NewSolutions

Community, a solution for saving the environment and conserving resources with equity for all.

The Smart Jitney: Rapid, Realistic Transport

Plan C, Community Solutions' response to Peak Oil and climate change, recommends energy conservation alternatives in three categories: buildings, agriculture and transportation. Of the three, transportation is the easiest category to address, but the solution involves changing our value systems and the way we view the world, rather than relying on high risk technology.

For many decades, the problems of transportation have revolved around the issue of private versus public. After World War II the country made transportation via the private car the top priority at the expense of public transportation. This choice is not sustainable. The private car, regardless of its convenience, can no longer serve as the principle mode of people transport. Its high cost, the depleting of fossil fuels, and climate deterioration – along with high rates of deaths and injuries – make it unacceptable. Our choice today is to determine what kind of strategy should be adopted to move the basis of transportation away from the private automobile.

Since Peak Oil could arrive sooner than expected and the depletion rate could be faster than predicted, prudence requires a backup plan other than merely changing car technology. A "Smart Jitney" system could be developed rapidly, and provide for a very sizable (50-75%) reduction of gasoline consumed and greenhouse gases generated by transportation. It could also be the model for a new and more efficient approach to personal mobility. Ultimately, it could be vital in keeping our economy going by giving people a way to get to and from work if there suddenly was not have enough fuel for private cars.

scooters. This represents about 30% of the approximately 750 million cars in use in the world today.

Worldwide, there are 75 million new CEUs built each year, 20 million as replacements and 55 million as new additions to the world passenger vehicle fleet. The world's growth in automobile fuel consumption for CEUs is about 8% annually.

U.S. Transportation Today – Defining a Way of Life

The U.S. transportation system is extremely complex. The car dominates our economy and our way of life. Before we can change to a more sustainable system, it is important to understand the effects of the automobile as well as the major trends – a growing car population, increasing use of fossil fuels, decreasing vehicle occupancy, as well as great numbers of deaths and massive property damage.

In 2006 there were 210 million personal vehicles in the U.S. including SUVs, cars, pickups, and other "car equivalent units" or CEUs, not including motorcycles or motor

America's cars and CEUs generate 45% of the world's total generation of auto-mobile CO_2.

On average, every American buys 13 cars in his/her lifetime.[1] Figure 1 shows the total U.S. transportation fleet except for trains.[2] The long life of these vehicles illustrates the difficulty of replacing them with more efficient ones, assuming highly efficient vehicles are available.

Heavy trucks are extremely important when considering the transportation of food and other materials. In addition, the 8,500 aircraft flying at 30,000 feet do more climate damage than their numbers suggest

Figure 1: U.S. Transportation Fleet

Fleet	Number	Median Life (years)	Cost to replace half the fleet (in 2003 $)
Automobiles	130 million	17	$1.3 trillion
Light trucks SUVs, etc.	80 million	16	$1 trillion
Heavy Trucks, Buses	7 million	28	$1.5 trillion
Aircraft	8,500	22	$0.25 trillion

because the emissions from burning fuel are deposited at higher altitudes.

Performance Improvements and Growth Trends

Automobile engine technology improves at approximately 1.5% annually.[3] However, even this improvement does not necessarily result in better mileage because at the same time that fuel efficiency improves, the size of both vehicles and engines increases, cancelling out the potential miles-per-gallon improvement.

For instance, if the current car fleet were still at 1981 engine size and vehicle weight, the passenger car would now get 38 mpg instead of the current 28 mpg. The reason it hasn't is because technology improvements have gone into other attributes demanded by the marketplace, such as speed, acceleration and size rather than fuel economy.

> ...if the current car fleet were still at 1981 engine size and vehicle weight, the passenger car would now get 38 mpg instead of the current 28 mpg.

Another reason our petroleum consumption (and with it our CO_2 emissions) are steadily increasing is that the number of cars and trucks is rapidly growing, not just in the U.S. but on a worldwide basis (see Figure 2).[4] This chart, which projects growth based on current trends, shows the numbers extending to completely unsustainable levels. And it does not take into consideration Peak Oil.

When oil production peaks, there will be a steady yearly decrease in the availability of diesel fuel and gasoline. Those who argue that basic changes to the transportation system are not needed because of improved car efficiency are not addressing the implications of going from 750 million cars that get 35 miles per gallon with an average yearly mileage of 10,000 miles to something like 1.3 billion cars (in just 23 years) that might get 50-70 miles per gallon and drive an average yearly mileage of 15,000 miles. The increase in the number of cars and the

Figure 2: Increase in Global Fleet Size and Petroleum Use

■ Fleet Growth (millions of cars and trucks)
Petroleum Use (billions of gallons gasoline equivalent) ■
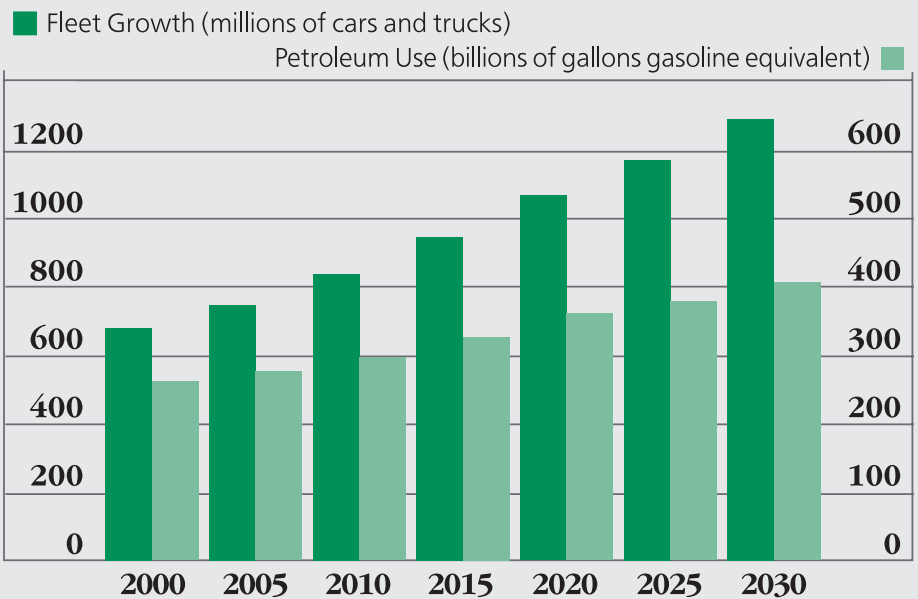
Source: World business council for Sustainable Development, International Energy Agency, Sustainability Mobility Project

