Car Dependence

How Groningen averted it, and how Reno hopes to reverse it

Peter Menchetti, Prins Hendrikkade 189-78, 1011 TD Amsterdam
Universiteit van Amsterdam collegekaartnummer #0500313
Social Trends, Social Problems and Social Policy in the Netherlands, Geert de Vries & Dr David Bos
June 16, 2005

With increasing concentrations of cars in our cities comes an array of social problems. In this paper I will provide an illustration of the effects of car dependence, using my hometown of Reno, USA as an example. And I will outline the social policies adopted in the Netherlands to tackle car dependence, and specifically the trends resulting from their adoption in the city of Groningen. Finally I will explore future steps for Reno, and how it might learn from Groningen's successes.

In the modern city, there are four basic ways for inhabitants to get around: by **foot**; on a **bicycle**; in a **car**; or with **public transportation**, like buses, trams, and subways. Urban planners must consider these four modes when designing cities and streets. For each mode, there are different ways to plan, and different infrastructures to employ – from sidewalks for pedestrians, to highways for automobiles, to bicycle bridges for cyclists, to transit centers for buses. How a city is planned will help to determine an inhabitant's decision about how to get from point 'A' to point 'B'.

Table 1. Energy Intensity of Selected Transport Modes, United States, 1984

Mode	Calories per Passenger Mile
Automobile, 1 occupant	1860
Transit bus	920
Walking	100
Bicycling	35

(Source: Lowe, 1989: 21).

In a city, the most efficient of the four transport modes is without question the bicycle. "Bicycles consume less energy per passenger mile than any other form of transport, including walking" (Lowe, 1989: 19). Economically speaking, the only cheaper way for a person to travel is by foot. And for governments, bicycle infrastructure is relatively cheap to build and maintain. Twelve bicycles can be parked in the same space required for one car (C.R.O.W., 1996: 241). And, people like bicycles! In a recent poll, BBC Radio listeners voted the bicycle as the best invention since 1800, ranking it above electricity generation and the jet engine (BBC News, 2005). Curiously, it is the automobile that often receives the lion's share of the attention and subsidization from many governments.

For those who live in rural areas, isolated and at great distance from markets and social services, a car can make sense. But in a city, increased concentrations of cars produce many serious negative effects for society as a whole. Their engines inefficiently burn fossil fuels, creating harmful air and noise pollution and a dependence on imported oil; their bulk consumes precious urban space; and their speeds threaten the lives of our children, pets, and elders. And for the user, costs are the highest of the four transportation modes. In the United States, 80 million people who are unable to operate automobiles are deprived of mobility (Kay, 1997), isolating the poor to their slums, the young to their empty suburban neighborhoods, and the elderly to their retirement homes. Delays caused by traffic have an adverse economic impact, since in our capitalist economies, time *is* money. And the hidden costs of driving, which include "road building and maintenance, police and fire services, accidents and healthcare… may total as much as $300 billion each year [in the United States]" (Lowe, 1989: 41), adding to everyone's tax bills. Other problems such as obesity, asthma in children, and stress can be partly attributed to the effects of car dependence.

Problems associated with car dependence even reach a global level – the greenhouse effect is of growing concern, and in the United States, vehicles are "the largest source of nitrogen oxides and organic compounds that are precursors to ozone" (Lowe, 1989: 15). And recently, "a French government report on the global oil industry forecasts a possible peak in world production as early as 2013" (BBC News, 2005). The industrialized nations of the world, whether they be in Europe or America or elsewhere, are increasingly oil dependent, and as demand for oil increases and supplies dwindle, prices will increase and economies will be impacted. Conflicts over control of remaining oil reserves has led to war and tensions could escalate, potentially even pitting long-time allies against one another in competition for fuel – much of which is needed for cars.

The solution to car dependence can come only through social policy and collective action, and public and community participation has proven to be key to the success of urban design for alternatives to the automobile (Urge-Vorsatz & Cherp, 2002: 6). Grassroots activists can strive for "shifts in modal split in transportation from cars towards public transport, ... bicycling and walking, while preserving mobility and accessibility for different social groups… along with other positive environmental

effects, such as recovering public space, reducing congestion and improving safety" (Urge-Vorsatz and Cherp, 2002: 6) When successful, activist efforts lead to changes in social policy, which translates to progressive urban planning which challenges car dependence. The influence of these new policies on citizen travel behavior becomes quite apparent in the comparisons of Reno and Groningen.

Table 2. The comparison cities

	Reno	**Groningen**
Population	133,850 (1990); 195,727 (2004)	160,000 (1990); 179,185 (2004)
Physical area	145 km² (1999); 223 km² (2004)	82.49 km² (1979); 83.72 km² (2000)
Population Density	1008 / km² (2000)	2251 / km² (2004)
Modal split		
Car	86.9%	36%
Pedestrian/Bicycle	6.3% (walking & "other means")	58%
Public transportation	1.9%	6%
Other		
Obesity	19.1% (Nevada, 2001)	<10% (Netherlands, 2002)
Traffic Fatalities*	23.5 (USA, 1997)	16.1 (Netherlands, 2004)
Gasoline / new car tax**	45% / 5% (USA)	245% / 47% (Netherlands)
Funding for Non-motorized transport	$21 million for 2004-2030 or approx. $807,700/year (Bicycle/Pedestrian, Washoe Cty)	$ 2.76 million for 2004-2007 or approx. $690,000/year (Provincial Bicycle Plan)

(Sources: City of Reno, 2004: XIII-6; ECF, 1998: 2; U.S. Census Bureau, 2000; Davis, 2000; CDC, 2005; IOTF, 2003; Provincie Groningen, 2005).
* per million inhabitants, **for bicyclists and pedestrians** (USDOT, 1997; Statistics NL, 2005).
** Taxes on auto ownership and gasoline compared with kilometers of auto travel (Lowe, 1989: 40).

