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**Interim Sustainability:
Can We Reduce the Carbon Footprint for Personal
Vehicles and Maybe Help Save Suburbia?**



We can try.

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MARCH 5, 2009



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Introduction

Our automobile dependence has affected so much of where and how we live for the past 70 years that we cannot expect overnight change, or to develop into a smarter population that can sustain the population increases, reduce the pollution, and avoid the dependence on foreign fossil fuels which we currently take for granted. In the quest for a better lifestyle, Americans have invested in housing sprawl to provide large homes at the cost of a long commute with no consideration for the recent and likely future high cost of gas or the increased need to drive. Motor vehicles will gradually become a more diminished presence in our lives, but the ideas presented here can help us to continue in a more sustainable manner until new options can be formulated and applied to suit demands.

Leading experts agree that something must be done to preserve and salvage our American way of life, based in large part upon the past infrastructure investments that have resulted in sprawl development. This white paper combines several opportunities into an implementation plan, and challenges communities, industry, government, and the public to be more creative in its vehicular and infrastructure programs and policies while taking a positive move towards sustainability.



In the short term, we must find an evolutionary alternative means to address our need for both vehicle freedom and dependence, while remaining focused on the following key issues impacting the sustainability of our diverse lifestyles:

- Foreign energy dependence.
- High fuel prices - commuter cost.
- Significant population growth.
- Suburban lifestyles that are dependent upon auto travel.
- Limited parking facilities.
- Limited public transit availability.
- Limited transit-oriented development.
- Massive past investment in suburban sprawl.
- Significant reduction in green spaces and natural environments.
- Inefficient energy consumption in vehicles.
- Air pollution.
- New hybrid battery vehicles with limited range.
- New energy technologies.

We cannot continue to ignore our past. Instead, we should take the lessons learned from both positive and negative aspects of our past and current practices to help shape our future. Only smart growth, energy-efficient vehicles and expanded public transit will secure our communities. Therefore, we are proposing a test, elements of which will require a significant investment, but which will address many of the issues we face today and will be confronting tomorrow.

Problems, Needs and Values

First, most Americans cannot switch suddenly to life without their cars, in part, because we don't presently have public transportation to replace cars. Cars carry us to work, schools, stores, restaurants, the movies, and to visit friends. We use our cars to get somewhere in an emergency, to take vacations, to go on first dates, to just take a ride - the list is virtually endless. To many, our cars represent freedom itself – just ask any senior citizen who has had to surrender his or her keys to a family member.

Sustainability, Smart Growth, and New Urbanism all promote public modes of mass transit but often at the expense of those who have a need or desire to drive. Advocates of these planning approaches cite high energy costs, pollution, congestion, and other factors related to automobile travel – all of which are real and must be addressed if the personal vehicle is to remain. Sustainability, Smart Growth, New Urbanism, and good planning all recognize that affordable housing must be accessible to communities to minimize travel cost and improve the interconnectedness of our homes with the world around us.

In addition, the recognized need for increased density in cities and towns is most likely to also attract an increased number of drivers. Furthermore, communities often lack sufficient mass transit options and provide only limited parking that is competed for daily by for the growing number of commuter vehicles and the large populations living in housing sprawl, or by reverse commuters to areas outside the cities and towns.



Unlike other countries' urban regions that have grown and remain connected by mass transit, the sprawl resulting from American automobile dependence and cheap fuel has created an environment which is disjointed and not readily repairable. Without a massive long-term capital investment, a shift in paradigm is likely to be resisted. To preserve and maximize real estate investments and restore and preserve our economic health, we must take steps now to work towards required long-term changes which may take 10-20 years.

The Plan

There are a myriad number of potential alternatives that could help guide us toward a more sustainable future. This paper focuses on one short-term alternative: To facilitate and test the use of electric, hybrid, and other alternative powered vehicles and reduce their size to the small, half, or two-third, sized vehicles already commercially available in the rest of the world. Vehicles with smaller bodies, lighter frames and reduced engine sizes provide a significant energy savings compared to the U.S. norms. This may require changes to, or suspension of, currently accepted commuter vehicles that must be addressed by statutory regulations to be implemented now.

NOTE: This first test will be based solely upon the use of small electric and electric hybrid vehicles. This is due to the wide availability of electricity and its relative familiarity and acceptance throughout the United States. However it is recognized that other technologies and advances may be suitable for additional future demonstrations, to include natural gas, liquid petroleum, hydrogen, and bio-fuels.