These projections assume present trends continue, no new policies are implemented, consumer behaviors do not change significantly, and alternative fuels and radical technological innovations do not significantly penetrate the market. Limits in oil availability are also not considered.

distances traveled far outweigh the mileage improvement from any new kind of engines. And, even supposing there were sufficient oil to fuel this growth, the amount of CO_2 it would generate would increase, rather than reduce, global warming. Rapidly increasing use while performance improves only slowly is neither sustainable nor survivable.

Vehicle Occupancy

U.S. drivers tend to be solitary (see Figure 3). Typically, American drivers average about 1.5 persons per car for a trip. Vans have only slightly more than two passengers.[5] Averaging all the different kinds of vehicles gives an occupancy of about 1.3 persons per vehicle; a great quantity of fuel

## Figure 3: Number of Passengers per Trip for Different Vehicle Types
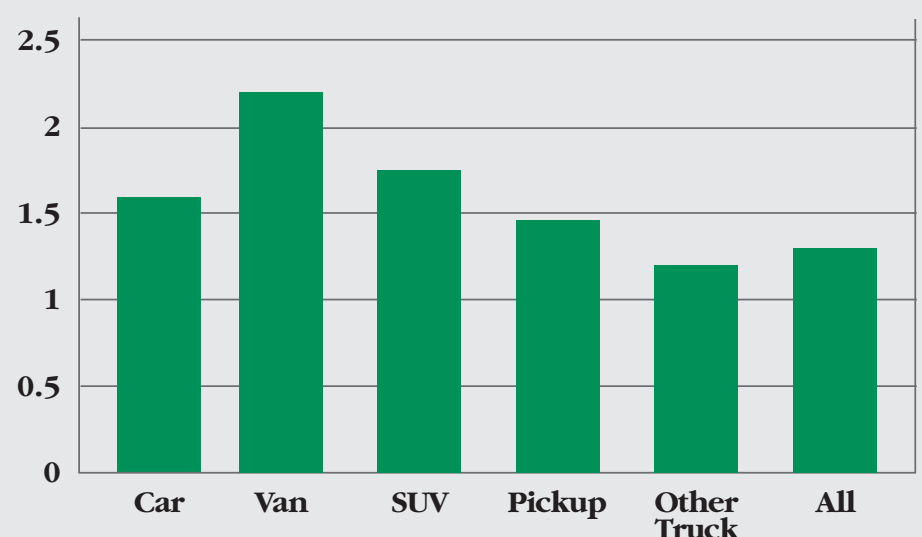
is wasted when driving vehicles that could contain more passengers.

Unfortunately, this tendency to drive alone is increasing, as shown in Figure 4.,[6] and is coupled with the increase in automobile size and weight and longer driving distances. Our own society and the societies of other countries are risking climate degradation by rapidly expanding our more car-intensive way of living.

Car Deaths and Injuries

The current car paradigm encourages people to take as many car trips as possible. Such heavy use of cars requires building and maintaining an enormous number of roads, garages and parking areas. Advertising that supports the cultural ideal of rugged individualism encourages driving the largest possible cars while we allow our buses and trains to be unpleasant. Walking and cycling are inconvenient and dangerous, and the priority is always "don't delay the car."

The cost of the private automobile goes beyond financial and environmental considerations.[7] Figure 5 illustrates annual auto deaths and injuries. The world total is about

Figure 4: Change in Occupancy 1977 to 2001 (persons per vehicle)
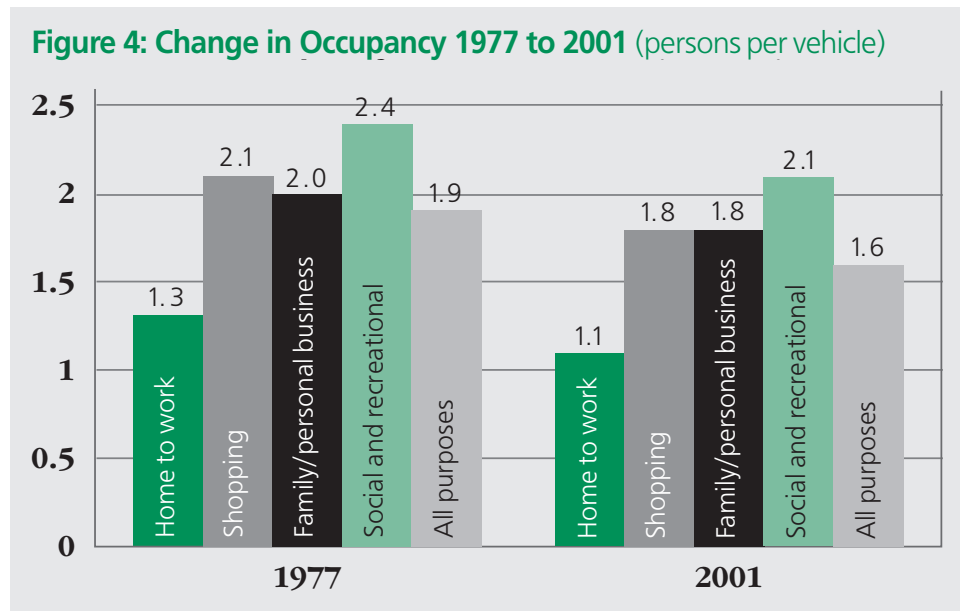
Instead of improving, the occupancy level of our vehicles has decreased since 1977. Only by increasing this level can we accommodate our need to use less oil and produce fewer

1.2 million deaths and about 40 million injuries yearly. In the U.S. about 40,000 people die each year in auto-related accidents.