Groningen, the Netherlands

Groningen is the largest and most important city of the northern Netherlands. Its current population is 180,848 (Wikipedia, 2005). The city has become well known in Europe and internationally for its progressive urban planning policies and programs.

> Groningen pays a lot of attention to the link between land use planning and transport planning. This is reflected in the concept of the 'compact city'. The compact city approach aims to keep distances as short as possible to as many destinations as possible, in order to limit the number of necessary travels and to allow many distances to be covered by bike (SMILE, 2002).

Despite Groningen's population growth, the 'compact city' concept has kept the physical area of the city nearly the same for the past 20 years (see Table 2). When asked whether or not the city feels crowded because of this compactness, Groningen inhabitants interviewed tended to respond quickly, "no," but added that the center gets really crowded on the weekends, when people from small towns in the region visit for shopping and leisure.

The Dutch have a long history of heavy bicycle use – in 1928, they were already considered a "bicycle country" as they are today, and had the highest level of bicycle ownership of all western countries (MVW, 1999: 19). National policy has, since the late seventies, given priority to the bicycle, encouraging "direct, uninterrupted routes – thus making riding practical, rather than simply getting cyclists out of the way of other traffic" (Lowe, 1989: 35), and has sought to limit car dependence. Nevertheless, car ownership in the Netherlands continues to rise – between 1970 and 1997, it more than doubled (MVW, 1999: 31). But bicycle use remains extremely high nationally, with a share of trips of over 25%. People in the Netherlands *do* have cars – but they aren't dependent on them, and they use them much less than Americans. This can also be attributed to the fact that more of the external costs of driving are passed on to Dutch motorists in the form of taxes (see Table 2).

The Dutch national cycling strategy amounted to much more than installing bicycle lanes. It consisted of four "spearheads":

- car→bicycle
- car→public transport + bicycle
- cyclist safety
- bicycle parking facilities and theft prevention

For each spearhead, there were research projects, pilot and model projects, instrument development, and information exchange, for a total of 112 projects (MVW, 1999: 55).

Groningen's city government, forseeing car growth, introduced their traffic circulation plan in 1977, which shifted focus away from the car to the bicycle (SMILE, 2002). Investments in cycling continue to pay off:

> Groningen is backing bicycles because of fears about car growth. Its ten-year bicycle programme is costing £20 million (US $37 million), but every commuter car it keeps off the road saves at least £170 (US $314) a year in hidden costs such as noise, pollution, parking and health" (Global Ideas Bank, 2005).

Other traffic changes have included "demarcating one-way streets for two-way usage by bicycles" (Urge-Vorsatz & Cherp, 2002: 8) and

> in the Netherlands separate bicycle signals are commonly used at arterial intersections that have bike lanes and high volumes of bicyclists and motor vehicle traffic. In Groningen, a special bicycle phase allows bicyclists in the bike lane to proceed straight before motor vehicles (i.e., right-turning traffic) are allowed to proceed. Motor vehicles are not allowed to turn right on red in The Netherlands (USDOT, 2001: 23.3).

But perhaps the most radical innovation has been the division of the city into "traffic cells":

> "Groningen divided its central area into traffic cells whose boundaries private motor vehicles were not permitted to cross. To travel from one cell to another, drivers must return to a ring road. Bicycling increased substantially, and now constitutes over 50 percent of all trips" (SFGOV, 2005).

Indeed these efforts have obtained their desired results – over 57.8% of inhabitants have no car, and "the bicycle is on average 30% faster than the car in Groningen and around 50% of the number of travels over short distances are made by bike" (SMILE, 2002). This 50% share of trips is widely reported in numerous articles and papers, but to be precise, this figure usually refers to trips of up to five kilometers. The bicycle's total share of all trips in Groningen in 1995 was 39% (MVW, 1999: 85) – still among the highest levels of bicycle use in the world.

Regulations are in place which continue to discourage car dependence and help to keep the city compact: "facilities and offices with large numbers of employees could only be located in places easily accessible to bicycles and public transport" (Urge-Vorsatz & Cherp, 2002: 8); "only enterprises really needing access by car are situated in the periphery" (SMILE, 2002). And management of public parking space

> is a key instrument in transport policy because availability of parking influences modal split in traffic (more parking attracts more cars) and because parking has a number of environmental effects and may negatively influence public transportation, biking and walking (Urge-Vorsatz & Cherp, 2002: 9).

> The parking policy of Groningen supports the strategic choice to limit car access to the inner city: parking spaces in and close to the city are only for business travel and targeted (short) shopping; parking for [leisure] shopping and commuter parking is discouraged in the centre and directed to Park & Ride; and on-street parking in inner city is most expensive" (SMILE, 2002).

There is also a bus system in town called "Kolibri", which utilizes synchronized switching technology to allow buses to pass at traffic lights. With a share of 6% of all

trips, the bus is not *heavily* used, but many rely on it, especially regional visitors to town and the elderly.

Groningen's success is the product of a long term commitment to change, and its proponents were met with resistance. Typically, businesses react negatively to proposed restrictions on automobile use, fearing that if clients can't come by car to their shops, they won't come at all. But as Gerrit van Werven, a senior city planner, puts it,

> 'This is not an environmental programme, it is an economic programme. We are boosting jobs and business. It has been proved that planning for the bicycle is cheaper than planning for the car.' Proving the point, requests now regularly arrive from shopkeepers in streets where 'cyclisation' is not yet in force to ban car traffic on their roads" (Global Ideas Bank, 2005).

