Dr. John A. "Jack" Deacon, *has recently retired from teaching Civil Engineering at the University of Kentucky since 1957. He also has worked as Senior Research Advisor for the Transportation Research Board (on special assignment), Associate Director of Research at the Kentucky Transportation Center, and Chief Research Engineer at the Kentucky Department of Highways.*

Dr. Deacon earned Civil Engineering degrees at the University of Kentucky and earned a doctorate from the University of California at Berkeley.

AFTERNOON GENERAL SESSION
October 2, 1995

Dr. John A. "Jack" Deacon
Professor Emeritus, Civil Engineering
University of Kentucky

OTHER PERSPECTIVES ON TRANSPORTATION FUNDING — COST ALLOCATION

I would like to begin my remarks by recognizing Jerry Pigman. Jerry really initiated the recent series of Kentucky highway cost allocation studies which began in 1982. As a Kentucky Transportation Center investigator, he has been a major contributor to all subsequent studies. I also want to recognize the Cabinet's Study Advisory Committee which has guided our work in recent years. David Smith has chaired the Committee whose membership includes Mike Hancock, Glenn Mitchell, Sandra Pullen, and Bruce Siria. As many of you know, most of the Center's work for the Cabinet is performed under the guidance and direction of a study advisory committee.

My comments today are organized into five areas. First, I will very briefly discuss *highway cost allocation* as it has been practiced in the United States. Then I will turn to our own activities beginning with the *Kentucky philosophy and its methodology*. Next I will share some of the *results of our last study* completed two years ago. We are currently in the process of an update in preparation for the next legislative session in Frankfort. After sharing some *lessons learned from the Kentucky experience*, I will close by describing some *current federal initiatives* that may become important to all of us.

Highway Cost Allocation in the United States

Let's begin by briefly addressing the question, what is highway cost allocation? Cost allocation is a process by which we try to allocate the costs of providing and maintaining the highway system to the various classes of users who travel on it. Why, then, are we interested in determining the cost responsibilities of road users? Our state highways in the United States are largely financed through user taxes, fees, and tolls, and an important objective in establishing the levels of such assessments is equity among the various user classes. We believe that infrastructure costs can be rationally assigned or allocated to the various groups of road users and that such allocations provide a basis for equity assessments. Finally, we believe that information about allocated costs and equity assessments is useful to those who manage the infrastructure and to those who legislate tax policy and assign tax responsibility.

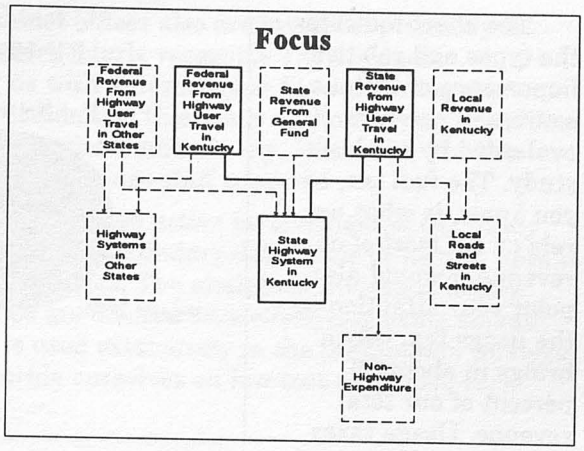
The *equity* or *fairness* approach bases its allocations on such measures as costs occasioned, road wear or consumption, relative use, benefits received, and ability to pay. An alternate approach to cost allocation, not used in our studies, bases its allocations on marginal costs, including both the costs that users incur in operating their vehicles and the costs they impose on others. In this *efficiency* approach, user fees are seen primarily as a tool to economically ration roadway use. Economists are among the leading advocates of the marginal cost approach, and a current federal study is seriously considering the merits and feasibility of such an approach.

Cost allocation is not a new concept, and its use is rather widespread. Kentucky's cost allocation efforts began with a pioneering study in 1956. The current series of studies began in 1982 with updates about every two years thereafter. According to AASHTO, Kentucky is joined by 23 other states which had active studies underway during the period 1975-1989. The federal government also has been involved, and its 1982 study has strongly influenced the current state-of-the-practice. Although federal studies during the 13 years since 1982 have been limited in scope, a comprehensive analysis is currently underway in Washington. Finally, the American Trucking Associations' Trucking Research Institute sponsored a 1990 study in which methodological and data issues were examined in depth.