There are hundreds of thousands of people injured in auto accidents who never fully recover, many condemned to a wheelchair for the rest of their lives. Deaths and injuries are even higher in the Third World where the infrastructure to support the car paradigm is not as well developed as in the U.S. As the car begins to penetrate societies such as China and India, we can only expect that pollution, injuries and deaths will increase.

Figure 5: Worldwide Traffic Fatalities and Injuries in 1998
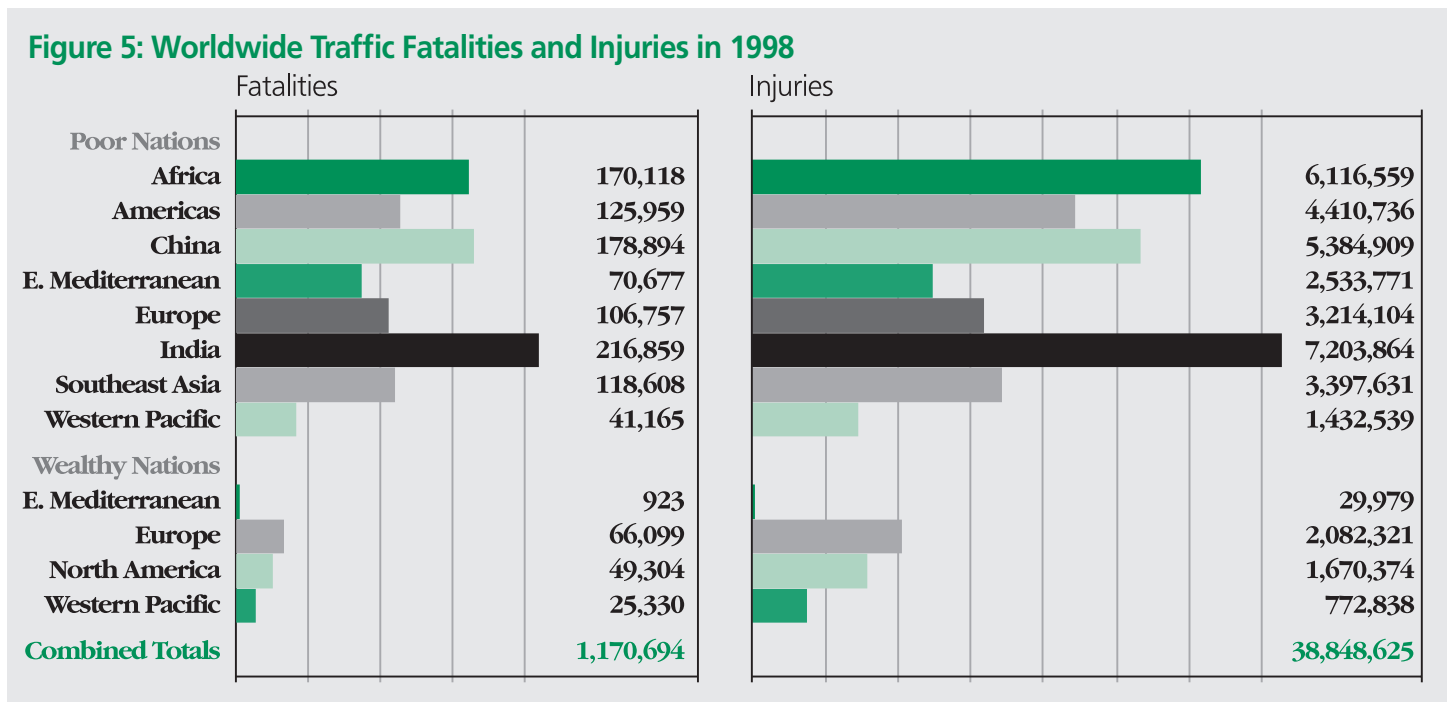
Worldwide there are close to 1.2 million deaths and 40 million injuries each year from traffic accidents and there is a strong correlation between the wealth of a country and its relative automotive safety.

New Automotive Options

It is likely that oil supplies will be virtually exhausted in about 40 years at the current rate of consumption. Although the internal combustion engine, now into its second century of use, is being constantly improved, it does not appear to have the potential to do more than its historical 1.5% per year mileage increase.

Many people hope for some kind of technological breakthrough. The favorite, under development for more than 30 years, is the hydrogen fuel cell car. But after so many decades of failed promises, its success is unlikely. Only a few hundred have been built as experimental models. This may well be one of the longest technological proposals in history with the least amount of progress. Only the futile efforts for fusion power offer a similarly hopeless effort.

Electric cars are another hoped-for option but they too have been around almost as long as the automobile itself, with only minor improvements. In the 1990s, under pressure of California law, several auto manufacturers built about 4,000 electric cars, most of which have now been scrapped. The electric car has always been limited by battery technology and hoped for breakthroughs have not materialized.

A recent development is the successful hybrid car, based on the combination of a gasoline engine and an electric drive, both well-researched technologies. Two problems face the hybrid. One is the tendency to use the electric engine for faster acceleration rather than mileage improvements. The other is the small numbers being purchased. After 10 years, only about a million hybrids had been shipped through 2006, about one out of every 750 cars in the world. Possibly in 5-10 years, 1% of the total fleet might be hybrids. This does not seem adequate, considering oil may peak in the next five years.

A hybrid fleet might give a 20-40% overall improvement in gas mileage. But, as said before, the increasing growth in the number of cars cancels out any mileage improvement.