As previously mentioned, public and community participation are important for design and implementation projects, and were a key success factor in Groningen.

> Ordinary members of the public make choices which ultimately determine the success or failure of transport and energy projects, so it is important to have full and informed public support. Thus, any successful urban project should be a 'combination of technical and motivation measures' (from Heidelberg report by EA UE). 'Participation' in this context means (a) providing the public with necessary information, awareness-raising and education; (b) consulting the public at early stages of project development and (c) involving the public in project implementation. ... Tools included: setting up comprehensive public information services; conducting public consultation exercises, running opinion polls and undertaking referenda on key transport policies; and motivating the public through advertisement and other means of promotion of better public image of public transport, biking and walking." (Urge-Vorsatz & Cherp, 2002: 6).

Hans Visser from Groningen Department of Town Planning, Traffic and Economic Affairs points out that the whole process of policy implementation to combat car dependence required

> a significant degree of determination - a willingness to stick to a planned course, even if it sometimes meant going against the tide. The results of this policy often only become visible in the longer term and there are many dangers lurking along the way. If you give in to resistance too easily, the ultimate result is no more than a pale shadow of the original goals. Secondly, it is crucial to maintain the dialogue with all those involved in order to maintain and broaden the basis of support. And lastly, there is the need to arrive at an integrated approach. The quality of life in a city is not determined just by a well-planned traffic structure or just by excellent shopping facilities or just by attractively laid out public spaces. It is precisely the combination of factors that governs the result" (Reported by EA UE)" (Urge-Vorsatz and Cherp, 2002: 12-13).

Some benefits that Groningen has enjoyed include reductions in pollutants from motor vehicles, reduction in petrol consumption, reduction in noise pollution, and reduction of barrier effect of major roads (Dekoster, J. and Schollaert, U., 1999: 17). Also thanks to going by bicycle instead of by car, on average, Dutch citizens produce roughly

half the greenhouse gases that an American produces each year. And starting in 1998, greenhouse gas emissions in the Netherlands began to fall (VROM, 2002: 122). In addition to the other $314 per year per car saved (mentioned previously), one study found that the cost of just five minutes per car of traffic jams which would be caused by a theoretical reduction in bicycle use in Groningen would cost over $450,000 total annually (Dekoster, J. and Schollaert, U., 1999: 17). Statistics Netherlands is reporting historical lows for traffic fatalities – cyclist fatalities have fallen 22.7% in the last four years alone, and for children under the age of 15, a 44% decline compared to the previous year was reported for 2004 (2005: 1, 3).

A very interesting benefit of bicycling found during research would actually support a claim that Groningen's cycling majority is four times *happier* than its motorists!

> A study carried out in Washington on 600 men and women aged between 18 and 56 and cycling a distance of 16 km (round trip) or more at least four days a week showed that cyclists enjoy a better physical and psychological health than non-cyclists. ... This study also shows that the likelihood of cyclists considering themselves 'happy' or 'very happy' is four times as high as for the controls.

And for children, bicycling to school encourages healthy exercise habits from a young age, which if continued into adulthood will help to avert obesity:

> An English study has reported an increasing number of children who do not take sufficient regular exercise because they are taken to school by car. The authors of the study stress that we are in danger of creating generations of obese people with fragile bones if the habit of physical exercise is not instilled in young people" (Dekoster, J. and Schollaert, U., 1999: 34-35).

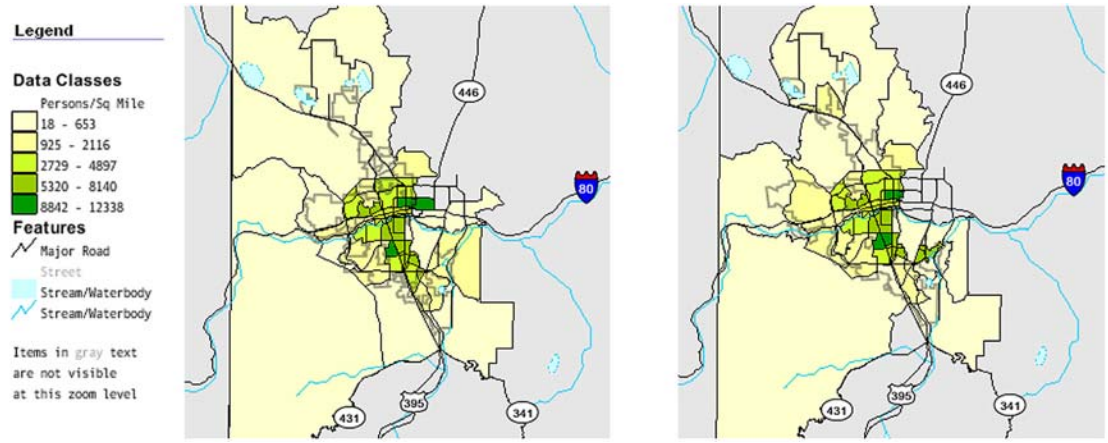
Figure 1. Satellite images of Reno (left, Sept. 2002) and Groningen (right, June 2003).

(source: Terraserver.com)

Reno, Nevada, USA

Reno is a city of 195,727 inhabitants (City of Reno, 2004: XIII-6) in Washoe County, Nevada, built in a river valley where the forested Sierra Nevada mountains of California end and the dry high desert of Nevada begins. The population of Reno has expanded rapidly in recent years, and the city, like most western North American cities, has sprawled out, consuming surrounding hillsides and former farmlands. This is due largely to a failure to link transport planning and land use planning as Groningen has done following their 'compact city concept'. Compared to the relatively tiny Netherlands, there is so much space in the United States that its conservation has not been a priority for planners. This spread out, sub-urban form, illustrated by Figure 2 (note the westward expansion), would not have been possible without the automobile, and the government's willingness to cater to it. Car ownership in Reno is therefore extremely high, and a vast majority of inhabitants own cars. At least 87% of all trips are by car, which is quite typical for a western U.S. city. The automobile has dominated Reno and the United States' transport and planning policies since the end of World War II. Public transit in the U.S. has received on average one dollar for every seven given to the car (Kay, 1997).

