Sustainable Transportation on Campus and in the Community

Keynote Address: "Sustainable Campus Transportation in the United States" Will Toor, Boulder County, Colorado September 22, 2005

Thanks, Michael. What I am going to talk about is some of the transportation issues that are really specific to university campuses and campus communities. What some of the driving forces are, and what some of the- I think- are kind of interesting examples from across the United States of university communities trying to do something a little bit differently. If you think about, why do campus communities try to go in a different direction in transportation, I think one of the reasons is that campuses tend to really worry about sustainability. When you think about, why is that? Well, there's the unprecedented threat of global climate change. The approaching end of the oil age, and natural ecosystems in decline all over the world.

As universities grapple with this, they typically come to the sense that there are a few key areas of action: educating students to be environmentally literate citizens, providing technical and policy research to assist the broader community in grappling with these issues, and reducing the environmental footprint of the university community itself. And when you think about reducing that footprint, by far the biggest act in our communities tends to be what we're doing directly to the land or land use planning, and then our use of fossil fuels and emissions of greenhouse gases into the atmosphere and if we're going to try to reduce that emission of greenhouse gases, then we have to talk about transportation. For a typical campus community, probably 40 percent of your greenhouse gas emissions will come from the transportation sector, so you somehow have to get a handle on that, both through looking at cleaner vehicles and reducing the automobile dependence for students, faculty and staff.

So, you've got that as one set of motivations. On the other hand, you also have the set of very practical motivations involving the interests of the campus and its community. Universities are looking for mobility and access, convenience, adequate parking. Do you have any issues here with adequate parking? There's a famous statement by Clark Kerr, former Chancellor of the University of California that a university is a diverse community held together by complaints about parking. I haven't found anywhere that that's not true yet. And, university administrators are also very concerned with how do they make the very best use of the limited dollars for infrastructure investment.

While surrounding communities, they're worried about managing congestion on city streets, reducing student and faculty parking demand in neighborhoods, maintaining good relations with universities. But transportation's often a focal point for conflict between a university and a community. I think the starkest illustration of that that I've seen recently was this spring at Cornell University in Ithaca, New York where the university fulfilled a long-term plan to build a new parking lot in a grove of trees that was much-beloved in the community, and they had to cut the trees down for that. Well they had the ex-mayor and a number of state legislators committing civil disobedience along with many community members trying to stop that parking lot from being built. That's the kind of conflict you don't want to end up with.

And parking, I think, is really a strong driving factor. Surrounding communities typically resent overflow parking in the community. Over time, on most campuses, new academic buildings often displace parking lots. I know one parking administrator who refers to parking lots as temporary weed control for building sites. It means that for many campuses, the only way to expand parking is to build parking structures. You start thinking about what that means in terms of cost. For a surface parking space you might be talking a couple thousand dollars. A structured parking space, you're talking about a minimum of ten thousand dollars per space. In some places, particularly places where you have to use an earthquake-resistant design, you may be talking forty thousand dollars per net new parking space you create in a parking structure. Think about that for a moment and what that means in terms of the real monthly cost of paying off that debt. At University of Colorado, we took a look at it and it essentially cost us about 200 dollars per month per space to pay off the debt on a parking structure. Compare that to what people are typically paying in monthly parking fees. Yet, you also think about the fact that universities have limited debt capacity and if they're going to borrow money to build parking structures, that's in direct competition with borrowing money to build academic buildings or student residence halls or all those other things that are much more a core part of the academic mission.

The other piece that is, I think, really important to remember- and many campuses haven't remembered in the past- is this notion that price matters. And, as you make that transition from surface parking to structures parking, the price is going to go up dramatically. That's going to have an impact on demand and your projections of parking need have to take into account the elasticity of demand. Otherwise, you're going to build too much parking and potentially be left with a very significant fiscal problem in how you pay off that debt.

A quote from the University of California at Santa Barbara Parking Committee as they were wrestling with this a couple years ago, as they were looking at building a very expensive garage, "There's some possibility that extremely high parking fees will lead to a substantial exodus to alternative transportation. We could even face a 'death spiral' in which high rates reduce permit demand, leading to even higher rates, etc." That's a very real possibility that needs to be kept in mind when doing parking planning. (Here's) an interesting example from Colorado State University a couple of years ago as they were doing their campus master plan. They originally started out with a- basically a straightline projection on parking demand, which they basically said we're going to almost level our campus population over a 20-year time period, so our demand for parking will go up by the same percentage. Well, then they brought in a consultant who actually looked at what it was going to take to provide that parking and what it was going to mean in monthly permit fees. And they were going to go up by a factor of 5, and that was going to significantly reduce the demand for parking to actually below the existing level of parking today. They're still wrestling with what to do about this, but it has certainly affected their plans dramatically.

