at most inopportune times especially in large cities.
Compliance is way too expensive in the current economic climate.
Cumins no issues. 125,000 miles on the engine. Detroit. Mostly electrical/communication issues. International. No issues.
detroit s 60 regens issue cummins no issues
Driver was not properly trained for regen and bus refused to start with a full load of passengers on board.
EGR Valves issues with Detroit engines
Electronics in the regen process have see issues
Engine Life & Component life decreased by 25 percent
EPA 2007 Caterpillar is the worst nightmare. need regen all the time. impossible to get new filters and repair etc.
Having to do regens at times that are inconvenient to our customers.
If you are referring to the DPF installs then that is what we are doing. Significant problems and expense especially with the EGR engines
Many regenerations many shutdowns
MCI took back our 2008 DD engine. It kept shutting down on us and we lost more business because of the engine then what we gained. Switched over to a Cummins in our 2009 and it has been working almost perfect.
Occasional engine light on one unit - not a huge issue.
Only talk from 2007 - 10 operator, they don't understand and feel that these regulations are costing their companies more money than they can pass on the cost to the customers.
Our fuel mileage per gallon has been atrociously low when compared with pre EGR engines! We seem to be always replacing EGR valves and V-Pods!

Particulate filter problems, regen of particulate filter, addition of additional electronics and systems
Regen issues
Regeneration doesn't always work properly occasionally shutting the bus down and stranding passengers.
Regeneration, Wiring
The 2007 engine has not really been a problem, however with the 2010 engine we've had to do a manual burn, and locating a safe place to manually run the engine for 20 minutes, it's been a challenge.
THE BUS RECYCLING OR REGEN PERIODS OCCUR AT TERRIBLE TIMES WHEN VEHICLES ARE ""WORKING"" ..... HAD ONE BUS RENDERED INOPERABLE BECAUSE OF REGEN
The demos we were fortunate enough to try for 2010 were not the best experience. We have had very good luck with our 2007 models in our fleet. The 2010 models of all the makers were a bit rough going due to the possibility of such new technology. We choose not to purchase any 2010 model coaches but are entertaining 2011 vehicles.
The EGR systems and particulate filtration systems have caused buses to break down, excessive towing and road service charges, etc. We hope that these systems will get perfected with the manufacturers eventually to lessen the frustration our own mechanics are facing.
The main issue was driver training. Also, when the bus is working at low speeds for very long, it can create a situation where the bus has to be taken offline for the cleaning cycle which disrupts the use of the vehicle.
THE MORE DEMANDS WE PUT ON AN ENGINE TO MEET REQUIREMENTS ITS NOT CAPABLE OF CAN ONLY CAUSE PROBLEMS
The only negative experiences we have is the heat in the engine compartment (EPA2007) and i know that the 2010 engine should be lower. That should help prevent fire at the engine.
The regen systems.
Too many problems with coaches we can't use or are broke down. Passengers left stranded.
Training of mechanic to handle and clean filters
UPDATING BUSES COST TOO MUCH MONEY THAT WE DON'T HAVE
we can't get to run a mini bus with 2007 EPA compliant
we had some camshaft problems with 2009 volvo d-13 engines, some regeneration recalls on the d-13 volvo engines, but as far as I know we have never had a bus down because of engine problems with these engines, and Volvo has been very proactive to get any problems repaired before they become big problems and the bus breaks down.
We have 2 CAT engines that have given us major problems because of the emissions. We figure it is because CAT no longer is in the market and didn't do a good job with the only year they were in the 2007 compliant engines.
Work with a lot of companies who have 2007&2010 Engines which have major problems I will not buy them until I must have cost a lot of people there businesses for reliability and cost of operation

Please state whether you agree or disagree with the following.

	<i>GCC Participants</i>		<i>General Motorcoach Operators</i>	
	<i>Pre-GCC mean (SD)</i>	<i>Post-GCC mean (SD)</i>	<i>Pre-GCC mean (SD)</i>	<i>Post-GCC mean (SD)</i>
<b>Certification</b>				
Positive for industry	2.20* (0.86)	2.00 (1.20)	1.26 (1.47)	1.06 (1.31)
Standards should be introduced	2.20 (0.86)	1.93 (0.59)	0.80 (1.53)	0.76 (1.62)
<b>Passenger MPG</b>				
A good idea	2.07 (1.22)	1.87 (0.83)	1.02 (1.32)	0.46 (1.06)
A good business practice	1.27 (1.48)	1.33 (0.90)	0.81 (1.36)	0.26 (1.15)
<b>EPA Engines</b>				
A good idea	1.53 (1.19)	1.07 (1.91)	0.34 (1.44)	0.15 (1.34)
Standards as positive impact	0.40 (1.81)	0.47 (1.96)	-0.40 (1.64)	-0.16 (1.37)
<b>Biodiesel</b>				
Help reduce impact	0.53 (1.73)	0.07 (1.67)	0.56 (1.51)	0.24 (1.44)
A good idea	0.33 (1.63)	0.33 (1.23)	0.18 (1.51)	-0.12 (1.05)
Lasting trend	0.53 (1.19)	0.20 (1.15)	-0.17 (1.25)	-0.08 (1.12)
<b>Recycling</b>				
Drivers should recycle customer trash	0.13 (2.17)	0.40 (1.68)	-0.67 (1.62)	-0.47 (1.60)
Employees should recycle at company	1.87 (1.25)	1.71 (0.82)	0.67 (1.68)	0.63 (1.89)
<b>Carbon</b>				
Offsets based on conclusive science	0.36 (1.22)	0.00 (1.13)	-0.44 (1.02)	-0.22 (0.84)
Should calculate footprint	0.67 (1.23)	0.40 (1.18)	0.09 (1.34)	-0.40 (1.10)