Implementation can be easily accomplished through successful city testing, by:

- Recognizing that private vehicles are needed and will be needed for the next 10-20 years at a minimum, they can be provided to positively address their purpose, size and travel limitations of large and growing populations.
- Promoting clean and efficient use of energy (e.g. electric, natural gas, hydrogen, etc.).
- Reducing pollution and thus helping some cities meet Clean Air Act requirements.
- Providing refueling/recharging capabilities at mass transit locations in town, and granting preferential service (free or reduced price parking, tolls, etc.) to downsized, qualified vehicles to promote their production, use, and purchase.
- Increasing parking capacities within current space limitations.
- Generating new business and income models that support shared use vehicles when needed, and discourages routine large vehicle use.
- By recognizing that population will increase significantly in those areas where they are already of the greatest impact.

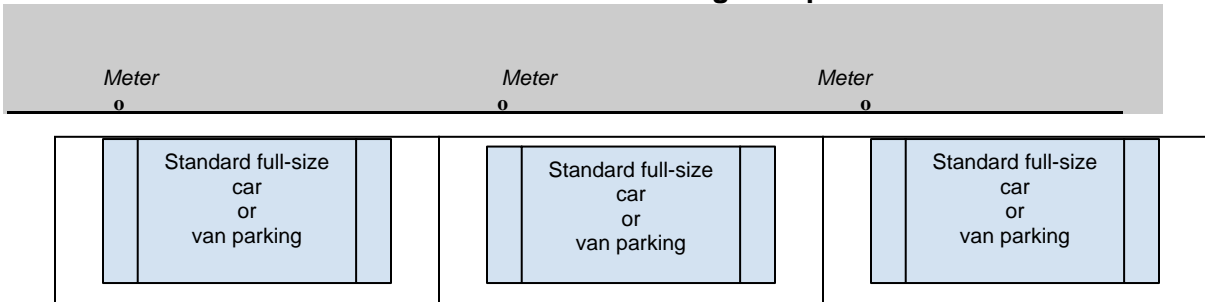




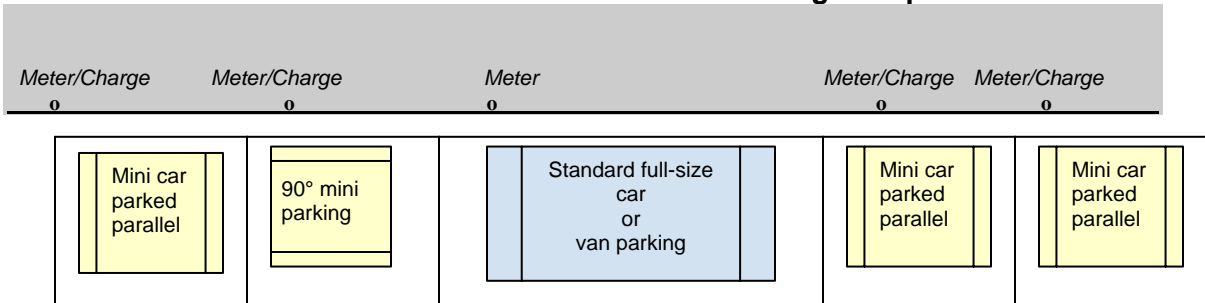
Opportunity Overview

Successful demonstration of this interim vehicle plan will require the establishment of test cities to explore whether or not expanded use of reduced size (say half and two-third sized) alternative fuel vehicles would be sustainable for continued use throughout the next 20 or more years. As a key component of this solution, and to immediately promote opportunities, there is a need to provide easily accessible electric charging/refueling stations that will effectively double the cars' travel range, which will also provide a sense of security and convenience for drivers. Additional benefits will be realized through economies of scale, which will provide affordable, clean, feasible, and desirable options for individual travel. Vehicle parking can also be increased within existing parking areas to accommodate additional vehicles as illustrated below:

