VMT Cap-and-Trade System for Sonoma County

Introduction and Background

Traffic congestion. Air Pollution. Global warming. Death and injury of people and animals. Noise. Resource depletion. These are the impacts of our transportation system. The numbers of vehicles have been increasing faster than population, and vehicle miles have been increasing faster than the numbers of vehicles. Although exhortations to reduce VMT (vehicle miles traveled[1]) become ever more frequent, it continues to grow. It grows because the incentives remain in place to keep it growing. There have been a number of proposals to change, eliminate or reverse those incentives, but little progress has been made.

A new proposal is introduced here, which might work. It could work because it recognizes the system of roads as a commons – i.e., property freely accessible and usable by all – and makes that a central part of the solution. The failure of most efforts to date is that they overlook this basic fact.

Analogous to overuse of the roadway commons is the overuse of the global atmosphere (a world scale commons) for dumping CO2, which has caused global warming. The key question of global warming is how to divide up the responsibility for curtailing CO2 emissions among nations. Because it is very difficult to get nations to agree on a formula for sharing the burden, no satisfactory agreement is forthcoming and progress is stalled.

A solution for CO2

Recently a new book has provided a mechanism for a single nation such as the United States, acting independently of other nations, to take action to reduce CO2, . In his book, ***Who Owns the Sky; Our Common Assets and the Future of Capitalism***, author Peter Barnes develops a model for dealing with commons problems. Although the book is about solving any of the problems in this general class, Barnes focuses on CO2. His model is a "cap-and-trade" system, where an overall cap on the pollutant is established and permits are sold to the "polluters". He solves the equity problem raised by prior cap-and-trade systems by having the revenues go into a trust, which distributes the accrued funds to all the people, each of whom owns one share (by right).

Applying the Cap-and-Trade model to roads

Since the system of roads is a commons, albeit of a much smaller scale than the earth's atmosphere, this same model could be applied to road use in Sonoma County, where reduction of VMT (as the best single measure of congestion and of fuel use[2]) provides a net benefit regardless of whether other counties reduce their VMT. Using this model, a VMT cap-and-trade system will be defined, with Sonoma County as the applicable area, and with bounded internal areas (e.g. cities) being the buyers of permits. The holders of shares in the trust could be the same areas that are defined for purchase of permits, or could be the individual residents of the County, or a combination of the two.

Defining the System

Refer to Figure 1. The participating entities are shown as geometric shapes. The connectors represent flows between the entities. Solid connectors are dollar flows.

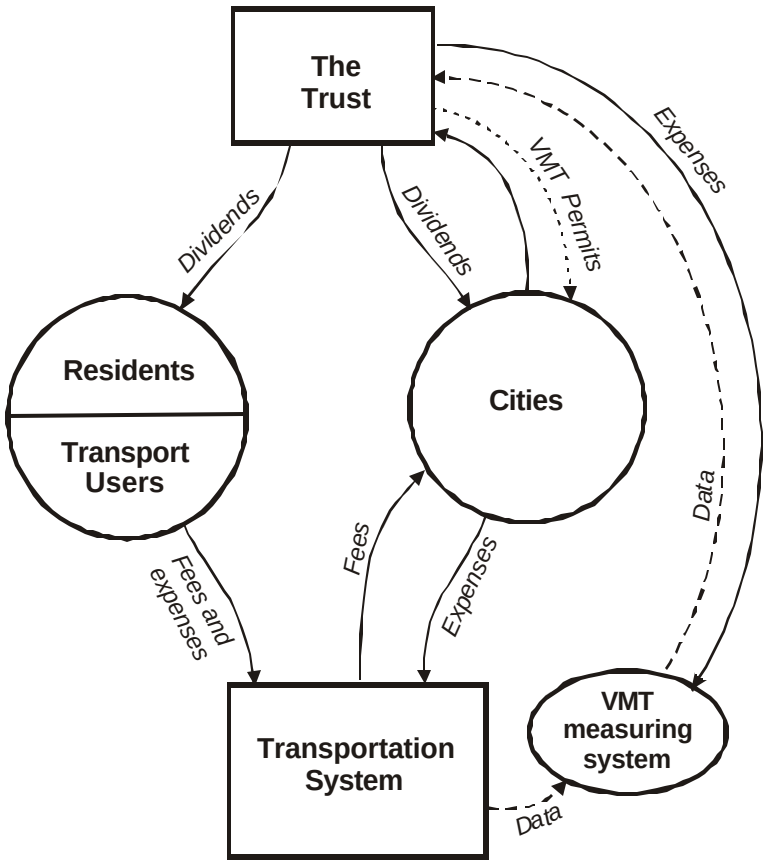

Figure 1 *Schematic of VMT Cap-and-Trade System*

Residents and Transport Users
This entity is shown as a divided circle because of its split personality. Residents and transport users are the same people who, as residents collect equal amounts in dividends disbursed by the Trust, but as transport users pay out differing amounts according to the amounts and means of their travel.