Purchasing offsets will reduce impact	0.00 (1.60)	-0.50 (1.69)	-0.22 (1.36)	-0.75 (1.35)
Offsets a good idea	0.67 (1.80)	-0.50 (1.45)	0.00 (0.83)	-0.21 (1.31)
<b>Idling</b>				
Important to implement	2.47 (0.52)	2.47 (0.64)	1.71 (1.33)	1.16 (1.44)
Should be required	1.93 (1.28)	2.00 (1.36)	0.70 (1.84)	0.45 (1.69)

\*mean values based on scale of -3 = strongly disagree, -2 = disagree, -1 =somewhat disagree, 0 = unsure, 1 = somewhat agree, 2 = agree, and 3 = strongly agree.

Has/would your company?

	<i>General Motorcoach Operators</i>	
	<i>Pre-GCC</i>	<i>Post-GCC</i>
Heard of GCC?	44.0%	51.6%
Consider participating in GCC?	76.0%	68.3%

Would your company be willing to pay a fee for each vehicle certified in the Green Coach Certification or similar program?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Yes	--	--	4	22.2
No	--	--	2	11.1
Maybe	--	--	12	66.7
Total	--	--	18	100.0

What is the maximum your company would be willing to pay for each vehicle certified in the Green Coach Certification or similar program?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
\$0	--	--	2	11.1
\$25	--	--	5	27.8
\$50	--	--	3	16.7
\$100	--	--	2	11.1
No amount selected	--	--	6	33.3
Total	--	--	18	100.0

Please indicate how important each of the following factors

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>mean*</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
To increase business for your company	3.7	1.2	4.1	0.9
To gain a competitive edge over other companies	3.8	1.2	4.0	0.8
To operate more cost-efficiently	3.8	0.9	4.5	0.7
To operate more energy-efficiently	4.3	0.7	4.2	0.6
To move toward independence from oil and gas	3.2	1.4	3.6	1.0
To have less impact on the environment	4.1	0.8	4.2	0.8
To gain recognition for the investment our company has made in environmentally friendly technology	4.2	0.7	3.8	1.1
To increase customer awareness of the environmental benefits of motorcoach travel	4.5	0.6	4.6	0.7

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>Mean*</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
To increase business for your company	3.9	1.1	3.8	1.1
To gain a competitive edge over other companies	3.9	1.1	3.8	1.1
To operate more cost-efficiently	4.1	0.9	4.2	1.0
To operate more energy-efficiently	4.1	1.0	4.0	1.0
To move toward independence from oil and gas	3.7	1.2	3.5	1.3
To have less impact on the environment	3.9	1.1	3.8	1.1
To gain recognition for the investment our company has made in environmentally friendly technology	3.5	1.3	3.6	1.2
To increase customer awareness of the environmental benefits of motorcoach travel	4.0	1.1	3.9	1.1

\*Mean values based on scale of 1 = not at all important, 2 = somewhat important, 3 = moderately important, 4 = very important, and 5 = extremely important

In this section, please answer the questions in a way that best represents the perspectives and beliefs of your company.

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
At our company, we make a concerted effort to make every employee understand the importance of environmental preservation.	-1.8	1.0	--	--
Our company has a clear policy statement urging environmental awareness in every area	-0.6	1.5	--	--
Environmental preservation is a high priority activity in our company.	-1.4	1.0	--	--
Preserving the environment is a central corporate value in our company.	-1.4	1.1	--	--
The financial wellbeing of our company does not depend on the state of the natural environment.	0.9	1.2	--	--
Our company has a responsibility to preserve the environment.	-2.0	0.8	--	--
Environmental preservation is vital to our company's survival.	-1.4	1.3	--	--
Our company's responsibility to its customers, stockholders, and is more important than our responsibility toward environmental preservation.	0.5	1.3	--	--
The natural environment does not currently affect our company's business activity.	1.1	1.0	--	--
In our company, environmental preservation is largely an issue of maintaining a good public image.	0.6	1.3	--	--
It is difficult for our company to be successful and preserve the environment at the same time.	1.1	1.2	--	--
In our company profits are more important than our environmental activities.	0.9	1.3	--	--
We evaluate our environmental efforts by their economic benefits to our company.	0.3	1.4	--	--
It is our company's mission to be a leader in environmental protection in our industry.	-1.6	1.2	--	--