Kentucky Philosophy and Methodology

In the state of Kentucky, our purpose is to provide information to those who formulate and implement state taxation policy and to those who manage the state system of highways. Our focus is on state tax policies, the revenue that is generated by those policies, and the cost of providing and maintaining the state highway system. We exclude from our analysis monies that are transferred to local governments for use on city streets and county roads. We also exclude federal revenue that is

transferred out-of-state, either to other states because of our status as a debtor state or to the federal government for deficit reduction or other non-highway purposes.



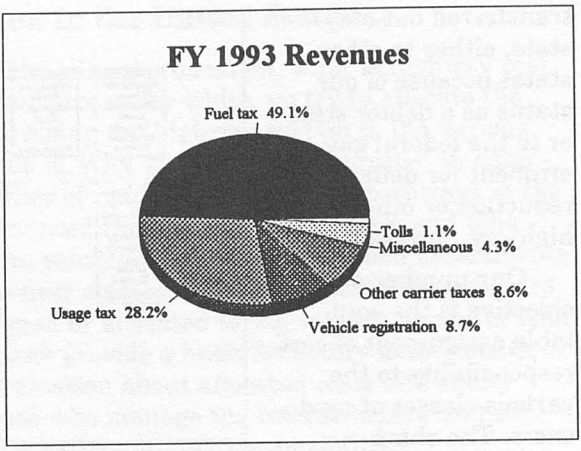
Our number one objective is the equitable assignment of cost responsibility to the various classes of road users. The chart identifies the basis on which our costs have been allocated. We must also estimate how much revenue is generated from each class, a process that is not quite as easy as it sounds. We compile composite records, for example, of fuel taxes that are collected, but we don't know how much of the total is collected from pickup trucks, automobiles, light trucks, and other classes. We have to go through a fairly detailed process to determine how to apportion the revenue totals to each user group.

Cost Allocation (%)

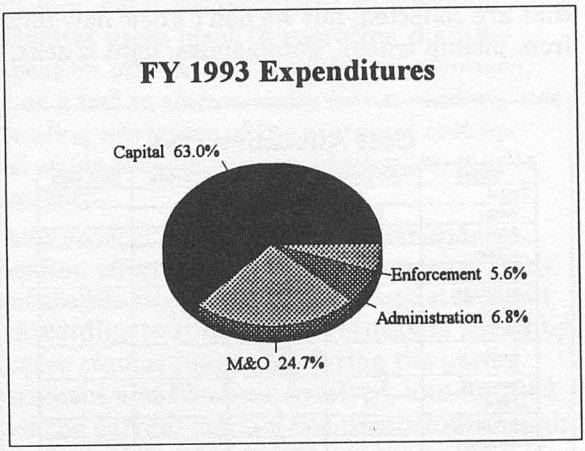
Element	Vehicle miles	Axle miles	PCE miles	ESAL miles
Capital				
...design	100			
...ROW	100			
...utilities	100			
...grade & drain			100	
...pavements	33			67
...bridges			100	
M&O				
...roads		80/20 (all/trks)		
...structures			100	
...traffic	100			
Administration	100			
Enforcement				
...motor carrier	100 (trks)			
...other	100			
Miscellaneous		100		

The basic measure of equity is the revenue-to-cost ratio. A revenue-to-cost ratio of one indicates equity, a condition where the relative revenue contribution is equal to the relative cost allocation. User classes which have a revenue-to-cost ratio less than one are contributing less than their fair share. We also have the opportunity to examine trends over time in cost responsibility, revenue contributions, and the revenue-to-cost ratio. That provides useful indications of where we have been and suggests where we may be going in the future. We also have looked, at least briefly and perhaps superficially, at the efficiency with which we collect some of our taxes. We also are able to evaluate the effects of legislative proposals to change the highway user tax structure. Our study is always based on the most recent fiscal year, so our current study is for fiscal year (FY) 1995.

The chart indicates the types and relative importance of various sources of revenue evaluated by our last study. The fuel tax, as you know, is what we rely on for most of our revenue. I would also point your attention to the usage tax, which brings in about 28 percent of our total revenue. Usage taxes were mentioned this morning and suggested as being highly volatile. But we do rely very heavily in this state on usage taxes, the sales taxes paid with the purchase of an automobile or truck.



