INTERCITY ULTRA HIGH SPEED MAGLEV TRANSPORT: AN AMERICAN IDEA

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We might be able to stimulate our way back to stability, but we can only invent our way back to prosperity. Thomas L. Friedman, June 27, 2009

Transportation is fundamental to the economy. The U.S. economic growth engine, created on fossil-fueled manufacturing and transportation, peaked in the 1970's when America's demand for oil outstripped domestic supply. Since then our economy has been based on mountains of debt that let us consume more than we produced. After two generations of growing dependency on foreign goods, services, and oil, American's ability to compete in global manufactured goods markets has radically declined. According to the World Trade Organization, the trade per capita of Germany is nearly three times that of the U.S. We have fallen to 3rd place in merchandise exports behind Germany and China.

The current financial crisis offers an opportunity to reason through sticky drags on long-term economic productivity problems like healthcare, energy, carbon emissions, and transportation. In achieving the optimal investment in the economy, which can meet the global warming and oil depletion imperatives, President Obama is leading an economic foundation rebuilding movement to shift to electric transport — electric autos for local trips, promoting the green generation of electricity, and electric high-speed rail for regional intercity travel.

America has the answer, if our policymakers can get their act together, follow President Obama's lead and use a modest portion of the Stimulus funds to invest in a Maglev Test Facility like our foreign competitors did, the United States can be the World leader in this new transport system, the first since the airplane. This great American idea will improve the economic productivity of the economy, reduce oil imports, create jobs and increase exports, reduce unhealthy pollution and make intercity travel much safer, faster, more comfortable and a lot more affordable.

Twenty years ago, the late Senator Daniel Patrick Moynihan, a well known innovator in transportation policy, recognized that electric transport is inevitable and was an early champion of wheel-less **Mag**netic **Lev**itated guided surface transportation. As a critic, rider and supporter of Amtrak he understood that rail must achieve much higher speeds and much greater convenience to succeed. Around 1990, as Chairman of the Environment and Public Works Committee, he introduced and successfully passed legislation in the Senate to implement a $750 million dollar R&D program but the measure was defeated in the U.S. House of Representatives by strong opposition of airlines and autos. In deference to the intellect of Senator Moynihan, who first proposed increasing the capacity of our national transportation system by constructing a National Maglev High Speed Intercity Network along the rights-of-way of our national highway and rail systems, I will let him tell the story by quoting from an article written by him in the November, 1989 Scientific American magazine:

"The idea for maglev was thought up by Dr. James R. Powell on a Friday night in February 1960, while he was stuck in that permanent traffic jam that awaits anyone trying to leave Long Island over the Bronx-White Bridge. Powell and Dr. Gordon T. Danby, a colleague at Brookhaven National Laboratory, presented the first paper on superconducting maglev transportation at an engineering conference in 1966, and the race was on."

The US started the Maglev race but stepped out when Secretary of Transportation John A. Volpe of the Nixon Administration declared it no longer a priority in 1975. Thanks to Senator Moynihan, several attempts were made to jump start the technology over the years but they all stalled due to lack of political urgency. The Japanese and Germans, however, embraced the concept and invested multi-billions of Yen

and Deutsche Marks in its development. The investments have resulted in two systems that have begun commercial operations (as in the case of the German system in Shanghai, China) or have Governmental approval for commercial operations.

However, Powell and Danby have not been idle with respect to superconducting Maglev technology. They have developed a 2nd Generation Superconducting Maglev Transport System that takes advantage of the engineering done by the Japanese and added features that make the system ideal for operation in the United States. The new Powell-Danby system is extremely energy efficient, powerful enough to carry high revenue earning highway tractor-trailer trucks and much lower in capital construction costs than both the Japanese and German 1st Generation Maglev systems and importantly the advanced foreign high speed steel-wheel wheel rail systems. Its low construction cost is due to the unique and patented, prefabricated narrow beam guideway design. This new low-cost, low maintenance guideway in conjunction with a new 2nd generation 4-pole superconducting magnet design give the 2nd Generation Maglev the unique capability to electronically switch to off-line stations and dual-use conventional rail trackage in a levitated mode. This feature, which allows the use of existing railroad tunnels and bridges, provides transport planners with exceptional flexibility to deploy the system without having to destroy the existing built environment.

Maglev route studies authorized under current U.S. law resulted in promoting Maglev transport based on the German Transrapid Maglev system as the technology of choice, establishing a defacto "gage" standard based on the much higher construction costs and less capable German Transrapid Maglev system.

