

QUAKER ECO-BULLETIN

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Riding the Rails to an Energy-Efficient Transportation Future

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Rail transportation is often forgotten as a part of the solution to global climate change and to our increasingly overcrowded highways and skies. I have been traveling by train my entire life, am a member of the National Association of Railroad Passengers, (NARP) and know first-hand the benefits of train travel. On my most recent trip from Oregon to Texas, I edited an entire book while enjoying the beauty of the countryside passing by my window. Beyond my personal preference for train travel, it is clear that a greatly expanded role for rail transport would help us significantly reduce our greenhouse gas emissions and result in other important social and ecological benefits.

Our Dependency on the Automobile

Perhaps the biggest obstacle to a greater role for railroads is our love affair with the private automobile. We use roughly twice the energy of people in Western Europe to support a standard of living that is not much different from that enjoyed by Europeans. Our dependence on the private automobile is a big contributor to this startling fact. Transportation is the largest component of petroleum use in the U.S and it continues to increase despite the dangers posed by global warming. (Figure 1)

The average household in the U.S. has two cars and spends 18 percent of its income on transportation, almost all of which is spent on cars. In cities with the most choice of transportation mode, that proportion is less (Baltimore, 14 percent), but in cities without convenient public transportation, the proportion is more (Houston, 20 percent).¹

Of the passenger miles traveled in the U.S. in 2004, 85 percent were in private cars, vans, SUVs, and pick-ups, 11 percent by airlines, 3 percent on buses, and a miniscule 0.6 percent by rail, including rapid transit, commuter and intercity rail (Amtrak).² In 2003 the average U.S. citizen commuted to work 26.3 minutes each way 20.3 days per month, 85 percent of which was by automobile, and 86 percent of that with the driver alone in the car.³ This is very inefficient transportation!

Energy Efficiency of Rail Travel

A train uses half or less energy than road transportation to haul the same weight, whether in freight or number of passengers.⁴ This is because, compared to rubber tires on a road, the rolling wheels on rails minimize friction and carry more weight. Locomotives also present a smaller frontal area in relation to the weight they haul, which reduces resistance from the air.

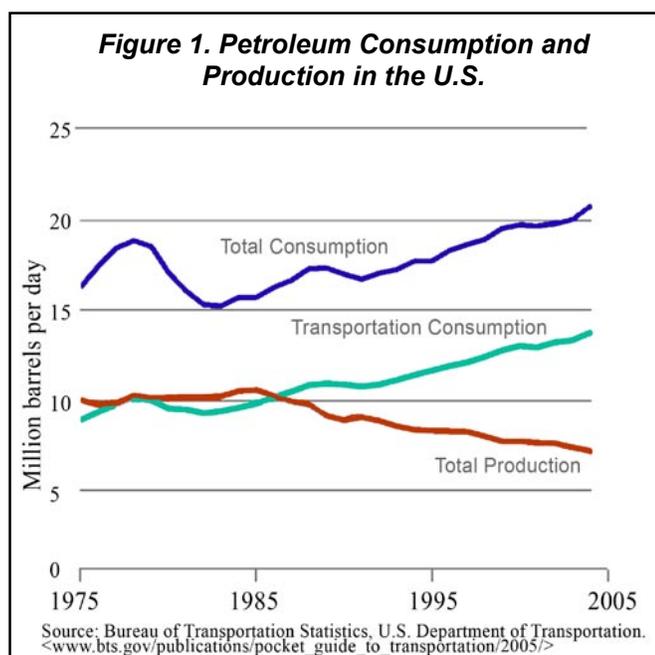
Rail transport creates very little impervious surface land area compared to the huge amounts of impervious land surface of highways and parking lots. Track beds include filters which protect ground water, while run-off from highways and parking lots is polluting ground water, damaging aquatic life, increasing erosion and causing floods. Furthermore, much less land is used for rails than would be used to carry the same load on highways. Much improvement in rail services can be made with existing land in right-of-way, so land consumption is much less than building new highways and airport runways. Thus, improving rail transport would have a much lower environmental impact than continuing to increase the capacity of highways and air travel.

If railroads are to fulfill their potential to help us reduce our impact on the environment, we must support much greater public and private investment to make U.S. passenger rail service faster, more convenient, reasonably priced and on-time.

There are three categories of passenger rail service in the U.S. 1) Commuter and transit services for distances of less than 100 miles, 2) Corridor service between urban areas for distances of 100 – 500 miles, and 3) Long distance routes greater than 500 miles. Commuter and transit services are outside the scope of this *QEB*, which will concentrate on services for distances greater than 100 miles.