Expenditures are dominated by capital costs which comprise approximately 63 percent of the total. Our debt obligations are included in the capital cost category. The point that I want to make here is that we continue to spend a lot of money to build and upgrade our physical plant (or at least to pay for roads that have already been built using borrowed money).



The two primary participants in our cost allocation studies are the Kentucky Transportation Cabinet and the Kentucky Transportation Center. I have already mentioned our Study Advisory Committee. Some of the things it contributes include:

- Sets goals and objectives,
- Monitors and supervises activity,
- Identifies alternative legislative proposals, and
- Reviews and approves reports.

A number of other Cabinet offices also are involved, primarily in providing data. I want to particularly recognize Taylor Manley, in accounting, for supplying us with a humongous file containing accounting data for FY 1995. We couldn't do this study without a number of fine people, such as Taylor, who assist tremendously. Of course, the Kentucky Transportation Center provides staff support.

Key features of our study include active involvement of the Study Advisory Committee. Also we use secondary data: little or no new data is collected specifically for our studies. The analytical process is highly automated. Published tables are created very effectively using spreadsheets, and the computer is used extensively in the preliminary analysis and data summaries. We pride ourselves on low cost and quick turnaround.

Example Outcomes

Let me share some example outcomes—which again are from the study completed two years ago—which exemplify what the output looks like.

Cost Responsibility (%)

Vehicle type	1990	1992	1994
Cars	45.69	44.16	45.22
Buses	1.11	1.34	1.29
Pickups & vans	20.23	20.40	19.80
Light trucks	3.04	2.53	2.44
Medium trucks	6.76	6.93	4.97
Heavy trucks	23.17	24.64	26.28

- **Cost responsibilities.** In 1994, we allocated to cars 45.2 percent of the cost responsibility for providing the highway infrastructure and to heavy trucks, 26.3 percent. The allocation was not quite 2 to 1 for cars, but we all know that there are many more cars than heavy trucks on most of our roadways.

Revenue Contributions (%)

Vehicle type	1990	1992	1994
Cars	44.76	44.69	45.10
Buses	0.37	0.28	0.54
Pickups & vans	21.44	22.49	22.60
Light trucks	3.05	2.69	2.82
Medium trucks	4.43	4.39	4.52
Heavy trucks	25.96	25.46	24.41

- **Revenue contributions.** In this similar chart, cars are shown to contribute 45.1 percent to highway revenue and heavy

trucks, 24.4 percent. One particularly significant observation concerns pickup trucks and vans. The vehicle miles of travel continues to rise for these types of vehicles, and they have become a dominant part of the traffic stream. On the other hand, buses are relatively insignificant.

● **Revenue-to-cost ratio.** In FY 1993, we assigned to cars a revenue-to-cost ratio of one, which means that they were strictly meeting their cost obligations. For heavy trucks, this equity ratio has unfortunately been decreasing, which gives some indication that perhaps they are slipping into a deficit situation. Part of the decrease is a result of a decline in revenue as a result of sunsetting of the weight-distance surtax.

Revenue to Cost Ratio

Vehicle type	1990	1992	1994
Cars	0.98	1.01	1.00
Buses	0.33	0.21	0.42
Pickups & vans	1.06	1.10	1.14
Light trucks	1.00	1.06	1.16
Medium trucks	0.66	0.63	0.91
Heavy trucks	1.12	1.03	0.93

● **Revenue per vehicle mile.** This is an interesting chart. It indicates that those of us who drive cars contribute about two cents' worth of tax revenue for every mile of travel on the state-maintained highway system. The total cost of car operation is now in the neighborhood of 40 cents per mile. Thus, approximately five percent of the cost of car operation is dedicated to providing the primary facilities on which the car travels. Heavy trucks contribute well over nine cents per mile, about five times what cars contribute. The troubling thing about the revenue-per-vehicle-mile figures (at least as far as I am concerned) is the trend in average revenue. We went from 2.93 cents per vehicle mile in 1990 down to 2.82 in 1992 and finally down to 2.68 in 1994. That is a troubling trend. On a per-vehicle-mile basis, on average, we are generating less revenue now than we did several years back. It will be very interesting to see how this changes in the future.

