When DAVID SCHONBRUNN read the April/May issue of Thinking Highways he felt compelled to write an article offering his own views on transportation's impacts onm and solutions for, climate change

View from another planet

As a working California environmentalist, I was thoroughly shocked by some of the things I've read recently in *Thinking Highways*: "*Climate experts … have known for at least 40 years that emissions are highest when vehicles idle*." ('Climate Control', pp 24-27, April/May 2007). While that might be true on a grams/km basis, that measure is meaningless when a vehicle isn't moving. Common sense dictates that absolute emissions bear a relationship to the energy expended, which increases with speed.

The same article suggests that the reduction of congestion is the path forward in the fight against climate change. A recent emission analysis paper determined that the vast majority of vehicle miles traveled (VMT) in Los Angeles occurred during free-flow highway conditions, while the congested periods that cause increased emissions involved less than 10 per cent of total VMT.[1] This means that reducing automotive greenhouse gas emissions will require reducing all driving, rather than just the unpleasant part - congestion.

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A quote from Prof. Dr. Dusan Gruden also clashed furiously with my understanding: "*The combustion of petroleum products by the private automobile contributes an insignificant portion of the global CO_2 emissions.*" ('The people or their sun?' ibid, pp 28-32). That's surely not the situation in California.

Pulling in the same direction

When statements like these are presented as facts, it makes me feel like I live on another planet. Despite that, environmentalists need to be able to work together with the readers of *Thinking Highways*, in furtherance of our common goals. We are likely to be some of the strongest supporters of road pricing and congestion tolls. In the interest of building understanding, I thought it would be useful to offer ITS practitioners an environmentalist's big picture view of the world of climate change.

The Governor of California issued an Executive Order that calls for the State to reduce its greenhouse gas emissions by 80 per cent below 1990 levels by 2050[2]. This amounts to an astonishing 82 per cent reduction on current levels. With road transportation making up a third of the most recent statewide inventory of emissions[3], motor vehicles are by far the biggest cause of global warming in California - larger than the combined next two biggest sources, electric power generation and oil refining. Clearly, meeting this ambitious goal will require profound changes in transportation.

As interim measures, the State has adopted lower GHG vehicle emissions standards[4] (consistent with its decades of refusal to innovate, the auto industry has challenged these regulations in court), and lower carbon-content automotive fuels.[5] However, I believe long-term change will require a move from fossil fuel to electric-powered vehicles, both pure electrics as well as plug-in hybrids.

Those look like the only scalable option to me. The power grid, the delivery system for electric cars, is here now, while batteries are good and getting better. A hydrogen delivery system and hydrogen fuel cells are way off in the future. Corn-based ethanol is just a giant handout to agribusiness - one that makes political rather than economic or environmental sense. Flex-fueled vehicles are the auto industry's fig leaf to look as if they are doing something about global warming, after they literally crushed a promising technology.[6] Prior to this transition to electric vehicles, GHG emissions from the transportation sector will continue to increase rapidly. Future VMT is projected to increase dramatically faster than the population. Strong interventions are needed to cap VMT growth and start to reduce overall driving.

Environmentalists believe that a major component of the response to the threat of climate change needs to be a shift in the pattern of growth away from suburban sprawl, where every trip requires a vehicle trip. Let's not continue the mistake of condemning new residents to dependence on the automobile! Clustering homes into traditional mixed-use villages and towns will make many trips feasible by walking or cycling. Convenient public transit becomes much more viable economically when people live closer together, and when job sites and retail are next to transit stops.

Reduce driving - a lot!

Deciding to not create more auto-dependence is a helpful step, but one that only works at the margins of excessive vehicle emissions. Past suburbanization - the cause of most auto emissions in North America - has created a tangle of expectation and privilege that will be painful to clear up. This unsustainable system of dispersed origins and destinations mixed with free parking and an unpriced road network will strongly resist change. Nonetheless, it is clear that any successful response to the threat of climate change will require a significant drop in how much people drive every year.