	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>mean</i>	<i>SD</i>	<i>mean</i>	<i>SD</i>
At our company, we make a concerted effort to make every employee understand the importance of environmental preservation.	-0.8	1.4	--	--
Our company has a clear policy statement urging environmental awareness in every area	-0.0	1.6	--	--
Environmental preservation is a high priority activity in our company.	-0.4	1.5	--	--
Preserving the environment is a central corporate value in our company.	0.5	1.5	--	--
The financial wellbeing of our company does not depend on the state of the natural environment.	-0.1	1.4	--	--
Our company has a responsibility to preserve the environment.	-1.3	1.2	--	--
Environmental preservation is vital to our company's survival.	-0.3	1.5	--	--
Our company's responsibility to its customers, stockholders, and is more important than our responsibility toward environmental preservation.	-0.3	1.5	--	--
The natural environment does not currently affect our company's business activity.	-0.1	1.4	--	--
In our company, environmental preservation is largely an issue of maintaining a good public image.	-0.2	1.4	--	--
It is difficult for our company to be successful and preserve the environment at the same time.	0.2	1.4	--	--
In our company profits are more important than our environmental activities.	0.2	1.4	--	--
We evaluate our environmental efforts by their economic benefits to our company.	0.1	1.3	--	--
It is our company's mission to be a leader in environmental protection in our industry.	-0.1	1.5	--	--

\*Mean values based on 7-point scale, -3 = "strongly disagree," -2 = "disagree," -1 = "somewhat disagree," 0 = "unsure," 1 = "somewhat agree," 2 = "agree," and 3 = "strongly agree."

What have you most enjoyed about your participation in the Green Coach Certification Program?

<i>GCC Participants (Post-GCC)</i>
Beginning the process of education employees and the consumers
Changing the way we collect data about our coaches and drivers.
Creating awareness in our company about the environmental advantages and impacts of motorcoach travel
Environmental Education for our company and our customers
Getting employees to think green and conserve energy.
It's not intrusive. It's relatively easy to participate and meet all expectations.
Learning about the program and best practices.
Learning about green initiatives and getting to know Dave.
Pride in green operations and environmental attitudes and actions.
Recognition of our Environmental Concern
Talking about the program in interviews and company promotional materials. However, we just don't see the consumer choosing us because of the program.
The things I've learned about ""green"" practices and technologies. Working with our ""green team"" to establish an environmental sustainability program for our company.

What have you least enjoyed about your participation in the Green Coach Certification Program?

<i>GCC Participants (Post-GCC)</i>
2007 engines have performed poorly.
Little guidance when calculating passenger miles per gallon.
no real negatives
Nothing
Nothing that I can think of
That the public doesn't seem to care much yet :(
The realization that the public does not connect well yet with a green motorcoach message
time it has take to get it up and running and the ability to gain market share and marketing materials for consumer education
too many surveys!
Very little interaction with program administrators and very little attention from the motorcoach industry.
We don't have a non labour intensive system to calculate passenger miles per gallon.

If a permanent Green Coach Certification Program were established in the motorcoach industry, what improvements could be made?

<i>GCC Participants (Post-GCC)</i>	
A strong public awareness and marketing campaign	
Help in press releases and recognition to those operators who have been certified, so that this certification can actually add revenue ROI to our operations.	
Marketing/educational materials	
Member Since... or something along that line.	
Online integration...turnkey collateral and information	
Simplify process for participation	
Standardized criteria, marketing materials, and publicity	
A strong public awareness and marketing campaign	
Help in press releases and recognition to those operators who have been certified, so that this certification can actually add revenue ROI to our operations.	
Marketing/educational materials	
Member Since... or something along that line.	
Online integration...turnkey collateral and information	
Simplify process for participation	
Standardized criteria, marketing materials, and publicity	

Does your company train drivers in techniques that can improve fuel efficiency?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	n	%	n	%
Yes	--	--	13	72.2
No	--	--	5	27.8
Total	--	--	18	100.0

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	n	%	n	%
Yes	--	--	92	72.4
No	--	--	35	27.6
Total	--	--	127	100.0

Has your company seen an improvement in fuel efficiency as a result of the driver training programs?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Yes	--	--	7	58.3
No	--	--	5	41.7
Total	--	--	12	100.0

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Yes	--	--	60	66.7
No	--	--	30	33.3
Total	--	--	90	100.0

Would you be interested in offering an educational program at your company if it improved fuel efficiency by...