Revenue per Vehicle Mile (Cents per Mile)

Vehicle type	1990	1992	1994
Cars	2.05	2.02	1.92
Buses	2.82	2.19	3.28
Pickups & vans	2.43	2.38	2.32
Light trucks	4.76	4.27	4.36
Medium trucks	7.97	6.54	6.72
Heavy trucks	10.45	10.07	9.44
Average	2.93	2.82	2.68

● **Weight-distance tax.** As previously indicated, we can estimate for some of our taxes the efficiency with which they are collected. One such tax is the weight-distance tax. In the 1990 study, we estimated that we were collecting about 67 percent of the tax that was due. That has since risen to a level of about 72 percent in the 1994 study. Collection efficiency seems to be improving, but there remains a shortfall of almost 30 percent. The weight-distance tax, like the personal income tax, is self reported.

Weight Distance Tax

Year	Vehicle miles of travel (1,000)	Estimated revenue ($1,000)	Reported revenue ($1,000)	Percent of estimate
1990	2,094,000	84,000	56,000	67.4
1992	2,170,000	87,000	61,000	70.3
1994	2,411,000	96,000	69,000	71.7

● **Fuel gallonage.** We also can make estimates of fuel consumption and the taxes it generates. Interestingly, gasoline consumption exceeded our estimates while special-fuel (predominantly diesel) consumption fell somewhat short. The over- and underestimates were somewhat balanced, however, and the estimates of total consumption were quite near the reported values.

Fuel Gallonage

Fuel type	Year	Estimated Gallonage (1,000)	Reported gallonage (1,000)	Percent of estimate
Gasoline	1990	1,678,000	1,811,000	107.9
	1992	1,702,000	1,834,000	107.8
	1994	1,869,000	1,908,000	102.1
Special fuel	1990	520,000	496,000	95.4
	1992	528,000	488,000	92.4
	1994	557,000	521,000	93.6
Total	1990	2,198,000	2,307,000	105.0
	1992	2,230,000	2,322,000	104.1
	1994	2,426,000	2,429,000	100.1

● **Fuel taxes.** After adjusting our fuel estimates to reported values, we also have estimated revenues generated by fuel taxes including two levied against fuel consump-

Fuel Taxes

Type	Year	Estimated revenue ($1,000)	Reported revenue ($1,000)	Percent of estimate
Heavy vehicle surtax*	1990	7,471	5,384	72.1
	1992	7,191	5,528	76.9
	1994	7,842	6,262	80.0
Normal use*	1990	16,920	12,084	71.4
	1992	16,504	12,435	75.3
	1994	17,911	14,808	82.7
Normal	1990	245,054	248,666	101.5
	1992	246,897	242,326	98.1
	1994	258,063	257,431	99.8

*Reported by carriers on quarterly tax return

tion by large trucks. Revenue collected from these taxes on heavy vehicles, which also are self reported by the carriers, averaged about 80 to 82 percent of what was expected. At the same time, the efficiency of collecting the normal fuel tax was almost 100 percent.

The highway cost allocation process also provides the capability for examining the potential effects of proposals to change highway user taxes. In the 1994 study, a specific proposal that had been advanced by the Motor Carrier Advisory Commission was studied. The charts identify the types of changes that were proposed, the total revenue change that was anticipated, and the equity ratio of revenue to costs. Our estimates indicated that the proposal would result in a $15-million loss in revenue and small changes in the equity posture of the various user groups.

Motor Carrier Advisory Commission Legislative Proposal

- Increase supplemental tax on special fuels from 2 to 5 cents per gallon
- Eliminate usage tax for trucks weighing more than 62,000 pounds
- Limit 2.85 cent weight-distance tax to trucks weighing more than 62,000 pounds
- Remove 1.15 cent weight-distance surcharge
- Repeal heavy vehicle fuel surtax of 2 cents per gallon
- Reduce passthroughs to urban streets, county roads, and secondary roads
- Extend fuel surtax to 26,000 pounds

Revenue Implications of MCAC Legislative Proposal

Proposal	Revenue change ($1,000)
Increase supplemental tax on special fuel by 3 cents	11,568
Heavy truck exemption from usage tax	-5,572
Limit 2.85 cent weight distance to more than 62,000 pounds	-1,006
Remove weight distance surcharge	-19,875
Repeal heavy vehicle fuel surtax	-6,272
Reduce passthroughs for local roads and streets	3,860
Extend fuel surtax	1,807
TOTAL	-15,490