Figure 2. Population distribution maps for Reno, 1990 (left) and 2000 (right).



(source: census.gov)

There are some important differences to note between Groningen and Reno. Groningen, like most of the Netherlands, is almost completely flat, which makes cycling easier and more attractive. But the Netherlands is also a very rainy country, and wet weather definitely does not encourage people to bicycle. Reno enjoys "more than 300 sunny days each year" (City of Reno, 2005), and its pre-sprawl center is mostly flat – most of the developments that climb into the hills are relatively new.
A difference of even greater importance to note between the two comparison cities is in their physical size and population density. Reno's physical area is more than twice that of Groningen's (see Table 2). With a nearly equal population, that means the density of Groningen is more than twice that of Reno. Since the city, at 83.72 km², is physically smaller, distances are shorter, which makes transport infrastructure automatically cheaper to build and maintain, simply because there is less of it. Additionally, cycling becomes much more attractive when distances are shorter. One Dutch study (C.R.O.W., 1996: X) found that distance is the single most important factor influencing a cyclist's choice of route, so it's safe to say that it will also be important when deciding between the car and the bicycle. Reno is an example of what happens to a city with a motoring population that lacks integrated transport and land use plans. Its physical area has increased from 145 km² to 223 km², or by 153%, in the last five years alone! Such a rapid territorial expansion would not have been possible without planning practices that have favored the automobile, which has led to the

vicious circle of road building and congestion that in so many communities has created urban sprawl that fosters car dependence and made the use of alternatives difficult, impractical, and expensive.

Table 3. City of Reno expenditures for streets, 2002

Street construction	$6,900,000
Paint and sign	$1,385,016
Pavement maintenance	$1,795,296
Street sweeping	$2,882,300
Traffic engineering	$2,386,709
Traffic operations	$981,939
Total	**$16,331,260**

In 2002 alone, more than $16 million was spent on streets in Reno (see Table 3). Washoe County acknowledges that "nationwide investment at all levels remains substantially below the amounts needed to maintain the current condition and performance of our nation's transportation systems" (RTC, 2004: 8-1). This supports claims by the Alliance for a Paving Moratorium that future road construction, in addition to being destructive to the environment, is economically unsustainable.

> To simply maintain roads in their current poor state would cost the U.S. $24.6 billion per year. Yet we spend typically $13.4 billion per year, assuring deterioration of existing roads. Meanwhile, $16.4 billion was spent to build new and wider roads. Federal, state and municipal governments cannot afford to maintain existing roads, but more are built as a result of powerful interests (APM, 1998).

More than fifteen years ago Reno's neighboring state of California determined that road building only encourages more traffic:

> building more roads [is not] the answer to congestion. Transport planners are finding that constructing new freeways just attracts more cars, as some public transit riders switch to driving and new developments spring up along the new roads. In 1988, a California Department of Transportation study concluded that neither a $61 billion road building program nor any further road building, could solve its traffic problem" (Lowe, 1989: 18).

This hasn't stopped Reno from building roads – the city's total street miles expanded from 449 (722 km) in 1999 to 546 (879 km) in 2004 (City of Reno, 2004: XIII-5).

Parking policy has also helped create urban sprawl. I was personally familiarized with Reno's planning requirements for new businesses in the late 1990s, when I sought to open a small concert hall in Reno. I found a building with a capacity of around 300 persons on Mill Street, not far from downtown. I was informed by the