High Speed Service

Recent developments have focused on improving corridor service with high-speed trains that allow door-to-door times competitive with air travel for distances less than 500 miles. The AMTRAK *Acela Express*, between Boston and Washington, reaches speeds of 150 mph. The trip from Washington to New York (225



¹ Surface Transportation Policy Project, "Driven to Spend", June 14, 2005

² Bureau of Transportation Statistics, National Transportation Statistics, 2004, Table 1-37 <bts.gov>

³ Bureau of Transportation Statistics Survey, October 2003, <bts.gov/publications/omnistats/volume_03_issue_s04/html/table_02.html>

⁴ "Railroads," 2007, *Wikipedia* <wikipedia.org/>

Quaker Eco-Bulletin (QEB) is published bi-monthly by Quaker Earthcare Witness (formerly FCUN) as an insert in *BeFriending Creation*.

The vision of **Quaker Earthcare Witness (QEW)** includes integrating into the beliefs and practices of the Society of Friends the Truths that God's Creation is to be held in reverence in its own right, and that human aspirations for peace and justice depend upon restoring the Earth's ecological integrity. As a member organization of Friends Committee on National Legislation, QEW seeks to strengthen Friends' support for FCNL's witness in Washington DC for peace, justice, and an Earth restored.

QEB's purpose is to advance Friends' witness on public and institutional policies that affect the Earth's capacity to support life. QEB articles aim to inform Friends about public and corporate policies that have an impact on society's relationship to Earth, and to provide analysis and critique of societal trends and institutions that threaten the health of the planet.

Friends are invited to contact us about writing an article for **QEB**. Submissions are subject to editing and should:

- Explain why the issue is a Friends' concern.
- Provide accurate, documented background information that reflects the complexity of the issue and is respectful toward other points of view.
- Relate the issue to legislation or corporate policy.
- List what Friends can do.
- Provide references and sources for additional information.

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miles) is three hours and from New York to Boston (250 miles) is three and one-half hours, both of which are competitive with the time it would take to fly. The flight from Washington to New York is one and one-quarter hours. Add the two hours one has to arrive in advance of the flight and the trip takes longer than via the *Acela Express*. Furthermore, train stations are located in the city centers eliminating the travel required to and from the airport.

Other high speed sections are between Philadelphia and Harrisburg where trains travel up to 110 mph, and in Michigan where trains travel a maximum of 95 mph. Feasibility studies are underway for several regional systems and some are in development. In March, 2007, the Federal Railroad Administration announced that they would "prepare an Environmental Impact Statement with the California High-Speed Rail Authority for two sections of the state's proposed high-speed passenger rail project."⁵

The U.S. is far behind other countries in the development of high-speed rail. In 1964 Japan was the first to develop a high-speed train "shinkansen," which now links all of their major cities with over 1,500 miles of track, and attains speeds up to 186 mph.⁶ The second (British) phase of the high speed Channel Tunnel Rail Link was opened on November 14, 2007, which now makes the trip from London to Paris (200 miles) in two and one-quarter hours, and to Brussels (200 miles) in two hours.⁷

Germany has a magnetic levitation (Maglev) system ready for commercial use, and Japan has a Maglev system under testing. This advanced system uses magnetic forces to lift and propel the engine over a "guideway," which eliminates the need for wheels, greatly reduces resistance and has the potential for speeds up to 300 mph. A new record of 357 mph for high speed trains was set in France on April 3, 2007. A Maglev system would make the trip from midtown New York to downtown Boston is just over an hour.⁸

The U.S. Congress passed the Intermodal Surface Transportation Efficiency Act in 1991, which authorized \$800 million for development of a prototype Maglev system. But funding for this advanced technology was never appropriated by Congress or requested by the Executive Branch, and the authorizations were later rescinded. To facilitate the construction of high-speed rail systems, the Act authorized up to \$1 billion in guaranteed loans, but no funds were ever appropriated. Five high-speed rail corridors were designated and \$30 million was allocated and used to eliminate highway/rail crossings along those corridors.⁹

The same 1991 Transportation Efficiency Act mandated a commercial feasibility study of various high-speed rail options, which was presented to Congress in 1997. Eight different high-speed passenger rail options with speeds ranging from 90–150 mph to the 300-mph Maglev were evaluated for eight corridors around the U.S. The study concluded "that States should consider HSGT [High Speed Ground Transportation] along with other options for improving intercity passenger transportation. ... In no corridor is HSGT projected to be commercially feasible, i.e. cover both its capital and operating costs. However, in most of the illustrative cases, HSGT is projected to function on a self-sustaining basis—independent of public subsidies—once the initial investment is in place and paid for. ... Beyond covering future operating and maintenance expenses and continuing investment needs, revenues in most of the illustrative cases could cover a portion of the initial investment." Estimates of the investment required in 1997 range from \$500–1,300 million for 90-mph systems in Chicago and southern California to \$5 – 23 billion for Maglev systems.¹⁰

Reliability

For the past five years, airline on-time performance has been steadily deteriorating from 82 percent in 2002 to 73 percent in 2006.¹¹ In contrast, the high speed AMTRAK

⁵ U.S. Department of Transportation Office of Public Affairs, 2007 Press Release, <fra.dot.gov/us/press-releases/142>.