Revenue to Cost Ratio: Implications of MCAC Legislative Proposal

Vehicle type	Current taxes	Proposed taxes
Cars	1.00	1.00
Buses	0.42	0.45
Pickups & vans	1.14	1.14
Light trucks	1.16	1.27
Medium trucks	0.91	0.94
Heavy trucks	0.93	0.91

Lessons from Kentucky Experience

What are the lessons learned from our Kentucky experience? We have found that the support and involvement of key officials in the Transportation Cabinet has been absolutely crucial to whatever successes that we have enjoyed. We believe this type of work should be conducted in-house or through an association such as our own by which a long-term and close working relationship can be assured. We advocate frequent updating. Equity evaluations soon become outdated in the complex and rapidly changing world in which we live. The 1982 federal evaluation is a prime example of an evaluation that became outdated and questionable long before the 14 or 15 years that will elapse before it will be updated. We believe in localized analysis, that the kind of analysis and results that reflect Kentucky conditions might be very different from those in California or Tennessee or nationwide. Finally, a simplified process is necessary to achieve the objectives of quick turnaround and low cost.

Current Federal Initiatives

A very comprehensive truck size and weight study is in progress in Washington. The focus is on possible changes in truck size and weight limits. Although scaling back is being considered in some areas and from some perspectives, attention focuses on increased size and weight. Preliminary studies have been completed, working papers have been developed, public comment has been received, and scenario analyses (what kind of change might be most appropriate for consideration) have been completed. The key issue here, incidentally, seems at the moment to be the diversion of freight from train to truck. The rail interests are fighting any increase in truck size and weight limits. Their argument is based on the premise that if those limits are increased, freight will be diverted from rail to the truckers, and such a diversion could have dire consequences for the rail industry.

Aligned with the truck size and weight study is a major highway cost allocation study. The two are proceeding at about the same pace, and final reports of both studies are due in October of 1996. The first key issue seems to be pavement impacts, that is, how much of the cost of providing new pavement and resurfacing should be allocated to the various user classes. This has been a difficult and controversial question from the very beginning. The second key issue seems to be external costs, the costs of accidents, congestion, air pollution, and so forth. Whether these costs get into the final federal equation is anybody's guess, but external costs are difficult to evaluate and controversial in nature.

Of course, no one knows what the outcome of these federal efforts is likely to be. I certainly don't know whether we will see truck size and weight increases or whether we are going to collect more truck taxes. At the same time increases at the federal level in weight and size seem unlikely unless truckers pay more taxes. There are also questions about how effective the rail lobby will be and whether Congress will be distracted with other compelling issues and just doesn't think truck size and weight is very relevant at the current time. It will be interesting to see how it all comes out.

Concluding Remarks

In conclusion, we have found highway cost allocation to be a proven and invaluable component of highway finance and taxation studies. While cost allocation studies do not determine tax policy, they do provide critical information to the policymakers who do. We strongly believe that user cost responsibilities vary among jurisdictions, for example, between Tennessee and Kentucky or between a specific state such as Kentucky and the nation as a whole. Those responsibilities also change through time as our use of the highways changes and we get different mixes of vehicles on them. Also, they depend upon our expenditure patterns. The effect of building new highways is considerably different from the effect of maintaining old ones. We certainly believe that repeat studies are necessary for credibility, and Kentucky is fortunate to have been among the two or three states that routinely update their work. Finally, current federal work is likely to significantly affect the future state-of-the-practice of cost allocation studies and may possibly lead to changes in federal vehicle size and weight limits and to changes in federal highway taxation.

Thank you very much for your attention.

As General Manager of LexTran, ***Stephen D. Rowland*** *is responsible for the operation of fixed route, paratransit, and rideshare services for the Transit Authority of Lexington-Fayette County. He began his career with the Kentucky Department of Transportation as a transportation planner, and then worked for Transport of New Jersey and the Hudson General Corporation. He also was the Manager of Operations for the Potomac and Rappahannock Transportation Commission.*

Mr. Rowland graduated from Eastern Kentucky University with a degree in transportation planning.