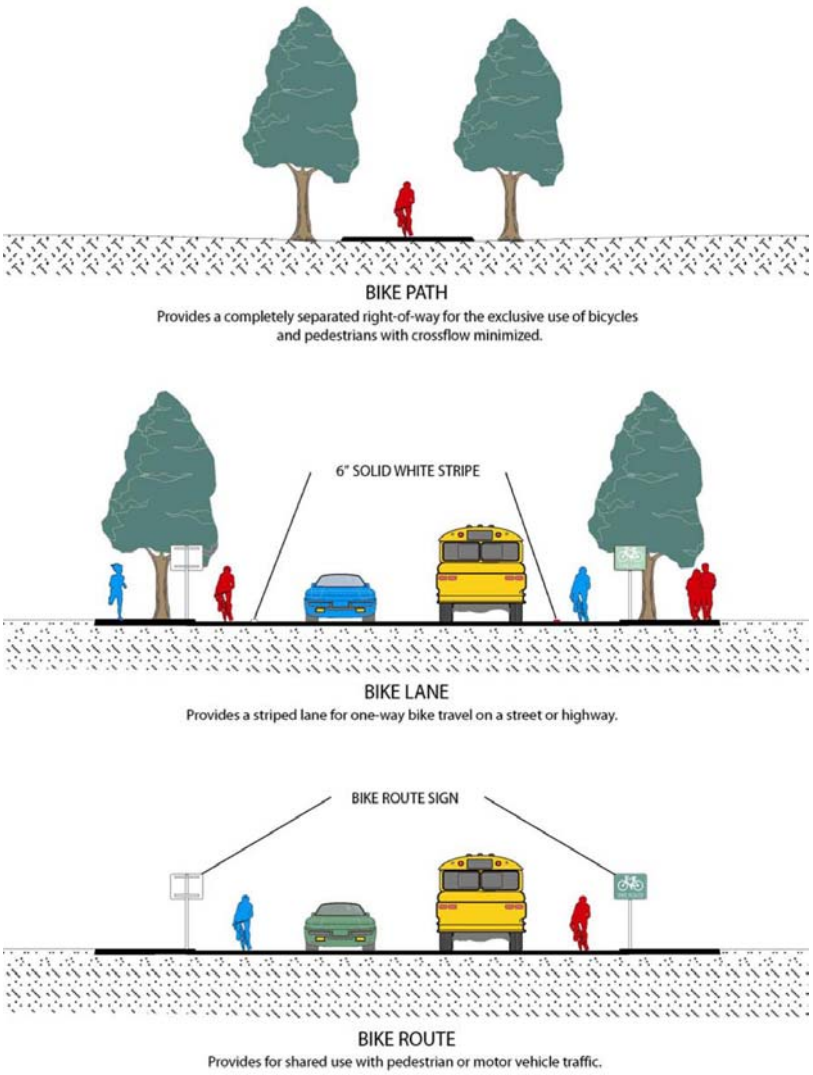
planning department that in order for this use to be permitted, I would need my own parking lot which would accomodate approximately 100 cars. It was therefore assumed that at least 1/3 of my customers would drive a car to the club, and that the other 1/3 would arrive either as passengers or by other means, and the responsibility to provide parking rested on me, so as to prevent conflicts with other businesses and residents in the neighborhood. There were, however, no planning requirements for any other means, such as bicycle racks, or proximity to public transit. This planning policy is practically a polar opposite of Groningen's previously mentioned requirement for businesses with large numbers of employees to be accessible by bicycle or public transportation, and has helped Reno contribute to the United States' "38.4 million acre monoculture of roads and parking lots" (Kay, 1997).

The bicycle is only in recent years starting to receive some attention in official United States policy. The Transportation Equity Act for the 21st Century (TEA-21), enacted in 1998 (TEA-21, 2001), lays out requirements for all U.S. cities which for the first time include mentions of "motorized and non-motorized users", and gives funding priority to bicycle, pedestrian, and public transport projects which "serve as alternatives to automobile travel" (RTC, 2004: 5-15). 50 miles (about 80 kms) of "bikeways" have existed for several years already in Washoe County (RTC, 2004: 5-2), but the majority are either "bike lanes", which are simply stripes of paint on the road to separate bicycles from car traffic; or "bike routes", which consist simply of a sign on a normal road, leaving bicycles to ride unseparated from car traffic (see Figure 3), often pushed into what most would call "the gutter". This road shoulder, to which bicyclists are relegated, is often on both bike "lanes" and bike "routes" covered with sand and dirt which has been blown aside by passing motorists, creating a somewhat slippery surface, and resulting in Washoe County's "second leading cause of bicycle accidents" (RTC, 2004: 8-12).

Funding for bicycle infrastructure in recent decades is difficult to track, since no plan dedicated to the bicycle has existed, and since most non-motorized projects are undertaken as part of road or transit projects (RTC, 2004: 8-10). But since "bike lane striping can cost as little as $2,000 per mile" (ODOT, 1995), and there is only

one bicycle path through town, it's safe to say that Reno has dedicated a very small fraction of road construction and maintenance budgets to bicycle infrastructure.

Figure 3. General Bikeway Facility Classifications, USA



(source: RTC, 2004: 5-4)

Reno's bus service, Citifare, began in 1978, and today consists of a fleet of 65 buses on 29 routes, which include routes into nearby Sparks and other areas of Washoe County (Citifare, 2005). Citifare's website boasts ridership of over 7.5 million in 2004, but this makes up only about 2% of trip share, just 1/3 of

Groningen's. Bicycle racks, with space for two, are installed on the front of all buses, which increases their multi-modal usefulness.

The transportation authority for Washoe County, the Regional Transportation Commission (RTC), has big plans for the next 25 years. TEA-21 regulations, which went into effect in 1998, have finally obliged the RTC to seriously consider bicycles and pedestrians in its plans. The planning processes for, in fact, all U.S. cities, must "provide consideration of projects and strategies that will ... increase safety ... for motorized and non motorized users; increase the accessibility and mobility options...; protect and enhance the environment, promote energy conservation, and improve quality of life" (RTC, 2004: 1-6). This has resulted in the creation of the 2030 Regional Transportation Plan (RTP).

A stated objective of the RTP is the development of a "transportation system that minimizes the need for automobile travel and maximizes the opportunity for transportation alternatives such as public transportation and non-motorized travel modes", and promises to insure "mobility for the transportation disadvantaged" (RTC, 2004: 2-1). In order to help achieve this goal, the following objectives (among others) are also stated:

- The promotion of "in-fill development and higher intensity development along transit-oriented development corridors and within downtown" which feature "density, design, and diversity of land uses" (2-3, 2-9).
- The creation of a Bus Rapid Transit (BRT) line with a 30% mode share by 2030.
- A minimum non-auto modal split of 3% by 2012, 4% by 2020, and 6% by 2030. It is unclear, however, whether this includes bicycles, pedestrians, or buses, or all three. A total of 6.3% of census takers in 2000 reported commuting either by walking or "other means" (see Table 2), but what they do in practice is likely to be different. The modal split data for Groningen was collected by actual traffic counts – so far, Reno's traffic counts do not include bicycles, but data collection on bicycle use is among other stated objectives.
- Development and implementation of a "Bicycle Plan", "a continuous regional network of safe and convenient bikeways connected to other transportation modes" which will be 60% complete by 2012; 80% by 2020; 100% by 2030. (2-10).
    - "New development ... will be encouraged to construct bicycle facilities" (2-11).
    - "employer subsidization of non-auto travel" will be supported (2-11).
    - Bicycles will be allowed on transit where feasible (2-9).
    - Bicycle parking will be provided at transit stations (5-12).

