

Bike Rail: Car-Free New York Presentation

Currently, for March 28th and 29th there is a conference held by Columbia's Earth Institute called "State of the Planet 2006: Is Sustainable Development Feasible?"

<http://www.earthinstitute.columbia.edu/sop2006/about.html>

This is a very serious question.

Global warming is a grave situation. The "Great Warming" is a PBS video scheduled for broadcast in the next few weeks.

<http://www.thegreatwarming.com/globalwarmingpromo-qt.html>

If we don't make the right choices and commitments many (more) people will needlessly die – twenty-seven thousand died in the heat wave in Europe a couple of years ago and the world's poor daily ongoing struggle will only get many times worse – and those that survive after us will most likely suffer severe deprivation lacking the wonderful bounty of life and environment we have in this world today.

You may want to read E.O Wilson's book "The Future of Life". He describes how life as we know it on this planet is rapidly disappearing: "Humanity, when wiping out biodiversity, eats its way down the food chain. First to go among animal species are the big, the slow, and the tasty." Our machines are doing an even better job.

You might hear a lot about there being solutions like increasing automobile fuel efficiency by 100% or the ten or twenty things each of us can do on a daily basis but, none really makes the required impact when you look at the scale of the problem and the current dynamics of human civilization.

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In a sense, we are lucky here in the US. Even though collectively, we have caused much of this problem and people here will suffer Katrina-like hardship we probably will have the resources to survive better than most other places even though we've done far less than nothing to deserve this advantage which is not really guaranteed.

The times call for dramatic solutions scaled and focused to impact the oncoming catastrophe of global warming.

It is my view that removing automobiles from the world's cities will greatly slow the human causes of global warming. Half the people in the world live in cities. Cities are built to solve the transportation problem and automobiles only make urban transportation more difficult and dangerous. Cities thrive despite cars not because of them and removal from the world's urban environments will not only provide great improvements to these environments but will also provide inspiration and insight into how these improvements can be transferred to non urban areas.

A very large part of the process will be to design cities without cars but this has been very difficult because of the human love affair with the automobile. They've become wonderful luxurious toys and the premiere consumer product combining the thrill of speed with the illusions of panache, safety, comfort, and home. They are the deeply entrenched bedrock foundation of developed world economies measured in trillions of dollars perhaps equivalent to terawatts of power and many billions of tons of polluting and greenhouse gas emissions.

Johnny Carson once said when his Tonight Show was still here that it's amazing how tough New Yorkers are: "If there was a major flood here people would swim to work!" With global warming this has added meaning.

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People become used to doing things in certain ways even though it might be the hard way. The idea is to demonstrate the easy ways and how much better things can be. There have been recent law suits against the coal power plants out west to get them to stop polluting and that is good. But, when you wipe clean a window sill one morning in this city and the next morning there is a new layer of soot, that pollution comes from automobiles. You won't find it upstate where the density of automobile traffic is much less.

Human-powered transportation is by far one of the best ways if not the best way to get around cities. Most of us already do it. We walk. That's why New Yorkers are in such great shape. Some even do a lot more by riding bicycles, scooters, skateboards, or skates. These are often the fastest, most fun, least expensive, most convenient, and definitely the most environmentally responsible way to travel around the city. The one caveat is that a lot of it has to be done on city streets and cars, trucks, and buses make the city streets extremely dangerous.

One solution is to travel the city under our own human power and avoid the danger of the streets by going above the cars; to travel the city despite cars. There's also the problem of having to travel relatively long distances like say over five miles or up hills or with wind head on or not being physically up to the task. This can be made easier by using a rail or guide way system to help steer human-powered vehicles. The vehicle can have auxiliary power when required and it would be miniscule compared to that required by most other forms of transport because it is applied directly to moving the individual rather than moving more than the additional half-ton or more of steel, glass, plastic, and whatever is required by automobiles, trains, and buses.

This is the idea of Bike Rail and it has been around for many years.

It is very simple. It's not like you have to build a rocket ship. Actually, a rocket ship is pretty simple except that you need an enormous amount of power.

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Human-powered transport does not have this problem. It also does not have a lot of weight so you do not have to build really strong things requiring massive amounts of materials (and costs) to hold the weight or to control the large forces caused by accelerating and decelerating massive objects. By accelerating and decelerating really light human-powered vehicles a minimal amount of energy is required and or wasted with no appreciable emissions and which in any case can easily be supplied by eating a peanut butter and jam sandwich.

So how does one design bike rails? People have been trying or proposing them for years and for some reason they have not caught on. MIT's David Gordon Wilson (<http://www-me.mit.edu/people/personal/dgwilson.htm>) has been involved with this stuff for some forty years, has held design contests, conducted student projects, written books and papers, has created patented inventions, and is a treasure trove of information, but, most of all he knows Paul MacCready who designed the first human-powered flying machine he named the Gossamer Condor and immediately became god.