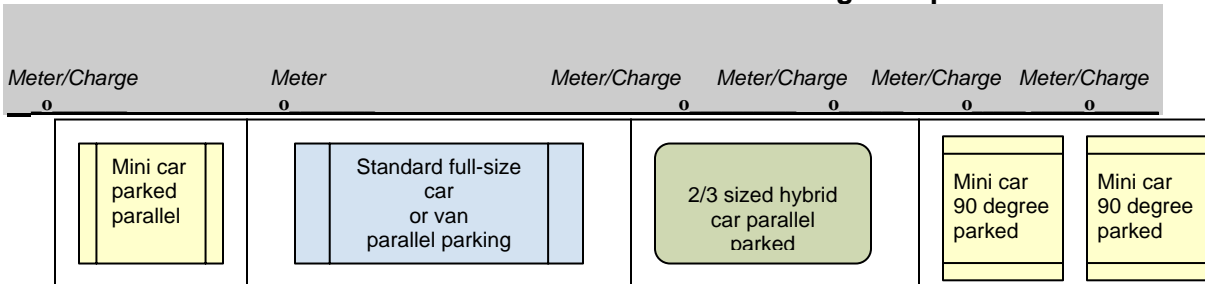
Traditional Vehicles and Parking – 3 Spaces



Traditional and One-Half Sized Vehicle Parking – 5 Spaces



Traditional and Mixed Small-Sized Vehicle Parking – 5 Spaces





The Benefits

The benefits are direct and irrefutable, and will be realized by commuters, business centers and cities, sprawl communities, public transportation systems, the environment, the alternative fuel industry, and the auto industry. Sprawl communities that lack direct mass transit access can achieve at least partial re-stabilization. Additionally, government at all levels will realize enhanced environmental conditions and additional job creation.

A partial list of benefits would include:

- Improved air quality.
- Acceptance and production of alternative vehicles and technologies.
- Reduced vehicle transportation cost.
- Increased emphasis upon alternative fuel technologies.
- Increased emphasis upon public transit.
- Reduced energy reliance upon foreign fossil fuels.
- Re-stabilization of sprawl communities.
- Increased revenues to public and private entities.
- Increased parking without increasing land use for parking.
- Job creation.

NOTE: Based upon average Washington, DC, vicinity travel of 16,800 miles per year (60 miles per day x 280 working days/year) at an average of 18 miles per gallon of gas, the average automobile commuter would account for approximately 933 gallons of gas used per year. This commuter consumption will result in a minimum of 5,598 lbs of carbon (6 lbs/gal) added to the air per commuter. If a modest 1,000 electric vehicles were employed to replace these vehicles, approximately 5.6 million pounds of carbon would be reduced from the DC area air annually, and about 930,000 gallons of fuel would be saved. Full electric vehicles would only require an electrical charge. Savings benefits will be reduced for hybrid vehicles.

Implementation

Key targets would be the predominantly high number of large and medium cities with established mass transit systems and suburban sprawl feeding the cities. This would demonstrate functional feasibility and the accurate assessment of vehicular suitability.

Program implementation and testing costs are an important consideration, and may rely upon public, private and governmental funding sources. In determining the proposed project's lifecycle costs, one must also consider the ancillary and likely significant health, environmental, functional and monetary benefits derived through reduced pollution, reduced health costs and significant energy savings.

Factors to consider in estimating the cost and time schedule for implementation include:

- Test city selection and mobilization.
- Community stakeholder meetings.



- Vehicles for shared use and test subjects.
- Regulatory changes that will promote test vehicle benefits.
- Marketing, education, and project outreach.
- Business model changes for rental car utilization.
- Regulatory changes regarding parking and split parking spaces with two parking meters.
- Parking space and lot re-striping.
- Transit oriented development growth demands.
- Refueling/recharging retrofits at mass transit stations, parking facilities, garages and lots), and in-town lots.
- Cost for installation of charging stations for electric vehicles at street locations.
- Development of metrics and monitoring.
- Data analysis and reporting.

Costs can be controlled by the size of the test group selected. Extended testing will require additional funding. In addition, costs will be reduced if contributions from the private sector or public/private partnerships can offset project public sector costs.

Achieving the Desired Results

- Potential test locations must be identified, and final test locations must be selected through a reasonable ranking process.
- Auto manufacturers must be 'sold' on participation, hopefully including providing vehicles suitable for the test for sprawl commuter families.
- Cities and mass transit systems must be prepared for accommodations to be extended for dedicated and shared test vehicles, to include priority parking, charging, space allocation and size.
- Test families must be selected and briefed.
- Establishment of metrics and procedures for monitoring, recording and evaluating results nationwide.
- Awareness must be created, expanded and maintained.

It is anticipated that it will take 12 months to prepare the test area and develop the support infrastructure suitable for testing. It is also estimated that testing will then be carried out for at least one year from initial deployment. The need for program revisions during testing will be constantly monitored throughout each trial.