In recent years, proposals have been made for what is called a "Pluggable Hybrid Electric Vehicle (PHEV)" based partially on the work of Dr. Andrew Frank at the University of California - Davis. Frank modified several vehicles by adding batteries that allowed them to operate in either a gasoline or electric mode. This is proposed as a logical and straightforward extension of the hybrid concept. However, since the electric component of the typical hybrid is essentially a form of extra power for the gas engine under heavy driving loads, it fundamentally differs from the classic electric car.

An electric car requires a much larger battery and one which is subject to a much heavier load than is the case with a hybrid. The fact that a hybrid system successfully uses batteries in a particular way does not mean that an electric car (with much larger batteries) combined with a gasoline engine can be designed and built quickly. A heavily promoted modified Toyota Prius could not be driven at a speed above 34 mph on electricity.[8]

But most important, such a car with its heavy dependence on pure battery operation just shifts where the CO_2 is produced, replacing gasoline burned by the engine with electricity generated through the national power system. Since 50% of electricity is generated from coal, 20% from natural gas, and 20% from uranium, the electricity used by a pluggable hybrid is generating CO_2 at the power plant roughly in the same amounts as is generated from the tailpipe of a gasoline engine.[9]

As the car's contribution to global warming and the threat of dwindling fossil fuels becomes more obvious, the hyping of new auto technology, whether it is the fuel cell or a pluggable hybrid, delays what is really needed – cultural change. People assume (as advertising and even our government tell them) that there is no need to modify their habits since the new technology is presumably "close at hand." They are led to believe

> ...the electricity used by a pluggable hybrid is generating CO_2 at the power plant roughly in the same amounts as generated from the tailpipe of a gasoline engine.

that there is no need to change their behavior and, of particular concern to automobile and oil corporations, there is no need to reduce consumption by buying smaller cars and driving less.

Our current CAFE (Corporate Average Fuel Economy) standards were passed by Congress in 1975, just a couple of years after the beginning of the first energy crisis. We have been in the new energy crisis now for at least five years and Congress has failed to address the issues, leaving the responsibility for intelligent action to individuals.

Results of the Private Auto Paradigm

It is difficult to realize how something that is so ubiquitous and popular can also be so damaging and harmful. Cars have played a major role in destroying community, a loosely used term that represents a feeling of home, of family and neighborhood. With the private automobile,[10] people are now footloose and "free." We have speed and mobility but have lost community relationships. We have chosen the freedom of the individual over the integrity and support of the community.

Our culture includes an idea of freedom known as "the freedom of the open road." A rite of passage for teens to become men and women is getting a license to drive. The automobile allows a young person to leave their "community," to experiment with high speed, and, removed from their family, with sex and drugs. The automobile is constantly being marketed to them. Our culture has accepted this so-called freedom for our children, ignoring the damage and danger to their well-being.

The greatest fear of parents is not drugs or pregnancy but death or injury in a car accident. And no wonder parents are

concerned – almost every beginning driver in the U.S. has an accident. Parents don't want their children to be among the 40,000 lives lost each year or the 2 million injuries, many permanent and crippling.

Because we crave what the car provides, we have accepted the destruction of our communities, the negative impact on family life and the deaths and injuries. But now the private car is threatening to destroy life on the planet as climate change becomes a critical problem. Peak Oil and climate change are challenging our current transport paradigm – without their threat, it is inconceivable for Americans to consider that life might be worthwhile without a private car.

The Role of Mass Transit

At first glance, mass transit appears to be a possible and obvious alternative. European cities are often praised for their superior transit systems. The New York City subway supposedly offers an alternative to the private car. But in all the cities with mass transit systems, there is still a growing car population. Streets are becoming more crowded, and far more expenditures are made on roadways than subways and buses. Subways and other forms of mass transit today are only supplemental to the car.

High density is required for mass transit. In successful past implementations, residential developments were laid out in dense corridors, typically along a rail or streetcar line. Between those corridors were open spaces and farms. The ideal configuration was analogous to a wheel, the hub being where people went to work and shopped, while the spokes represented where they lived.

When the private car became popular, the areas between the spokes were more accessible and were eventually filled in. Food growing was transferred further and further away from where people lived. This led to urban sprawl, making mass transit more difficult. After some time, there was no longer any attempt to build along mass transit lines, so today they have mostly faded or disappeared.

Our urban sprawl has no precedent in history, so the feasibility of a mass transit system has yet to be proven – a true mass transit system for the U.S. today may, in fact, be impossible. In addition, the energy savings of mass transit, in the context of implementing such a system in today's con-

Figure 6: Mass Transit Overrated (Btu per passenger mile)

Private Car	3,549
Light Truck (SUV)	7,004
Bus Transit	4,160
Airplane	3,587
Amtrak Train	2,935
Rail Transit	3,228

Mass transit offers only a small improvement over private vehicles for personal travel, and is hardly applicable.

figuration of cities and urban sprawl, may be highly overrated. Figure 6 shows that existing mass transit systems do not provide significant fuel savings.[11] It depicts the Btus of energy per passenger mile (assuming average passenger densities) for each type of transportation.

As previously noted, it is not obvious that a mass transit system can be implemented on top of our current sprawl. The mantra of "We need light rail" provides no evidence that a light rail system would work. Modeling of this complex system is required but has not been done to date.

That leaves us with the private car as the only option. In spite of its numerous benefits, the many conveniences and the sense of freedom associated with the automobile, it is unlikely that the concept of the private car, as we know it today, is viable for the future. Traffic is worsening all over the world. We can't continue using a machine that has been so devastating for the planet. As energy resources deplete and pollution worsens even a 100 to 200 mpg automobile cannot be the main vehicle for billions of people.

Another option is needed.