AFTERNOON GENERAL SESSION
Monday, October 2, 1995

Stephen D. Rowland
General Manager
Transit Authority of Lexington (LexTran)

OTHER PERSPECTIVES ON TRANSPORTATION FUNDING—PUBLIC TRANSIT

I want to talk to you about public transportation and the concerns that we are faced with here in Lexington. As many of you are aware, transit is facing a downturn in federal funding. LexTran has received cuts in federal funding for the last five years and, if legislation is passed this month that we expect to be passed, our current federal funding of $1.1 million will be cut in half. We realized what was happening several years ago, so we started to work on it by looking at local issue themes for generating revenue to support public transit. What that means is having more dedicated support from the local governments.

How did we come to that conclusion? We conducted several studies and surveys to find out what people wanted in public transit in Lexington and came up with some interesting scenarios. We also did a peer group comparison. We compared cities similar in population to Lexington that also had public transit systems. We compared their efficiency ratings and effectiveness to ours. We found that LexTran is an extremely efficient system. Our cost per mile is a dollar less than the average for the nine peer group systems that we studied. Our cost per hour is $20 less. We are an extremely efficient system. As a matter of fact, 80 per-

cent of LexTran's budget goes directly into providing service on the street. That is a high percentage in the transit industry.

We did find, however, that we are not as effective. We do not carry the numbers of people that the other systems carry, so we tried to ascertain the reason. The studies showed that these other systems are funded at a much greater level than LexTran. They included large amounts of local subsidies. To give you an example of the nine peer group cities that we studied, their operational budget each year is $11 million. Compared to LexTran's $4 million a year, that is a $7-million difference. What that extra money brings to riders is frequency of service and a more expanded service that we are not able to provide.

We then looked at what our customers wanted by conducting a ridership survey. We found some interesting results from that survey. First of all, we found that 62 percent of our ridership of 5,000 people per day use transit to go to work. We also found that 55 percent of these riders do not have drivers' licenses, and 88 percent did not have another means of transportation at the time they took the bus trip. Finally, we found out that 77 percent of our riders earn less than $20,000 a year. So, in effect, we are providing service to the working poor.

We asked them what transit improvements they would like. Close to 60 percent of the riders asked for more frequent service. We conducted a telephone survey of the community at large. We found out that even though 98 percent of the people we surveyed did not use public transit, their overwhelming concern was more frequent service.

Finding out that we are very efficient (we cannot utilize our existing funds any better than what we are doing now), we are grossly underfunded as compared to similar cities, and the community is looking for more service. Our only alternative is to seek greater local funding and we are going to seek that through a tax referendum. What this referendum will do is to allow the community to vote on increasing payroll tax by one quarter of one percent and dedicate the proceeds of that tax solely for public transit.

This is a method that public transit across the country has been using. As a matter of fact, the other two large transit systems in Kentucky, the Transit Authority of River City in Louisville and the Transit Authority of Northern Kentucky in the Covington/Boone County area, already have a dedicated tax.

How do we propose to get this? Obviously, raising taxes is not a thrilling subject to talk about to people. Many folks feel that there is a movement in this country right now to severely cut taxes, not raise them.

Our alternative was to establish a very effective, grassroots campaign to show the benefits of transit. One of the things we have shown is that we do take people to work. There is a public perception (and not a very good one) or a stigma concerning public transit about who we carry.

This has opened a lot of people's eyes when they find out that working people, people trying to better themselves, are using public transit to get to work. If you look at what these people put into the community—if these 3,100 people only make minimum wage, they are still generating over $24 million of economic activity in the community.

This has been a strong focal point of our presentation to the public. We have established the Bluegrass Coalition for Transit Now that has been very helpful to us in spreading the word on the benefits of transit. It is made up of various organizations and citizens throughout the Lexington-Fayette Urban County area. We have started an extremely intensive educational campaign that we have presented to neighborhood associations, to senior citizens homes, to anybody who wants to listen to us talk about public transit. We have had an extremely good feedback from this.

Finally, we are telling folks what we will do with the money and how we can survive for the next 20 years. That is an extremely important issue that people want to know about. We are finding that the folks that we have been talking to do not want additional taxes, but if they pay this tax, they want to know what they will get in return for it. Since we are able to dedicate this tax to transit, we can show them specifically what we will do—increase frequency of service and broaden our service area.

Obviously, we feel public transit is an extremely essential service to the community. In Lexington, LexTran provides the University of Kentucky with student shuttles and parking lot shuttles. We carry over 2,000 to 3,000 people a day just on this shuttle. It is a viable part of the University's infrastructure, and we feel that transit is a viable part of this community's infrastructure. Thank you.