Other plans in the RTP which are significant to this study, and at times echo successful measures employed by Groningen:

- Creation of the Bicycle/Pedestrian Advisory Committee (BPAC). This has already been achieved.
- Public input will be encouraged by allowing public comment at development meetings (1-7).
- Bicycle and pedestrian "facilites serving as alternatives to automobile travel will be given a higher priority" (2-11, 2-12).
- The investigation of "limits on parking supply to reduce single occupant vehicle trips" (2-14).
- "Traffic signal priority setting" for buses and the development of a "Primary Transit Network" which aims in part to "reduce vehicle trips by competing with the automobile" (4-19).
- the development of "Rapid Transit corridors, lined with dense residential development and shopping districts" (4-13).
- Transportation System Management (TSM) and Transport Demand Management (TDM) programs, which are "designed to improve operation of area streets to make transit, bicycling, and pedestrian circulation safer and more efficient without costly development of new infrastructure" and to "minimize automobile travel by increasing the number of persons in a vehicle, changing modal choice by influencing the time of, or need to, travel" (7-1). This could translate into something like Groningen's traffic cells, and "may include... parking management programs" (7-1).

Still More Must Be Done

Reno and Washoe County are faced with a difficult challenge. They should be applauded for their efforts so far, and particularly for the creation and adoption of the 2030 Regional Transportation Plan. I feel, however, that more must be done. Most importantly, planning policies that integrate **land use**, **transportation**, and **energy** must be adopted. Note that energy must now enter the planning equation. With a peak in global oil production forecasted as early as 2013, it is crucial that Reno – *and* Groningen – consider energy limitations when making planning decisions. Quick action that can be taken, should be taken: since bicycle infrastructure is inexpensive, for example, and the benefits of cycling are great (particularly in regard to energy), goals for completion of the RTP's Bicycle Plan could be advanced to 2010 instead of 2030. And since creation of bicycle lanes often amounts to paint striping on sides of existing roadways, the network of bicycle lanes could be completed in a year or two at minimal cost. And new

developments should be *required* – not encouraged – to construct bicycle facilities, just as businesses for years have been required to provide car parking spaces.

Because of Reno's low density, a thorough reorganization of urban spaces (Urge-Vorsatz & Cherp, 2002: 12) will be necessary, so success will depend on long term commitments and dedication from stakeholders. This can be achieved through increased intensive public and community participation, exemplified by the "design charette" process, which was employed for redevelopments on Wells Avenue. And a study on successful European urban sustainability projects concludes that "education, information and debate are the most powerful tools for change." (Urge-Vorsatz & Cherp, 2002: 11). An educational program that addresses excuses for car dependence, such as the need to transport small children, cargo, or the need to dress formally for work should be implemented. Photographs from the Netherlands can be used to show Renoites that it is quite possible to do it by bicycle, and "creative arts to enhance public image" of alternatives to the automobile should be used in campaigns. In Freiburg, Germany, "the advertising slogan of the campaign to increase the use of the new tram line was: *Faster than a sports car to the city center*" (Urge-Vorsatz & Cherp, 2002: 9).

Reno and its parent county need to devote still more funds to alternative transport modes. A direct correlation between fund allocation and resulting travel behavior has been found. "A striking disparity exists, for instance, between the percentage of travel by bike in the Netherlands (27.3) and in the United Kingdom (2.3); a disparity which is matched almost exactly in the respective amount of transport budget these countries allocate to improving cycling facilities" (Global Ideas Bank, 2005). The 2030 RTP budgets $16 million to bicycle/pedestrian improvements, and an additional $20 million to TDM/TSM measures which are designed to make conditions favorable for alternatives to the automobile.[1] In contrast, the Province of Groningen's four-year Bicycle Plan budgets only about $100,000 per year less than Washoe County's plan, which is for bicycle *and pedestrian* infrastructure along with TDM/TSM measures. Groningen's plan is focused on the bicycle, and funding is high despite a history of over twenty years of investment in their bicycle network. Washoe County is basically starting from scratch building a

[1] In my calculation of total spending for bicycle/pedestrian programs, however, I added only $5 million of this amount for a total of $21 million – because the RTP states that the major TSM project will actually involve improvements to the McCarran Boulevard ring road, which will primarily benefit motorists.

bicycle network, and undoing the harm done by urban sprawl will not be cheap, so initial investments will have to be higher. Perhaps funds can be diverted away from the over **$5 billion** which is budgeted for street & highway improvements and rehabilitation through 2030 (RTC, 2004: 8-15), which are likely to benefit primarily motorists. But a change in priorities is unlikely, according to Reno Park Manager Jeff Mann, who responded to an inquiry about a plan to connect Reno parks with bicycle/pedestrian "urban trails" by stating that "it could be several years before a specific plan is developed unless the project gets moved up on the priority list, which isn't likely under current funding scenarios."

While RTC's plans represent great progress for the community, this disproportionate investment in automobile infrastructure might still lead some to claim that alternatives to the automobile are being discriminated against.

> It would be quite normal for bicycles to be allotted a place alongside cars and public transport in towns. The minimum, therefore, would be to make *at least as much effort*, comparitively, for bicycles as for the other modes, account being taken of the potential of each mode of transport and the cost of the equipment which it requires. In this way, a mode of transport which, if better taken into account, would have its supporters, would cease to be discouraged (my emphasis, Dekoster, J. and Schollaert, U., 1999: 18).