The high costs of the 1st generation systems have created a market opportunity for high-speed foreign steel-wheel rail systems. For example, the recently enacted American Recovery and Reinvestment Act is pointed toward the development of high-speed steel-wheel systems. Transportation policymakers in the Congress, the Administration and State and Regional authorities are being heavily lobbied by foreign steel-wheel high-speed rail equipment manufacturers. Committee members, staffs and journalists have made their discovery trips to Europe to ride the trains in France and Spain and have come away thrilled.

Despite the recent warnings of the Government Accountability Office, who have carried out a worldwide study for over a year (http://www.gao.gov/new.items/d09317.pdf), that high speed steel-wheel rail will require government subsidies to implement and operate; the Powell and Danby Superconducting Maglev technology is being ignored by the policymaking community. The Secretary of Transportation, Ray LaHood, in late May, made a trip to Europe to talk to train equipment manufacturers and rode their advanced high speed trains which operate at an average speed of 138 mph and can achieve speeds on special tracks of nearly 200 mph.

Hopefully, the Secretary will visit Japan, take Drs. James Powell Gordon Danby and me with him and meet with Dr. Yoshiyuki Kasai, the Chairman of Japan Railways, the constructor of Japan's Maglev line and operator of the Maglev Test Facility at Yamanashi. Dr. Kasai recommends that ***"the most effective future train system for the United States would be a maglev transit line. If such a network was in place, people in New York would be able to participate in an early-morning meeting in Washington without the bother of having to go to and from airports at both ends. Likewise, transcontinental maglev services could supersede aviation networks."***

Dr. Kasai recognizes that Japan's steel-wheel High Speed Rail (HSR) is a fully mature technology, and any advances in its technology will only be marginal. In contrast, Maglev technology is still evolving. The 1st generation German (i.e. China) and Japanese systems are still too expensive and limited in capability and revenue potential to be implemented in the U.S. Like HSR, they must be government subsidized. In effect they are like the pre-World War II DC-3 airplanes. If passenger air travel had remained at that level, instead of evolving to modern jet airliners, air travel today would be an oddity.

The U.S. should build a National Maglev Test Facility to generate detailed cost and performance data for the 2nd generation superconducting Maglev technology developed by Powell and Danby. We believe this should be the first step in proving a guideway "gage" standard to build a National Maglev Transport Network along the rights-of-way of existing highway and rail networks and establish a job creating American manufacturing industry for this all-electric, all-weather 300 mph highly energy efficient transport system. The speed, affordability and convenience of the Maglev vehicle service (Maglev is not a train of many cars) will attract passengers, truckers and private equity. This game changing system will reduce pollution from tailpipes, and in conjunction with electric autos will eliminate imported oil. The speed, convenience and affordability will relieve the drag on productivity from congestion on our highways, airways, and airports .

For the 2nd generation Maglev there has been one bright light: President Obama. The stimulus (American Recovery and Reinvestment Act) contained $1.3 billion for Amtrak and $8.1 billion for high-speed intercity rail projects. On April 16th, President Obama said at the announcement ceremony, ***"What we need, then, is a smart transportation system equal to the needs of the 21st century. A system that reduces travel times and increases mobility. A system that reduces congestion and boosts productivity. A system that reduces destructive emissions and creates jobs.***

What we're talking about is a vision for high-speed rail in America. Imagine boarding a train in the center of a city. No racing to an airport and across a terminal, no delays, no sitting on the tarmac, no lost luggage, no taking off your shoes. (Laughter.) Imagine whisking through towns at speeds over 100 miles an hour, walking only a few steps to public transportation, and ending up just blocks from your destination. Imagine what a great project that would be to rebuild America.

Now, all of you know this is not some fanciful, pie-in-the-sky vision of the future. It is now. It is happening right now. It's been happening for decades. The problem is it's been happening elsewhere, not here

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In France, high-speed rail has pulled regions from isolation, ignited growth, remade quiet towns into thriving tourist destinations. In Spain, a high-speed line between Madrid and Seville is so successful that more people travel between those cities by rail than by car and airplane combined. China, where service began just two years ago, may have more miles of high-speed rail service than any other country just five years from now. <u>And Japan, the nation that unveiled the first high-speed rail system, is already at work building the next: a line that will connect Tokyo with Osaka at speeds of over 300 miles per hour. So it's being done; it's just not being done here.</u>
(See: http://www.readinessresource.net/maglev/2000.html)

<u>There's no reason why we can't do this. This is America. There's no reason why the future of travel should lie somewhere else beyond our borders. Building a new system of high-speed rail in America will be faster, cheaper and easier than building more freeways or adding to an already overburdened aviation system –- and everybody stands to benefit."</u>

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