So, at the same time you have these- sort of sustainability concerns pushing us to do something different, there are these fundamental concerns around the fiscal stability of campus parking systems, and it's about minimizing conflict with your campus and community that are pushing many campuses into a very different approach. If you think about what some of those elements are, in many places, developing transit systems that serve the campus community and developing transit pass programs in which students, faculty and staff have free access to a transit system by showing their university ID are often relatively inexpensive. These programs might cost 5 to 15 per person per month and would involve no issuance of debt. If you think of what it costs to shift one person from driving to cycling to what the infrastructure investments are- much lower than for automobiles. In a number of places, folks are using market incentives to shift behavior, and there can actually be a net revenue gain, depending how that is structured.

To really have this new vision of how campus transportation- based upon all those elements and on looking at reducing that demand by moving people closer to where they need to go by providing housing on or near campus for both students and faculty and staff.

Transit pass programs have probably been the most widespread innovation over the last 15 years. There were a few programs that existed since the 1960's, but no new ones had been created until the early 90's and since then, there's been an explosion of programs. There are programs serving over 800,000 students and staff and they've had a remarkable impact on transportation behavior and many of the places, we've seen 100 percent or higher increases in ridership in the first year of the program. In at least one example, ridership going up at least 200 percent in the first year of the transit pass program.

In many cases, these start out as student pass programs paid for by student fees based upon the student vote. Faculty/staff programs are generally paid from the university general fund or from parking revenues, and again, a dramatic impact on ridership.

A picture from the campaign many years ago at the University of Colorado for the bus pass program (referring to Powerpoint slide).

If you think about the economics of it, for the faculty/staff program, which is paid for with parking fees, we've had to very carefully track the impact on parking. During the first year of the program, the faculty/staff pass program reduced parking demand by 350 spaces. If you divided that into the total cost of the program, about \$400,000, it came to about \$1100 per parking space- per space that demand was reduced. Well, it cost us almost \$3000 to add new parking space on campus, \$3,000 per year in making those bond payments, so it's 2 and a half times more expensive to meet demand through adding parking as it is through reducing demand with a transit pass program. That's the justification for paying for extra parking revenues, that all those folks who aren't using transit are paying for it with parking permits are benefiting from it because it's a heck of a lot cheaper for them than it would be if we had to expand the parking supply.

This picture just shows one of the buses next to campus. I did a quick calculation that there's \$280,000 of avoided parking costs represented in that picture.

The idea of managing the demand through price, again parking demand goes down as the price goes up. In places where the parking is free, shifting to paid parking, you need to make permits very cheap, typically it reduces single occupant driving by 15 to 40 percent. Standard parking supply generally requires price increases; so again, in many cases it's going to be cheaper to manage demand by increasing price than it is going to be by simply providing that extra parking.

One of the other ideas is simply pay people not to drive. That's an approach which Stanford University has pioneered. Give the advantages of using financial

incentives. You're not losing your debt capacity, you can generate new revenue that can be used for investment providing people with other options than driving into campus. It's a low risk approach. If it doesn't work, you can always back off. It's not like having committed 20 or 30 million dollars to a parking structure.

Stanford University, in the early 1990's was, for a variety of reasons, had to develop a different approach to their transportation programs and one of the elements that they decided to do was creating this Clean Air Cash program, in which employees who choose not to buy a parking permit are paid a surcharge attached to their paycheck every month and as- I think this number is actually from 2002- it was 144 dollars a year. So they're getting 12 dollars a month in their paycheck in addition to not having to pay for a parking permit. At the same time, they were gradually raising parking rates so that the financial difference between having a parking permit and not having a parking permit was growing over time, and it had a very significant effect on employees' transportation behavior. That effectiveness combined with other programs that they implemented was able to add 2 million square feet of academic buildings over a 10-year period with no increase in peak period traffic on campus and they measure that very carefully because they have an agreement with the surrounding community that if they do increase peak period traffic to campus, they have to come up with millions of dollars for investment in interchange improvements and intersection improvements. So, this is something that they actually pay a lot of attention to.

University of California at San Diego, a couple of years ago as they were looking at their long-term campus master plan, they started out with, again, straight line planning of what they need to do in the future for parking structures and what- they started out thinking that they were going to need 13 new parking structures on campus. Their annual cost for those was going to be about 16 million dollars each year for debt payment. They then started asking a very basic question: "Is this the cheapest way that we can meet our transportation needs?" They started looking at what mixtures of investment in parking in transit pass programs, in investment in- excuse me- in bicycle infrastructure and other methods to manage demand for single occupant vehicles, what mixture would be the least expensive on campus. When they went through that exercise, what they ended up determining was they could save 7 million dollars a year by investing about 2 million a year in transportation demand management programs and going down from 13 structures to 4 parking structures- a dramatic change, driven not primarily by interest in these overall sustainability issues, but by simple smart planning and attention to the bottom line for the campus.

A key piece also, I think, is really paying attention to non-motorized modes of transportation. At the high end it might cost 150 dollars to add parking for one bicycle on campus, again compared to possibly 100 or 200 times that amount to add space for one car on a campus- very efficient use of space, the most energy efficient mode of transportation and very low cost to users.