This statement echos the spirit of TEA-21: transportation equity. Reno and Washoe County, with a bit more effort, could achieve this equity.

A shift away from the automobile will depend on more localized commerce – smaller stores in neighborhoods which are more accessible for pedestrians and bicycles – and Reno needs to move quickly in that direction. Reno can still have a strong economy – a European study has found that "motorists are not better customers than cyclists, pedestrians, or the users of public transport" – but admittedly, under current conditions a similar study done in Reno might not arrive at the same conclusion. European cities are typically more dense, with people living in apartments above neighborhood shops – as opposed to the strip mall big box superstores with ample parking found on the edges of Reno and many American cities. Congestion caused by increases in automobile traffic will be costly for Reno businesses, and the 2030 Regional Transportation Plan even acknowledges a potential increase of up to 50% by 2030, actually setting a goal not to exceed that amount (RTC, 2004: 2-2). "It is quite clear that companies suffer as a result of heavy traffic, as their accessibility both for their suppliers and for their visitors is

impaired. Traffic jams also cost them very dearly of course for the time lost by their own deliverers and, above all, by their own employees" (Dekoster, J. and Schollaert, U., 1999: 20).

Figure 3 shows the three standards for bikeways in the United States outlined in the AASHTO design manual. In order to encourage cycling, a diversified approach such as ones taken in the Netherlands (shown in Figures 4 and 5) are necessary.

Figure 4. Separated and on-street bike lanes in the Netherlands

Figure 5. Bicycle facilities at intersections in the Netherlands

(Source: USDOT, 2001)

Unity is needed among American cyclists – so-called 'vehicular cyclists' have, since the 70s, argued that "cyclists should practice and obey traffic laws applicable to drivers of vehicles, and also be treated by other drivers and by law as drivers of vehicles",

opposing “sidepaths or designated bicycle lanes on the grounds that they make cycling slower and more dangerous, and that they promote the belief that cyclists are not legitimate users of ordinary roads”. But elderly and juvenile cyclists “need greater separation from moving car and truck traffic”, which is illustrated by the fact that in the United States, “nearly one-third of the pedalcyclists killed in traffic crashes in 1997 were between 5 and 15 years old” (USDOT, 1997). In the Netherlands, traffic fatalities for the same age group have decreased sharply. And “for the 18-50 year age range cycling has a lower overall accident risk” (Dekoster, J. and Schollaert, U., 1999: 33). As illustrated by Table 1, traffic fatality rates for bicyclists and pedestrians are 31.5% higher in the United States than in the Netherlands, which is especially striking when one considers the differences in levels of walking and cycling! Proponents of separated bikeways would also point out that, among those in this age 18-50 group, which is more skilled in cycling, few “are interested in working to develop vehicular cycling skills” (Pucher, Komanoff, and Schimek, 1999: 7-8). Riding in traffic with vehicles moving at higher speeds is quite stressful and physically demanding.

Thankfully, the 2030 RTP acknowledges that “bike lanes that are separated from automobiles and are differentiated by color, texture or material provide an extra level of safety and security. If the public is confident that safety and security are provided, bicycle use is likely to increase” (RTC, 2004: 7-8). I believe that Reno’s bicycle network, like the bicycle networks of Dutch cities including Amsterdam and Groningen, should consist of primary routes, which would include extra measures like separation mentioned in the RTP; and secondary routes, which can simply be painted lanes. At intersections crossing the primary routes, special design attention should be paid to bicycles which increase safety and decrease conflicts, such as by striping or signaling (as in Figure 5).

Conclusion

A constructivist sociologist would argue that since most motoring Renoites don’t consider car dependence to be a problem, it is not a social problem. But since the problem of a city choked by cars results from the choice of large numbers individuals to drive, affects society as a whole, and can be solved through collective action, it is clear to me that it is indeed a social problem. Reno’s challenge is in getting the problem on the public agenda, so that individuals might consider changing their behavior. Care must be taken –

the abrupt introduction of measures which penalize motorists might be met with fierce opposition. A shift from driving to walking, cycling, or transit represents a significant lifestyle change for the average Reno resident, who is used to driving everywhere he or she goes.

Since a bicycle culture has existed in NL for years, Groningen was already a cycling city. Since action was taken early – before many people purchased cars, there was far less opposition to the new costs imposed and the regulations restricting their movement. And first-time car purchasers have been well aware in advance of the expenses that would await them. In Reno, the introduction of new measures to discourage automobile travel might feel like unfair punishment to motorists who are accustomed to cheap gas, free parking, and three lane highways.

Perhaps a way to convince Renoites to accept more radical measures is to propose even more drastic ones, and then to meet halfway at the negotiating table. In the end, some action would be taken. Ultimately, money does make the world go 'round – when the world reaches peak oil production, and there's no doubt that at some point, it will – motorists will be hit in the wallet not by new policies pushed for by moral entrepreneurs or introduced by politicians, but by geological changes and their effects on the economy. This will attract the media attention and public outcry necessary to really put the automobile on the agenda as a social problem.

It's important that Reno acts now to prepare for the volatile times which await. Drastic changes in transport, land use, and energy planning – and linking the three – will be necessary in order to make alternatives to the automobile feasible. New developments which will encourage car use must be forbidden, and funding for traffic projects which favor the automobile must be diverted to infrastructure and programs which will encourage the use of other modes.

References

A.F. (2005). *Bicycle chosen as best invention.* http://www.energybulletin.net/5952.html. (visited 13 June 2005).

Answers.com. (2005). *Groningen (city).* http://www.answers.com/topic/groningen-city?method=6. (visited 10 May 2005).