Peak Oil and Climate Change: A New Transport Paradigm

The world is threatened with the combination of declining fossil fuel resources and a climate that is already severely damaged by the products of fossil fuel burning. The damage is already so bad that severe restrictions may have to be placed on the consumption of the remaining fossil fuels, making the need for alternative transport systems even more important. A new transport paradigm would place the highest priority on minimizing the use of fossil fuels, a priority higher than convenience, speed, or personal "freedom."

At the same time, a new approach could solve some of the problems of the existing system. For example, it could be much safer. A new system could protect people from irresponsible drivers – something that is not possible today. It could allow parents to retain control over the safety of their

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children's lives a little longer. It could also give people precedence over vehicles. Walking, cycling, and buses could be made more convenient and cars less convenient, reversing the trend of the last century. This differs from most of today's proposed solutions that simply involve combinations of mass transit and the private automobile.

No viable approach can be a one-for-one replacement of the current car fleet with more efficient ones. It would take decades to replace the 210 million vehicles in the U.S. with some superior version, even if such a version were already on the drawing board. However, it might be possible to convert the existing private car to public use for a jitney system.

The Smart Jitney Option

The Smart Jitney is an intermediate technology which increases service and reduces energy use with existing vehicles. It could provide – anywhere, any time, any place – pick up and drop off. It is not limited to tracks, lines or schedules. It could also provide a very high level of security and safety.

A jitney is defined as a small bus that carries passengers over a regular route on a flexible schedule. Another definition of a jitney is an unlicensed taxicab. Basically, a jitney is a form of mass transit using cars and vans, not passenger buses. Jitneys typically are not required to travel specific routes on a specific schedule as are trains, buses and street cars. They are both ancient and contemporary.

The concept of the Smart Jitney is simple: you use your car, pass a test, apply a magnetic sign to your car door and you're off!

A jitney system could basically increase passenger occupancy from the current 1.5 persons per trip to 2-4 times that number. An increase of 2-4 times would allow using one-half to one-fourth the number of vehicles to achieve the same number of passenger trips, removing most of the cars on the road at any particular time and thus substantially reducing fuel consumption and CO_2 emissions.

A jitney's advantage is that it could be quickly implemented, using the existing personal vehicle fleet. More and more evidence says that the CO_2 reduction required to stabilize the atmosphere may be as high as 70-80 %. And the reduction must begin soon. Non-linear increases in climate degradation, combined with reducing availability of oil, require an option that can be implemented rapidly. A jitney system would make it possible for people to continue to travel fairly long distances to work, school and for necessities if transportation fuels were no longer available in the quantities currently being consumed or if the deteriorating climate effects of CO_2 emissions could no longer be tolerated.

Smart Jitney Benefits

One key benefit of the Smart Jitney would be faster transit time. Commuters sitting on any freeway in any large American city (most of us) are aware of the stop-and-go traffic at rush hour, averaging only a few miles per hour for much of the journey. Use of a Smart Jitney system could eliminate three-fourths of the cars currently on the road, and allow much more rapid flow of traffic. Even the time for stopping to pick up and drop off riders would be small relative to the time spent in the current congestion. Scientists have developed many kinds of ride optimization algorithms for complex pickup and deliveries for both people and materials.

A second benefit is that the Smart Jitney would use the existing car fleet instead of requiring all new vehicles. It is important to begin thinking about passenger miles per gallon, not car miles per gallon. Thus an SUV getting 10 miles per gallon containing six passengers is getting the same passenger mpg as a Honda Insight with one passenger.

The Hirsch report[2] has pointed out that replacing the current fleet could take 10 to 20 years. The high mileage cars that would be needed to replace the current fleet are not yet available and may never be, if one considers the failed promise of the fuel cell car and the marginal improvement of the hybrid automobile. The Smart Jitney could address the important task of improving passenger miles per gallon by changing the current car paradigm rather than waiting decades to change the car miles per gallon.

The third major benefit is to drastically

Where parking is an issue, parking spaces could be reserved for Smart Jitney drivers and their passengers.

reduce the consumption of fossil fuels. This would help avoid economic disaster, lower the chances of worldwide wars over fossil fuel resources and, even more important, reduce CO_2 emissions. Increasing the passengers per vehicle substantially would provide a very large reduction in such emission, helping to eliminate the specter of global warming with its potential for massive disasters and loss of life.

> The Smart Jitney could address the important task of improving *passenger miles per gallon* by changing the current car paradigm rather than waiting decades to change the car's miles per gallon.

The fourth major benefit would be to eliminate much of the current carnage which is accepted as part of our ordinary way of life. Just as we have accepted the possibility of destruction of planetary life by nuclear war or climate degradation, we have accepted the huge number of deaths and injuries associated with the private automobile.

By monitoring driving in real time, keeping records of driver performance, enforcing speed limits and other laws via Auto Event Recorders (AERs), lowering speed limits to save gasoline and by many other options which would be designed into the system, the Smart Jitney could save tens

of thousands of lives every year. Additional lives could be saved because there would be significantly less traffic and the best drivers would be at the wheel.

Smart Jitney Technology

An important advantage of the proposed Smart Jitney is that the technology needed for implementation is already available and, for the most part, in mass production. The vehicles are already available – existing cars. Jitneys can be any vehicle, new or old, small or large but with the minor addition of a cell phone connected to the car.

Each passenger using the jitney system would have a personal cell phone although computer access or regular phone access would also be available. Eventually, the cell phone would include GPS capability as well as an emergency call button for security. Whenever the rider feels any sense of danger or threat, punching the emergency call button would automatically transmit information to the nearest law enforcement center for assistance.

Initially there would be relatively small adjustments to the existing vehicle fleet and the ubiquitous cell phones currently dominating communication. Reservation tracking systems accessed by the rider's and driver's cell phones (or via the Internet) would need to be developed and installed throughout the country. The reservation system would control both the ride management and bookkeeping of this new trans-

portation modality. Rides would be planned and scheduled in a similar way to an airline reservation, except in a more timely, local and responsive manner.