Dave co-designed a bicycle that broke the world speed record and his idea for the fastest machine runs on a rail. His wife is a visiting nurse and using her bike to travel to clients' homes likes to tease her associates because of their difficulties getting around, finding parking spots, and not be able to cover the ground she does because they use cars.

In "Transportation Systems Based on HPVs" Dave Wilson writes of history's "courageous attempts" (I like that term) "to devise mass-transit using bicycles and other human-powered vehicles" and describes various combinations giving "advantages and disadvantages for different circumstances of use" including dedicated right-of-way systems providing for safety, the addition of propulsion where there may be hills and other difficulties and spacing control to increase the number of people that can use systems.

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What is not included in his paper's description of past designs potentially offers direction for additional design focus, application and perhaps optimism for acceptance.

1. Global warming is a very serious life-threatening and world-threatening problem and the annual manufacture of many millions of automobiles at about one-half trillion dollars in the U.S. alone will only continue to make it worse despite even dramatic improvements in energy efficiency and reduced emissions. Maybe enough people will realize this to value and select sustainable transportation before the global environment degrades beyond recovery. There's that the situation where comedian Jack Benny is threatened by a mugger with the words: "Your money or your life!" Of course, Jack Benny has to think about it. . . . but do we?
2. Distributed on-demand human-powered systems have considerable advantages. These are the same advantages of automobiles and human-powered vehicles not in systems which are very successful and popular.
3. There are very important advantages in keeping transportation at human scale. Proper scaling is extremely important and is a concept all too often ignored and optimizes efficiencies, ease-of-use and construction among other things.
4. It is crucial that human-powered systems be extremely agile, quick, easy to put up, take down, modify, upgrade, and adapt to local needs and conditions on a timely basis; and, be simple to use, understand, and maintain requiring a minimum of special knowledge.
5. It is very easy to develop human-powered systems many times less expensive than other systems with comparably minute environmental footprints also many times smaller that are much simpler to use than other systems including people not normally comfortable with bicycles especially the elderly and handicapped.

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6. Rail is a much better road.
 - a. Much better surface for vehicles to ride on:
 - i. Much less rolling friction
 - ii. Controls vehicle steering
 - iii. Less problems with rain, ice, snow, animals, and people
 - b. Much safer than a road:
 - i. Prevents collisions
 - ii. Prevents vehicles from running off the rail.
 - iii. Prevents vehicles from turning over.
 - c. Human scale
 - i. Much smaller environmental footprint.
 - ii. Much less expensive and easier to build and maintain.
 - d. Modular, distributed, and somewhat on-demand.
 - e. Much more adaptable
 - i. Much easier to add intelligence
 - ii. Much easier to add power

Note: Too much intelligence and power creates over dependence and should be avoided so that the system still works well when they are not available.

The system I have been working on has been continually evolving and currently entails a skateboard-sized monorail-type rolling platform with bogey wheels or essentially a miniature pallet serving as an adapting interface to attach recumbent bicycles riding on rail of rectangular structural steel pipe. Recumbent bicycles are preferred because of their inherent low center of gravity, considerable comfort and minimal back strain, improved aerodynamics and speed among other reasons. An alternate method employing a double-slotted rail may be more suitable and requires further evaluation. Low cost, ease of use and maintenance seems to indicate that functionality and complexity should be included in the vehicle whenever possible rather than the rail which extends for long distances.

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Human-powered recumbent bicycles will provide the main source of power but auxiliary powering should be modular, scalable, and normally always available.

In most conditions it will probably be beneficial to have the rail elevated; especially, limiting heat-effect causing impermeable surfaces; but, generally should be no higher than necessary though, urban tourist routes may benefit for enhancing elevation. An idea of the potential scale of such benefit might be gleaned from the success of the two-week Christos "Gates" art exhibit in Central Park which brought in one-quarter billion dollars of business to New York City.

Running on the side of a rural road or railroad track the rail could be in most instances no higher than to keep it above the occasional large snowfall, flood, or out of reach of packs of vicious dogs. It might not look much different than guard rails typically found on rural roads. In a city it should be high enough for the tallest bus or truck to pass underneath. In unusual or ad hoc situations a section of rail can be easy to remove temporarily to allow passage which can be easily upgraded to a kind of "drawbridge" functionality if this has to be done often.

The rail should be easy enough for two people to assemble a city block length within a few hours and a team of people to assemble a mile overnight such as before and after Fifth Avenue parades or during the Christmas holiday season. One ambitious goal might be that rail systems would be as easy to put up as large fences and assembled at the rate of one mile an hour. They could provide critical functionality in dire emergency situations.

There are a lot of details in implementing this system but the most important conditions should include that they are safe and easy to use, adapt easily to local and changing needs, be optimized for distributed on-demand use, and work well when only human power is available tapping into perhaps certain individuals' extra human power when needed.

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A priority right now is to achieve a design suitable to define the technology and costs required by current opportunities.