Cities
"Cities" is shorthand for local public decisionmaking bodies within the County. The intent here is the governmental bodies that determine land use and provide for transportation in bounded geographic areas. For the most part this would be cities as we know them. For the rest of the County, i.e., unincorporated territory, the entity could be the County itself as arrangements exist today. However, the trading system is likely to work better if this unincorporated territory is subdivided into smaller zones.

Transportation System
This would be the entire ground transportation system, including roads, cars, parking, transit, bicycles and walkways.

The Trust
This would be a normal trust, like the land trusts that are becoming increasingly common, and subject to all the same laws that govern trusts. It would have a board of directors who would act on behalf of the beneficiaries. The beneficiaries are those who receive dividends – in this case residents and "cities". Duties of the trust would be to disburse dividends, set annual countywide caps on VMT, sell VMT permits to cities, and audit VMT measurements.

VMT Measuring System
VMT is measured today by various jurisdictions in various ways. As the basis for exhortations the data is probably satisfactory, but the system will have to be improved once real money

depends on it.

Flows between the entities
Most of the flows in Figure 1 already exist. All that is new is dividend distributions by the trust and the payments for permits from which the dividends are derived. The trust would have some of the normal expenses of a non-profit organization of course, plus some specific expenses (shown) to assure that VMT is satisfactorily monitored.

Implicit in the dual flows of dividends to individuals and to cities is a decision on the fraction going to each. Individuals would receive dividends in part to compensate for some increases in transport expense that they would be required to pay, as subsidies are reduced. Cities would receive dividends to offset part of the price of their VMT permits.

One result of establishing the trading system is that some of the existing flows would change. One could expect, for example, that fees collected by cities from the transportation system would increase as the cities are encouraged to put transportation in a more self-financing position.

How the system would be brought about

Adopted by ballot
The trading system would be adopted by a countywide majority vote. Since taxes wouldn't be involved, a supermajority vote wouldn't be needed. Except for the dividends, which are like the dividends from any stock that pays them, all other cash flows are payments for benefits received, e.g., the cities pay for permits, and transportation users pay fees in some instances for use of the transportation system.

The initial question to the voters would be whether we should establish this market system. The means of establishing the cap would be included in the details. This could be a procedure for asking for a single answer for two questions: "How much traffic do you want to make?" and "How much traffic created by others will you tolerate?" Having each citizen in the dual role of trust shareholder and traveler will assure that they will render conflicted hence honest decisions. The cap and the price of permits would be reset each year, based on prior years experience and other factors.

Determining the cap
The process for determining the annual cap might involve ballots, perhaps at infrequent intervals, and/or it might be a decision revised annually by the Board of Trustees, somewhat in the manner that the Federal Reserve Board sets monetary policies for the nation.

The level at which the cap is set determines the intensity of dollar flows through the system; the more it is constraining (the lower the cap), the greater the price for VMT permits, the more reluctant cities are to purchase the permits, and the greater the dividends to the shareholders. One could imagine that initial VMT caps would be set a little high, probably even higher than the historical VMT levels, to compensate for lack of experience with the system, and imprecision of VMT data.

Getting the VMT data
A continuous process of VMT sampling would be needed so that the actual VMT for each of the jurisdictions within the County could be estimated satisfactorily.

There are at least 3 different definitions or types of VMT that could be used.

> (1) The VMT that takes place on all roads in each sub-jurisdiction of the County. This is the simplest and most obvious VMT measure. It is generally obtained from vehicle counts at fixed points along the roads, which are then multiplied by the associated lengths of roadways being sampled.
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> (2) The aggregate annual mileage of vehicles registered in the County. This would include travel outside the county, and would not include mileage of vehicles registered outside the county. This data would be obtained from periodic readings of odometers, probably in the smog check system, and possibly in connection with annual vehicle registrations.
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> (3) The mileage of all trips originating within the county. This would include trips that end outside the county as well as internal trips, but unlike (2), it would account for all trips, whether or not the vehicle is registered in the county. This estimation would probably necessitate use of a travel model in addition to one or both of the above sources of data.