An existing technology that would be incorporated into the Smart Jitney system is the Auto Event Recorder The AER is analogous to the flight recorders on airplanes. AERs already exist on more recently manufactured automobiles. The National Transportation Safety Board (NTSB) estimates that 65 to 90 percent of all vehicles in the United States contain some type of AER.[12] These systems record driving activity that is taking place in real time including vehicle speed. This information would provide the basis for adding a new level of traffic safety and could be fully implemented nationally.

Smart Jitney Process

As previously noted, the Smart Jitney system could be accessed by the Internet or telephone. In either case, a request for service would be initiated by the passenger dialing a reservation number using their cell phone (or the Internet) and entering a pickup location and a destination location along with desired times for pick up and drop off. A fifth number to be entered would be the level of service desired.

The Smart Jitney computer would constantly be monitoring all cars that are part of the system, including the number of passengers, the destinations and the vacant seats available. Once the analysis was

completed (a few seconds of calculation) the rider would be assigned to a participating vehicle. The driver of the vehicle would be notified and provided the pickup location and time, along with directions.

The rider would be picked up and dropped off as requested. After the trip,

Smart Jitney vehicles and drivers would be evaluated in much the same way as E-Bay users evaluate sellers.

the rider would submit an evaluation by cell phone or web, similar to the evaluation used by the Internet based company E-Bay. E-Bay's method of evaluating customer satisfaction and publishing the information has eliminated many complaints because people stopped buying from sellers with poor delivery performance. By having both a ride evaluation and AERs, driver records of long-term performance would be available.

Levels of Service

The easiest and most efficient system would be one where all riders take whatever ride is available. It might be difficult for Americans to share in such a completely democratic jitney system. Therefore, different levels of service would be required with at least three levels provided in the initial system. Other levels could be developed as the system evolves.

The first level of service is more or less random. Only the pickup and destination locations are entered along with the time of pickup and preferred time of drop off. The rider would input the data and the system would inform him or her of the car descrip-

When Cuba lost access to Soviet oil in the 1990s virtually every vehicle was put into use as a jitney in an effort to solve their new transportation problem.

tion and time of pickup. The rider would accept the random assignment to the most available vehicle. This level would allow for the most possible rides and the quickest service.

The second level of service would allow a person to input preferences, requesting rides with certain groups of people. Possibly the most important would be for women to be able to request rides with other women. Men could also request non-coed trips. Other options would be to limit selection by requesting certain age groups. Still others might want to put limits on the playing of radios or wish to ride with people who will be quiet. Any rider should be allowed to select the mode that best suits them.

> The automobile has become far more than transportation – it represents the good life. However, it might be that it represents a form of addiction.

Of course, if a rider's preferences were too strict, availability of rides would decline.

The third level of service would be to allow scheduling of rides in the future with a specific set of people. For example, a group of people with mutual interests who have a predictable schedule on a regular basis (such as work or school), would be accommodated. This would mean that for family outings, all could ride together. Other levels of service would be added as experience dictates.

The Smart Jitney Driver

The Smart Jitney need not be implemented as a separate business like a taxicab service or a mass transit business. It is intended to be a form of ride-sharing using existing passenger vehicles and existing drivers. Anyone with a good driving record could serve as a jitney driver.

Overall, the number of people driving should decrease significantly. Although people could still drive and maintain an automobile, it is expected that eventually most people would accept the role of

The Smart Jitney program could also include trucks and other vehicles, for transportation of all kinds of goods.

passenger. Certain limitations would be required. For example, teenagers could not be jitney drivers. Minimum age limits for drivers would correspond to the age limits set by insurance and rental car companies, which reflect the very high accident rate of young drivers.

More rigorous driving tests would be administered to be qualified as a Jitney driver. People with poor driving records, as measured by accidents and traffic citations, would also be barred from being Smart Jitney drivers. People with DWI convictions would not be permitted to be drivers until some time had elapsed or some type of re-qualification had been passed. People with child molestation records could not be drivers. Existing Smart Jitney drivers could also lose driving privileges based on poor driving or the use of intoxicants. Finally, not everyone would want to be a jitney driver.

Drivers would be compensated for providing the transportation service, with the fee regulated just as mass transportation fees currently are. An additional benefit for drivers would be greater access to dwindling fossil fuels and more flexibility in transportation.

Addressing Concerns – Security, Safety and Privacy

Evaluators of the Smart Jitney proposal typically are concerned with issues of secu-

rity, safety, and privacy. In general, women are more concerned than men, particularly with regard to security. Other issues deal with a feeling of loss, both of private time while driving and the loss of the self-esteem associated with ownership of a vehicle. Americans have been taught to believe vehicle ownership says something about who they are. The automobile – for them – has become far more than transportation – it represents the good life. However, it might be that it represents a form of addiction.

Increasingly, the private automobile has also been responsible for the fears and concerns many of our Smart Jitney evaluators expressed. Its availability certainly makes crime much easier – perpetrators can be miles away from the scene of the crime in minutes. Date rape becomes easier when a man and woman are alone in a vehicle.

Moreover, the image of the private automobile, as presented in advertising, is typically one of power, speed and force. Cars are sold on that basis, with strong emphasis on the individual and implied contempt for the community. The poor record of young male drivers is possibly based more on driving with a certain machismo image in mind than from a lack of driving skill.

The Smart Jitney could serve as a vehicle for cultural change as well as a new transportation modality. But to do so, security, safety and privacy problems must be addressed.

Security

Security is a term that covers the risk and danger from other people who, for whatever reason, may intend some kind of harm to our persons or psyches. Concerns about personal security are not trivial. Figure 7 compares the members of the G-7, the seven wealthiest countries in the world.[13] It shows that the U.S. has about four times the murder rate, 2.5 times the rape rate and 3.3 times the assault rate of the other six countries. A comparison to Japan alone shows that the U.S. has 8.6 times as many murders per capita, 15 times as many rapes per capita and 22.5 times as many assaults per capita.