> "Flex-fueled vehicles are the auto industry's fig leaf to look as if they are doing something about global warming"

Reforming transportation in the suburbs will take the introduction of economic rationality. Pricing will most likely be the most effective technique in the toolbox of transportation demand management (TDM). We know from transportation demand modelling that trip cost and trip time are key determinants of mode choice. Having a tangible cost associated with each trip is essential to demand reduction. Other than causing the elimination of some low-value trips, pricing will nudge drivers to shift some vehicle trips to walking, biking, carpooling or transit. With appropriate pricing, they will trade off an increment of convenience for lower cost. The trade-off only works, however, when the infrastructure is in place to make the alternative mode trip reasonably convenient and safe.

This means wide-ranging programs like building bike paths to ensure that children can safely get to school on their own, and creating ride-match services to help drivers find carpool partners. Given the tight budgets of transportation agencies, providing convenient transit will require shifting funds away from traditional highway building and exercising the discipline of cost-effectiveness. Once society agrees that we all need to reduce driving, adding highway capacity will no longer seem a reasonable use of public funds.

Shifting trips to transit requires improved transit time-competitiveness to counteract the longer travel times caused by multiple stops, as well as the perceived disadvantage of having to wait for a bus or train (an ITS opportunity for NextBus-type information displays). This means making sure transit doesn't get stuck in traffic, no matter how congested the roads get. Speeding up transit riders will require taking mixed-flow lanes away from single-occupant drivers to provide high-occupancy vehicle lanes (which have a higher person-throughput than mixed-flow lanes when operated properly). It means implementing traffic signal priority (another ITS opportunity) for transit vehicles operating on surface streets. And it means putting existing separated rights-of-way into transit use, such as commuter rail.

> "Charging a parking fee at the trip's end is functionally equivalent to pricing local roads"

Once the alternatives are in place, how do we create that higher cost per vehicle trip needed to incentivize mode shift? Pay-at-the-pump auto insurance is a good way to move part of the fixed costs of auto ownership over to the variable cost side of the equation, where more driving creates higher costs.

Significant gas taxes or carbon taxes would do the trick - and yield revenue for transit operations - if they were politically achievable. Capable politicians tell me to forget about that option, but nevertheless, one concept that might prove viable would be to authorize swapping local transportation sales tax measures for revenue-equivalent increases in the gas tax.

My organization believes that the most feasible way to institute road pricing is to extend government authority over private parking areas and require parking charges for all commercial parking spaces. The principle here is that charging a parking fee at the trip end is functionally equivalent to pricing local roads, while requiring a lot less hardware. Charging for employee parking simplifies parking cash-out and other commute alternative programs - employees who don't use employer-subsidized parking spaces receive cash instead. Retail malls would no longer have an unfair advantage over downtown shopping districts, and would be encouraged to put excess parking areas to productive use. A local tax per commercial parking space would generate revenue for transit operations like shuttles.

Finally, we are very supportive of road tolling, traffic flow smoothing and congestion tolling, but have no idea how to get there politically. I'm confident that environmentalists will stand with the ITS community as these kinds of proposals come forward. As the scientific findings on global warming get more and more alarming, hopefully the public will discover it is willing to make the sacrifices necessary to avoid the worst of the consequences of a century-long binge on fossil fuels. TH

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David Schonbrunn, along with Congressman John Olver, is one of the keynote speakers at H3B Media's Climate Change: Transportation's Impacts & Solutions Think Tank *at the University of Massachussets at Amherst in May 2008. For more details go to www.h3bmedia.com and click on the H3B Events button.*

References

1 Barth, M. and K. Boriboonsomsin (2007) *Real-World CO2 Impacts of Traffic Congestion*, submitted to the Transportation Research Board's Transportation Research Record, National Academy of Science, 2007. See figure 8.

2 http://gov.ca.gov/index.php?/print-version/executive-order/1861/

3 www.arb.ca.gov/cc/ccei/inventory/tables/rpt_inventory_ipcc_sum.pdf

4 www.arb.ca.gov/cc/factsheets/ccfaq.pdf

5 www.arb.ca.gov/fuels/lcfs/eos0107.pdf

6 www.sonyclassics.com/whokilledtheelectriccar/presskit.pdf