There are a number of campuses that have taken this very seriously. University of California at Davis which, admittedly is very flatland (and have) probably slightly better weather for cycling than one would find around here, but they had 15,000 bicycles on campus on a typical day. 60 percent of student trips to campus are by bicycle or by walking, and they've actually gotten enough volume that they have to have innovations like this- a traffic circle for bicycles in order to manage the volume of bicycle traffic.

University of California Santa Cruz has the same issue that you have here, the campus being up on a hill. During peak periods in the morning they actually have a trailer that runs up and down the hill so people can ride their bikes from town to campus, but that last couple minutes where they don't want to go up that hill, they can get pulled on this trailer.

A number of campuses have developed various sorts of bicycle checkout programs to make it easy for people who aren't used to using bicycles for their transportation use to try it out. These pictures are from the University of New Hampshire. A similar program at the University of Colorado was started by the students a couple of years ago where any faculty or staff or student can show their campus ID and check out a bicycle for a two day period. It makes it both very easy for people to try it out and it makes it much easier for folks who choose to take transit to get to campus but then need to run an errand during the day to have easy access to something that allows them to that errand that's only a mile or two, but that's difficult to do if you don't have your car there.

Another interesting innovation a number of campuses have begun in the last few years is working with their local banks and credit unions to offer zero interest loans to students to make it- for purchasing bicycles- to again, make it easy for students to have access to that.

Just, again, as an illustration of the fiscal impacts. This picture, I counted the bicycles here one day and saw about what it would take to serve this demand through parking for cars either in areas of land or a parking structure. I can guarantee they didn't spend 10 million dollars on those old bike racks.

If you think about how do- okay we want to do some things differently, but how do we make that transition? We know how we pay for what we've been doing in the past, how do we pay for this stuff? There's a variety of funding options available. Many places, again, use parking revenue. It's very common for students to vote in place fees for transit. A number of places use parking fines. It can be politically difficult to use parking revenues to fund investment in other modes because people have an ownership that will- "I'm paying for these, they should be for providing parking". But parking fines- it's awfully hard to feel ownership over, "Boy, I got in trouble for breaking the rules and had to pay a fine". There's not the same ownership over that. In fact, in the state of California for both University of California system and California State University system, under state law, those fines must be segregated and a portion of that goes into their Tranportational Truths Programs rather than to provide for parking infrastructure. Universities can partner with their surrounding communities and apply for a variety of federal transportation funds, enhancement funding and congestion mitigation and air quality funding can- have been used by many universities by partnering with their surrounding communities. A number of universities have begun charging transportation fees to any new building projects on campus that can be used to help provide infrastructure.

I'll take a couple on minutes to describe our experience at the University of Colorado. We really have a strong partnership that we've built between the university, the transit agency and the city. The university provides the student bus pass program, the faculty/staff bus pass program, help create demand. The three entities work together to help create a community transit network that this bus is a hop, skip, jump, dot, dash...

Sometimes people make fun of the names, but there's a reason Coca-Cola is Beverage 227. Branding and marketing work. We involved the campus community intimately when designing these transit services. We've worked together to create quality pedestrian and bicycle systems and have gradual increases to parking rates. This is in the context of a community with a master plan of capping the vehicle miles traveled in the community at 1994 levels by reducing the percentage of all trips taken in single occupant vehicles over time to 25 percent of trips.

The partnership has really been key, and that partnership was in planning but also in funding. All three entities share funding for the transit routes, we share funding for creating new transit stops, we share funding for bicycle and pedestrian investments and we share, most recently have been sharing funding to provide real time transit arrival information to customers. (Referring to slides) Here are pictures of a couple of the routes and showing that about 50 percent of the residents in the community are within easy walking distance of one of the routes.

The impact has been significant. From 1990 to 2000, we were able to reduce vehicle trips- only about 12 percent of student trips to campus are in a vehicle. Transit trips went up by a factor of 6, biking went up by 50 percent, and it was really a very different picture than one sees in much of the country. And again, all of this was in a context where it was being driven by a community vision of transportation, and a campus vision about saving money. This picture right here shows the estimated cost per trip to campus. The ones on the right, which are the most relevant, show the cost per net new round trip accommodated on campus by investments in different modes. The cost of over \$2,000 per round trip to accommodate a car coming to campus only cost us \$20 a trip to accommodate a bicycle coming to campus. That is a huge driving force for these policy changes.

For the community, with this policy context, what we've seen is that this set of programs has had a dramatic impact on overall travel behavior. We went back to the early 90's; our behavior was going about the regional rate. Since the- and you really see the regional rate- the purple line showing vehicle miles traveled in the region, how that's been growing. The red line shows our goal of holding vehicle miles traveled to 1994 levels, and the white shows what we've actually experienced. So, while we didn't meet that goal, we were able to reduce the rate of growth of vehicle travel by a factor of about five through these policy initiatives. So, clearly they've had a significant impact.

I know that I'm running out of time, so I think I'll finish with an advertisement of my book. If you're interested in more information on this or in seeing case studies on this from about eight different campuses and what they've done, you can order it from IslandPress.org. Thanks very much.