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
5%	--	--	14	77.8
10%	--	--	15	83.3
15%	--	--	16	88.9
20%	--	--	15	83.3

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
5%	--	--	70	54.7
10%	--	--	86	67.2
15%	--	--	82	64.1
20%	--	--	90	70.3

Does your company use fleet monitoring equipment to monitor...

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Idling time	--	--	14	77.8
Fuel-economy of each driver	--	--	9	50.0
Fuel-economy of each vehicle	--	--	14	77.8
Tire pressure on each vehicle	--	--	11	61.1
Hard-breaking by drivers	--	--	10	55.6
Fast-starts by drivers	--	--	6	33.3
Average vehicle speed	--	--	10	55.6

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Idling time	--	--	52	40.6
Fuel-economy of each driver	--	--	40	31.3
Fuel-economy of each vehicle	--	--	68	53.1
Tire pressure on each vehicle	--	--	60	46.9
Hard-breaking by drivers	--	--	53	41.4
Fast-starts by drivers	--	--	41	32.0
Average vehicle speed	--	--	58	45.3

Does your company use the following technology?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
R134A as an air conditioning refrigerant	--	--	13	72.2
Super single tires	--	--	0	0.0
Verified low rolling resistance tires	--	--	4	22.2

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
R134A as an air conditioning refrigerant	--	--	103	80.5
Super single tires	--	--	6	4.7
Verified low rolling resistance tires	--	--	15	11.7

Please indicate which of the following are included in the work you do at your company? (Click all that apply.)

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Owner	8	38.1	10	55.6
Managing operations	14	66.7	8	44.4
Customer service	6	28.6	9	50.0
Managing finances	5	23.8	5	27.8
Supervising staff	7	33.3	9	50.0
Office administration	6	28.6	4	22.2
CEO	5	23.8	6	33.3
Human resources	4	19.0	3	16.7
Board of directors member	16	76.2	6	33.3

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Owner	130	64.4	90	70.3
Managing operations	118	58.4	62	48.4
Customer service	94	46.5	48	37.5
Managing finances	76	37.6	42	32.8
Supervising staff	84	41.6	45	35.2
Office administration	7	34.7	38	29.7
CEO	56	27.7	43	33.6
Human resources	72	35.6	38	29.7
Board of directors member	152	75.2	35	27.3

When it comes to making a decision about participation in a green coach certification program, how much influence do you have in your company?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Final decision maker	16	76.2	13	76.5
Some influence	3	14.3	4	23.5
Little influence	1	4.8	0	0.0
No influence	1	4.8	0	0.0
Total	21	100.0	17	100.0

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Final decision maker	142	70.3	90	73.8
Some influence	46	22.8	27	22.1
Little influence	4	2.0	2	1.6
No influence	4	2.0	3	2.5
Total	196	100.0	122	100.0

Did you as a representative of your company fill in this survey independently or did you solicit input/assistance from others in your operation?

	<i>GCC Participants</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Filled out on my own	12	57.1	12	76.5
Filled out with input/assistance from others in my operation*	9	42.9	6	23.5
Total	21	100.0	17	100.0

\*Input/assistance was provided by members of all job categories

	<i>General Motorcoach Operators</i>			
	<i>Pre-GCC</i>		<i>Post-GCC</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Filled out on my own	178	90.8	113	91.9
Filled out with input/assistance from others in my operation*	18	9.2	10	8.1
Total	196	100.0	123	100.0

\*Input/assistance was provided by members of all job categories

## Appendix A2

### Tour Operators

For what purpose(s) does your company book transportation? (Click all that apply.)

<i>Purpose</i>	<i>n</i>	<i>%*</i>
All-inclusive group charters	58	80.6
One-day tour experiences	51	70.8
Group charters (transportation only)	48	66.7
Shuttles (airport, hotel, etc.)	41	56.9
All-inclusive private charters	39	54.2
Private charters (transportation only)	34	47.2
Private events	34	47.2
Other	4	5.6

\*Percentages out of 72 total potential respondents.

How long are the trips that your company offers? (Click all that apply.)

<i>Trip Length</i>	<i>n</i>	<i>%*</i>
Less than a day	23	31.9
One day	53	73.6
Multi-day	69	95.8
One week	48	66.7
Longer than a week	46	63.9

\*Percentages out of 72 total potential respondents.

What is the most typical trip length offered?

<i>Trip Length</i>	<i>n</i>	<i>%</i>
Less than a day	0	0.0
One day	13	18.1
Multi-day	47	65.3
One week	8	11.1
Longer than a week	4	5.6
Total	72	100.0