The U.S. is a very dangerous culture and its citizens are more violent than the majority of people in the rest of the world. Women have good reason for concern. But most American men, although feeling safer than woman, must also take the necessary precautions for living in a violent country.

"I wouldn't ride with a man," many female reviewers said, stating openly their fear of the violence in our culture. Initially, the ability to choose to ride only with other women must be a component of the Smart Jitney system. Additionally, children and minors must also be protected from bullying or other anti-social behavior. Everyone – men, women and children – must be

With multiple passengers daily providing reviews, poor or unsuitable drivers would quickly be identified and their jitney license taken away.

protected from the potential of violent or bullying passengers.

At the completion of each ride, passengers would be asked to rate their Smart Jitney experience, covering such categories as the condition of the vehicle and the skill and suitability of the driver. With multiple passengers daily providing reviews, poor or unsuitable drivers would quickly be identified and their jitney license taken away. Eventually, selection of top-rated drivers could become an option when scheduling a ride. Obnoxious passengers would also be identified by the rating system.

Safety

Safety in relationship to automobiles refers to the accidents, deaths and injuries that come from a myriad of causes including auto and traffic equipment, roads, unintentional driver errors and reckless drivers. Initially, to insure vehicle safety, there would be mandatory inspection of vehicles for Smart Jitney licensing. Annual inspections would also be required. Passenger reviews would include questions on the apparent suitability of the vehicle.

At first, Smart Jitneys would be existing

cars but eventually replacement vehicles could be designed with a focus on safety. Rather than more electronics for watching TV in the car or automatically parking the vehicle, collision avoidance electronics could be implemented.

Automobile companies have always given priority to speed, styling and image over safety. The failure to set standard bumper heights, to provide governors to

A reduction in the number of car wrecks, deaths and injuries could be one of the best results of the Smart Jitney system.

maintain speed limits, and to limit performance and weight to protect slower and more frugal drivers (including those who choose smaller cars) calls for some form of regulation that places the priority on safety at the expense of marketing features.

If the forty billion dollars a year spent on automobile R&D were redirected from styling changes, then major safety improvements could be realized quickly. Furthermore, cars could be designed for longevity and ease of repair, which would contribute to reduced CO_2 emissions by minimizing the amount of embodied energy expended on the automobile fleet.

Traffic equipment and roads must be carefully evaluated but are not the main reason for accidents. Driver errors could be dramatically reduced by setting a lower speed limit, 50-55 miles per hour, the optimum speed limit for efficient performance of the internal combustion engine. Slower moving vehicles with higher passenger density would leave more of our streets

Figure 7: U.S. and G7 Violence Rates

Country	Population (millions)	Murders per 100 K	Rapes per 100 K	Assaults per 100 K
US	300	4.3	30	764
Japan	130	0.5	2	34
Germany	82	1.2	9	142
France	63	1.7	14	176
UK	62	1.4	14	748
Italy	60	1.3	4	50
Canada	34	1.5	74	718
US/G6 Ratio		3.8	2.5	3.3
US/Japan Ratio		8.6	15.0	22.5

Security is a primary consideration, particularly for women in the U.S. given the high rates of violence in this country compared to most other G6 nations.

available for bicycles and also reduce the risk of riding them. Irresponsible drivers would quickly be eliminated by the rating system.

Through a shift to ride-sharing, the nation could set a high priority on reducing highway carnage. Legislation and market demand for safe jitney vehicles could force new safety standards from the automobile manufacturers.

Privacy

Privacy refers to people's need to maintain the confidentiality of their personal identification including name, employer or place of residence. Whereas safety refers to the damage done by irresponsible drivers and passengers, a breach in privacy refers to people intruding in one's life through inappropriate access to their personal data.

In modern times, real privacy is increasingly limited even though we have a sense of it in our private cars and homes. Internet access and phone records, along with other

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private information, can now be purchased by businesses, corporations and government agencies such as the CIA and NSA. Marketing of people's personal information is now somehow acceptable, and viewed simply as a business opportunity. The 2006 Hewlett-Packard scandal on "pretexting" shows how easy it is for people's personal information to be obtained.

With people sharing rides with strangers on a daily basis, the protection of privacy will be a challenge. The Smart Jitney system would utilize the same methods of anonymity and protection as banks or any other institution promising confidentiality, with the same caveat – "We cannot absolutely guarantee that your ride sharing information will not one day be inadvertently revealed or stolen from us."

Infractions of privacy would be traced back in the ride-sharing system by reviewing records and appropriate responses taken.

Implementation Strategies

Implementing a system of this complexity would not be difficult. At least one rental car company, Zipcar.com, has an Internet system with some of the features proposed for the Smart Jitney – scheduling with many options and tracking cars via GPS. In the United Kingdom, liftshare.com administers a ride-sharing program which matches riders and loads to cars and trucks around the country, utilizing phone and Internet connections. Liftshare has more than 150,000 individuals and businesses as members. And, based in Germany, Mitfahrzentrale.de offers ride-sharing throughout Europe to its 600,000 members.

The technology effort is far less than that associated with creating a new video game for teenagers. An 18-month feasibility model could be done for approximately $500,000. Prototype systems could be made available a year after that with expenditures of a few million dollars. This is a much lower-risk effort than building fuel cell cars or beefing up the national coal-intensive power system for battery vehicles.

However, there will be enormous resistance to the concept as it will require a paradigm shift that will include changing the legal system, the law enforcement system, and all aspects of the transportation system. Because of this resistance, a grassroots effort to develop the system may be required. A cooperative public development, similar to that of the LINUX computer operating system, may be the best way to achieve early implementation.