Test city focus will be placed on automobile manufacturers, automobile rental firms (e.g. Flexcar, Zipcar, and the nationwide rental firms), other transit entities, plus energy agency offices and utility providers.

The Measure of Success

Immediate results should be expected, with a significant increase in small alternative fuel vehicles initially as a "second" car/vehicle to many. These vehicles will be a viable component in energy



and pollution reduction, increased vehicle flexibility, and a positive view by the automobile industry of the economic sustainability of this high impact, extremely positive technology.

In the long term, overall sustainability, economic stabilization and continued sprawl will provide a stop-gap solution until mass transit alternatives and transit oriented development can be effectively implemented and accepted.

Short- and long-term benefits will include improved air quality, reduced high speed traffic, expanded transit choices, and a more sustainable environment through re-education and acceptance over time. Additionally, dependence upon fossil fuels will be reduced as continuing technological and efficiency improvements are made.

Results of these tests and gradual adoption of these new processes and technologies will result in a win-win situation for the pilot test cities and will yield positive additional growth through broader adoption and acceptance by an ever-increasing number of municipalities and jurisdictions. Increased participation of additional test cities, and adoptions of the principles of this realistic slow growth evolution, will deliver future smart growth transit.

If Washington DC and its surrounding suburbs were to conduct this test, we could expect:

1. Commuter volunteers from surrounding suburban sprawl suburbs, who travel at least 50 miles a day by car, would be selected for participation. Participants would be provided electric vehicles, or use their own vehicles, with a limited maximum range of 40 miles.
2. Metro bus and rail lots would be retrofitted with solar and electrical charging stations.
3. Metro/rail and bus use would increase.
4. Downtown parking areas would be re-striped and designated for one-half and two-third sized vehicles with additional meters – or – the striping in the parking areas would be eliminated and multi-space meters would be used to maximize the land area.
5. Preferred parking areas would be promoted to private property owners to be designated at public and private parking lots throughout the metro area.
6. Installation of garage charging units would be promoted for installation.
7. On-street charging units would be retrofitted with charging units.
8. Flexcar/Zipcar and other rental agencies would be requested to switch to test vehicles.
9. Tax credits would be offered for replacement of fossil fuel vehicles with electric vehicles.
10. Carbon monoxide levels would demonstrate savings.
11. Home prices in suburban communities would normalize and increase in value.
12. Employment opportunities would increase throughout the region.

The Price of Inaction

The longer we delay, the more costs will increase and the longer it will take to win support for the gradual acceptance of the program proposed. Given projections of future oil supply and demand, the currently affordable fuel will soon give way to increased petroleum costs. Heightened emotions and responses will lead to unreasonable actions without comprehensive forethought or careful planning, and most importantly, without a measurement of the overall costs and benefits. Reactive strategies are much less likely to have a lasting positive impact or succeed as well as proactive, well-planned and carefully implemented strategies.



General Summary of Benefits

Driver Benefits:

- Tax credit for purchased new technology vehicle purchase
- Transit cost reduction for alternative fuel vehicles
- Parking (possibly preferred locations > up front & reserved parking)
- Available charging will double battery range (e.g. 40 to 80 miles)
- Available commercial parking (lots and garages) with available charge for electric vehicles and natural gas stations for natural gas vehicles to recharge) + new electric vehicle charging stations
- Parking garages/commuter lots with recharging for electric and possibly natural gas vehicles
- Reduced fuel cost per trip
- Priority parking of personal and shared vehicles
- Increased vehicle and energy sources will develop based upon an increase in user demand

City/County Benefits:

- Increased parking availability (2 cars per space) in/near city centers
- Increased parking revenue
- Reduced dependence upon fossil fuel
- Cleaner air – Reduced carbon footprint
- Increased capability for use of alternative fuel vehicles by Government
- Revenue from sale of battery recharge and maybe natural gas (concession licensing)

State/Federal Benefits:

- Promotion for increased use and market for alternative fuel vehicles
- Lighter vehicles result in lower road wear and maintenance cost
- Reduced dependence upon fossil fuel
- Cleaner air
- Increased capability for use of alternative fuel vehicles by Government
- Increased revenue resulting from increased building area allowed by smaller parking spaces > smaller parking lots.
- Increased LEED credit availability for new development.

Test City Locations:

- To be determined.

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