Quality of the data
Currently published VMT data probably isn't of sufficient quality to fully implement a VMT Cap-and-Trade system. The sampling is so sparse that figures are generally available only for whole counties; sub-county variations have to be measured. The advantage of the type (2) data is that it is already collected for individual vehicles (although not annually), and (at least for special studies) has been processed for small zone specificity[3] (census tracts?).

Expected results

Since individuals would not be required to purchase VMT permits, there would be no *direct* behavioral change on the part of drivers with the advent of the VMT Cap-and-Trade system. But the city governments would see positive and negative consequences of VMT levels within their boundaries, and would have budget motivations to make changes that would encourage VMT reductions by individuals. Here are some likely changes:

- Reduce parking requirements
- Charge for parking
- Provide inducements for using transit, riding bikes and walking
- Support traffic calming
- Encourage re-use of existing parking spaces
- Encourage mixed use development and redevelopment
- Find ways of rewarding individuals and groups of individuals for reducing VMT
- Assess fees to developers based on likely increase of VMT induced by their projects

Related Schemes

Feebates
A proposal to reward/penalize auto fuel efficiency would have tacked on fees to less efficient cars while giving rebates to buyers of more efficient cars, in such a way that the feebates as a whole would be revenue neutral. Amory Lovins was credited as the originator of the idea. It was expected that this would influence vehicle sales, and thereby influence the vehicle supply, to provide a continual shift toward efficiency.

Pay-at-the-Pump Insurance
Several schemes were proposed to switch the auto insurance system to a mileage base rather than the current system, which is essentially a fixed annual cost. The "Pay-at-the-Pump" or "Pay-as-You-Drive" scheme would have tacked onto the fuel price all or most of the payment for auto insurance. Other versions would have used odometer readings for insurance charges. More recently, there was an experimental program conducted by the Progressive Insurance Company, which actually monitored the movement of the insured vehicles in order to establish the charge for insurance.

VMT Reduction Fund
SCTLC has been working toward a system that rewards counties for per capita VMT reduction by increasing transportation funding. The hope was that the VMT reduction fund could be established at the State level. Then, it was supposed, the same concept would trickle down from the Counties to the local governments that make many of the VMT-influencing decisions.

Any of these schemes, and probably others as well, have considerable merit, and would be worth pursuing in parallel with the VMT Cap-and-Trade system. None of them would replace this more comprehensive approach, but they would all contribute to most of the same ends. As in most natural systems, multiple feedback loops are generally better than single loop systems.

Considerations of Equity

As in the basic model conceived by Peter Barnes for CO2 reduction, basic income equity is achieved by passing the permit revenues through a trust, which distributes them on a per capita basis. The rationale for doing this is that the commons belongs to everyone equally, and so if there are any monetary gains, they should be distributed equally.

In the VMT version of the model, part of these revenues would be distributed to the cities on a per capita basis. It then is up to each city to assure that its expenditures reflect the same underlying commitment to equity.

There will be claims of geographical inequity – that people who live in outlying areas, or have to commute long distance to jobs, or have few services where they live – will be losers in this

system, at least relative to the current one. To an extent this is true. It could hardly be otherwise, since one of the goals of the proposal is greater travel efficiency. In fact the current system artificially encourages inefficient transportation, by providing subsidies flowing from the majority to the few who position themselves to take advantage of the subsidies.

The issue won't be expressed purely in terms of geographical equity, but will mix income with geography, e.g. "the poor can't afford to live close by, are forced to find cheap accommodations at a distance from economic activity, and therefore are unfairly treated by rising costs of long distance travel". There is enough truth in this argument to expect that it will be repeated often, but it is invalid. This type of argument has been called "the cry of the rich on behalf of the poor".

J.W. 12/26/2001

ENDNOTES

1.The "T" in VMT seems redundant. While "vehicle miles" is used when written out, the acronym VMT will be used because it has meant the same thing for so many years.

2.Travel has many different consequences, including oil depletion, air pollution and CO2 emission, road damage, death and injury, etc. No one variable corresponds precisely with all of them. Vehicle miles (VMT) is selected as the best compromise. Part of the rationale for the choice is that the data could possibly be estimated satisfactorily. Even for VMT, a system to fully account for it won't be easy to develop.

3.Holtzclaw study of density and VMT.