APM. (1998). *The Problem with Paving.* http://www.culturechange.org/factsheet1.html. (visited 15 June 2005).

BBC News. (2005). *Bicycle chosen as best invention*. http://news.bbc.co.uk/1/hi/technology/4513929.stm. (visited 13 June 2005).

_____. (2005). *'Peak oil' enters mainstream debate.* http://news.bbc.co.uk/go/pr/fr/-/1/hi/business/4077802.stm. (visited 11 June 2005).

CDC. (2005). *Overweight and Obesity: Obesity Trends: 1991–2001 Prevalence of Obesity Among U.S. Adults by State*. http://www.cdc.gov/nccdphp/dnpa/obesity/trend/prev_reg.htm. (visited 15 May 2005).

Citifare. (2005). *Citifare.com*. http://www.rtcwashoe.com/transportation/citifare/. (visited 13 June 2005).

City of Reno. (2004). *City of Reno 2004/2005 Budget.* http://www.cityofreno.com/gov/budget/pdfs/Section08bmh.pdf. (visited 13 May 2005).

_____. (2005). *Redevelopment*. http://www.cityofreno.com/bus/redevelopment/. (visited on 13 June 2005).

C.R.O.W. (1996). *Sign Up for the Bike: Design Manual for a Cycle-friendly Infrastructure.* Centre for Research and Contract Standardization in Civil Engineering, Netherlands.

Davis, David. (2000). *ADONIS, Making it Happen.* http://www.staffs.ac.uk/schools/sciences/geography/cast/walk21/papThorson.html. (visited on 1 June 2005).

Dekoster, J. and Schollaert, U. (1999). *Cycling: the Way Ahead for Towns and Cities.* European Commission paper.

ECF. (1998). *'Cycling in Urban Areas'* ECF Position Paper. European Cyclists' Federation, Brussels.

Eugene Bicycle Map. (1998). *Eugene/Springfield (Oregon) Bicycle Map.*

Gemeente Groningen. (2004). *Key Figures.* http://www.groningen.nl/assets/pdf/keyfigures_2004.pdf. (visited on 12 May 2005).

Global Ideas Bank. (2005). *Groningen, the Car-free City for Bikes*. http://www.globalideasbank.org/site/bank/idea.php?ideaId=378. (visited on 16 May 2005).

Hu, Pat S. and Reuscher, Timothy R. (2004). *Summary of Travel Trends: 2001 National Household Travel Survey.* U.S. Department of Transportation, Federal Highway Administration.

IOTF. (2003). *Prevalence of Adult Obesity in Europe BMI >30Kgm².* http://www.easoobesity.org/temp/report73.pdf. (visited on 13 May 2005).

Kay, Jane Holtz. (1997). *Asphalt Nation.* (New York, Crown Publishers)

Lowe, Marcia D. (1989). *The Bicycle: Vehicle for a Small Planet.* Worldwatch Paper #90, Worldwatch Institute.

MVW (Ministry of Transport, Public Works, and Water Management). 1999. *The Dutch Bicycle Master Plan: Description and Evaluation in an Historical Context.* MVW, The Hague.

ODOT. (1995). *Oregon Bicycle Pedestrian Plan.* http://www.odot.state.or.us/techserv/bikewalk/planimag/implemnt.htm#fin. (visited 12 June 2005).

Provincie Groningen. (2005). *Actieplan Fiets.* http://www.provinciegroningen.nl/verkeerenvervoer/actieplanfiets/?view=Standard. (visited 5 June 2005).

Rain Magazine (2000). http://www.rainmagazine.com/15-1bikcol.htm. (visited on 10 June 2005).

RTC. (2004). *Regional Transport Commission of Washoe County: 2030 Regional Transportation Plan.* http://www.rtcwashoe.com/planning/downloads. (visited 11 May 2005).

Schneider, Robert; Patton, Robert; Toole, Jennifer; Raborn, Craig. (2005). *Pedestrian and Bicycle Data Collection in United States Communities.* Federal Highway Administration.

SFGOV. (2005). *Bicycle Advisory Committee: Bicycle Plan.* http://www.sfgov.org/site/bac_page.asp?id=11544. (vistied on 15 June 2005).

SMILE. (2002). *Demonstration Projects: Groningen.* http://www.smile-europe.org/demonstration_projects/groningen/catalogue_groningen.pdf. (visited 15 May 2005).

SMILE. (2003). *Local Experiences Database: Cycling as core of Transport Policy.* http://www.smile-europe.org/locxpdb/front/show.php?lang=en&lxp_id=220. (visited 13 June 2005).

Statistics Netherlands. (2005). *Press Release: Sharp fall in traffic deaths in 2004.* www.cbs.nl. (visited 10 May 2005).

Urge-Vorsatz, Diana and Cherp, Aleg. (2002). *Ingredients of Success of Urban Sustainability Projects in Europe.* http://www.ceu.hu/envsci/aleg/research/urbansust_eng.pdf. (visited on 7 June 2005).

USDOT. (2001). *FHWA Course on Bicycle and Pedestrian Transportation.* http://safety.fhwa.dot.gov/ped_bike/univcourse/swtoc.htm. (visited on 15 June 2005).

_____. (1997). *NHTSA Traffic Safety Facts 1997*. National Center for Statistics & Analysis, Washington.

U.S. Census Bureau. (2000). *United States Census 2000.* http://www.census.gov/main/www/cen2000.html. (visited on 13 May 2005).

Wikipedia. (2005). *Groningen (city).* http://en.wikipedia.org/wiki/Groningen_%28city%29. (visited 13 June 2005).

VROM. (2002). *National Strategy for Sustainable Development.* Ministry of Housing, Spatial Planning, and the Environment, the Hague.