All development to date on The Smart Jitney has been put into the public domain, as an "open source" approach is desirable. Hardware changes are minor and, should manufacturers with vested interests be reluctant to develop the ideal products, existing technology can be adapted. Once the system is underway, the market may

find and develop lucrative options outside the purview and control of major auto manufacturers. An effort by a few hundred systems engineers and programmers could lead to this paradigm shift in an amazingly short time.

The Smart Jitney – Long Term Implications

The combination of Peak Oil and Climate Change challenges both the last century's industrial economy and rapid growth. It is becoming ever more apparent that this economy is based on a concept of no physical limits.

The accepted view is that the world will never run out of fossil fuels, or, if it does, technology will find replacements. Yet, as the world peak in oil production approaches, no clear replacements are visible, and many of the alternatives presented are themselves finite, merely delaying the reality of physical limits.

In terms of climate change, popular wisdom and practice have been that the earth and air are adequate depositories for toxins from fossil fuel use. These so-called "sinks" have been viewed as essentially limitless. However, the accelerating increase in CO_2 emissions worldwide and the rapid melting of polar ice suggest the "sinks" are getting full.

The use of fossil fuels changed the world from one of smaller more local communities with limited mobility and resources to one of large urban concentrations with high mobility. Goods and food are shipped from thousands of miles away. High mobility is based on the private car with its continuous use of significant quantities of gasoline.

The advantages of this way of living are becoming more and more questionable. Low energy ways of living will need to include many changes, such as devolution from concentrated urban centers to smaller communities and local food supplies. Eventually a pattern of smaller neighborhoods and towns with a focus on walking and bicycling will be more the norm. This is not

> This is not a return to some previous period in human history. Medical science and other advances will not be abandoned even if we drive less and share

a return to some previous period in human history. Medical science and other advances will not be abandoned even if we drive less and share vehicles.

The Smart Jitney may start as a short-term emergency solution within the existing infrastructure, since it will allow us to keep the same patterns of living. Any inconvenience and discomfort we may experience will be overshadowed by the possibility of stopping planetary degradation and its threat to basic survival. In the long run, the Smart Jitney could evolve into some mode of transportation not yet envisioned. It could help serve the larger physical community in the future as an intra-city mechanism for longer travel. It's possible that the evolution from an emergency measure to a key component of a jitney-based mass transit system, within the context of a decentralized local way of living, will naturally occur.

Summary

Our culture has declined in many ways. Skills like politeness, good manners, courtesy and chivalry have atrophied. Misbehaving in public is "cool." Conversing with strangers used to be an art form and children were taught such social skills. One of our principle cultural values is competition which is also the key principle of our economic system. Cooperation, a key value in other cultures, is viewed as a sign of weakness in America. Walking or getting in a car with a stranger or riding a bus is just an unexpected inconvenience in other cultures. For Americans, it is seen as a threat to who we are.

What will be the effects of Peak Oil and Climate Change? Will society make a choice to be more competitive or more cooperative? Or, as happened in the Great Depression, will people simply begin cooperating and helping each other? Peak Oil and Climate Change will be the test case of people's reactions – they could be the basis for a new way of living or it could become a dog-eat-dog world.

We are at the end of the era of the private car, the ultimate example of American consumer values and the most destructive device ever made. The Smart Jitney can replace the car and help restore community. Men will have to start behaving well to women. Society may have to give up profane language in public, like smoking was disallowed in public places. Just as people cannot drive when drunk, they will not be able to ride when drunk. Such social criteria must be imposed even though it is counter to our so-called freedom, which is often nothing more than a license to be offensive. But if implemented properly, the Smart Jitney ride could be a real pleasure.

Initially the Smart Jitney may be a traumatic change to the current mode of private cars. But the threat of energy shortages, loss of jobs, and life threatening climate change can provide the motivation for such a system. The concept and design are such that long term benefits for the environment and society will accrue. Eventually, the personal advantages in terms of time, safety and economics will become apparent and this transport approach will prove to be superior to the existing private system as it helps save us from climate disaster.

– Pat Murphy

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Resources

The Power of Community: How Cuba Survived Peak Oil
This fascinating and empowering film shows how communities pulled together, created solutions, and ultimately thrived in spite of decreased oil imports from the USSR. By The Community Solution. Order at www.powerofcommunity.org.

Peak Oil Books

The Oil Depletion Protocol: A Plan to Avert Oil Wars, Terrorism, and Economic Collapse by Richard Heinberg, September 2006

The Post-Petroleum Survival Guide and Cookbook: Recipes for Changing Times by Albert Bates, October 2006

Beyond Oil: The View From Hubbert's Peak by Kenneth S. Deffeyes March, 2005

The Final Energy Crisis. edited by Andrew McKillop, April 2005

The Long Emergency: Surviving the End of the Oil Age, Climate Change, and Other Converging Catastrophes of the Twenty-first Century by James Howard Kunstler April, 2005

The Collapsing Bubble: Growth And Fossil Energy by Lindsey Grant, Seven Locks Press, May, 2005

Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy by Matthew Simmons, June, 2005

The Empty Tank: Oil, Gas, Hot Air, and the Coming Global Financial Catastrophe by Jeremy Leggett, November, 2005

Other Recommended Resources

Design on the Edge: The Making of a High-Performance Building by David W. Orr

Your Money or Your Life: Transforming Your Relationship with Money and Achieving Financial Independence by Joe Dominguez and Vicki Robin

The Small-Mart Revolution: How Local Businesses Are Beating the Global Competition by Michael H. Shuman and Bill McKibben

The Logic of Sufficiency by Thomas Princen

Radical Simplicity: Small Footprints on a Finite Earth by Jim Merkel

The Conserver Society: Alternatives for Sustainability by Ted Trainer

The Circle of Simplicity: Return to the Good Life by Cecile Andrews

The Small Community, Arthur Morgan, 1942 (available from CSI)

The Long Road, Arthur Morgan, 1936 (available from CSI)

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