⁶ "Rail Transport in Japan," 2007, *Wikipedia* <wikipedia.org>

⁷ Eurostar <eurostar.com>

⁸ "Magnetic Levitating Train," 2007, *Wikipedia* <wikipedia.org>

⁹ Legislative Information, Library of Congress <thomas.loc.gov>

¹⁰ *High-Speed Ground Transportation for America*, Federal Railroad Administration, September 2007 <fra.dot.gov/Downloads/RRDev/cfs0997all2.pdf>

¹¹ Bureau of Transportation Statistics, 2007 <bts.gov/programs/airline_information/airline_ontime_tables/2007_09/html/table_01.html>

Acela Express (Washington to Boston) on-time performance has increased from 73 percent in 2003 to 85 percent in 2006. The *Acela Express* has demonstrated that people will use rail transport that is reliable. In 2006 the *Acela Express* had half the market of air/rail traffic from Washington to New York and one-third of that between New York and Boston.¹²

However, only 30 percent of the long-distance Amtrak trains arrived on time in 2006. This is a great deterrent to the use of Amtrak for long-distance travel. The only track that Amtrak owns is in the Northeast Corridor. About 70 percent of the tracks that Amtrak uses are owned by freight companies. Most of the Amtrak train delays (80 percent) were caused by the freight railroads. Federal law obligates those freight companies to give priority to Amtrak trains, but there are delays beyond their control that are attributable to insufficient rail capacity and inadequate infrastructure. A major investment in rail infrastructure is needed to improve the performance of both passenger and freight transportation.¹²

Safety

When asked in a 2006 Harris poll for the most important considerations in choosing their modes of transportation, respondents mentioned safety first.¹³ Travel by car is by far the most dangerous. In the United States over 40,000 people are killed in highway accidents each year, while the average number of railroad passengers killed per year from 1999-2006 was 5, on rapid transit 59, and on light rail systems 19.¹⁴ One of the inherent disadvantages of rail transportation is that trains cannot stop within the distance that the train driver can see. In 2006 accidents at railroad crossings killed 362 people.¹⁴ Programs are underway to reduce this number by eliminating the crossings. Safety of rail operations is the first priority of the U.S. Federal Railroad Administration. Therefore, much of the budget is spent on development of new and improved signaling and control systems.

Stations

Railway stations are an important part of the rail passenger's experience, but only one quarter of the stations are owned by Amtrak. One-third of all Amtrak stations are owned by cities, one quarter by freight railroad companies, fewer still by other entities like port authorities, transit agencies, or private owners. Station renovations are often undertaken in the context of downtown revitalization projects. The complex of restaurants and retail shops in Union Station in Washington D.C. provides a good example of what can be accomplished using an Amtrak station as a centerpiece. "[S]tation restoration is more than simply a tribute to our past; it is also an investment in our future."¹⁵

Financing

Rail transportation is capital intensive because railway cars and, especially, locomotives are very expensive. Either state or national governmental subsidy or loan guarantees are required for development and maintenance of railroad systems. A dedicated fund with federal-state matching funds is needed to facilitate the develop-

ment of an effective passenger rail service in the U.S. This would require new taxes and/or a shift in existing government subsidies for such things as highway construction, petroleum production, and air transport to subsidies for railroad infrastructure. To date, there has been little success in challenging the powerful political forces that work hard to block such basic change.

There has been resistance to Amtrak funding in the federal budget for many years but little acknowledgement of the extent to which other modes of transportation are subsidized. Government subsidies, or loan guarantees, have supported air traffic control, built airports, purchased airplanes, rescued pension funds, bailed airlines out of bankruptcy and even paid airlines to serve communities where usage was too low to be financially feasible.

In 2003 funds used for the Interstate Highway system amounted to \$138 billion, only 58 percent of which was paid from gasoline taxes, vehicle taxes and user fees such as tolls, leaving \$58 billion to be paid from general funds.¹⁶

In contrast, Amtrak support from the 2006 federal budget was only \$1.2 billion, 27 percent of the total operating budget. This was three percent less than the previous year, in spite of significant increases in the cost of fuel, power, utilities and health benefits.¹⁷

Federal funding for Amtrak is on a yearly basis, and every year there is a threat that it will be discontinued, which is a big problem for long-term planning and implementation of multi-year programs. On the positive side there are several indications we are moving in the direction of increased support for passenger railroads. A portion of the Highway Trust Fund (usually 10-15 percent) is used to support transit systems and bicycle paths. Partnerships between Amtrak and states to develop corridor systems are increasing. Amtrak currently has contracts with 14 states to operate corridor rail systems and negotiations are underway with several others. In 2005, average ridership on Amtrak state-supported corridor trains increased five percent over the previous year with the Boston to Portland, Maine, segment increasing 23 percent. California, Illinois, Pennsylvania, and Washington all launched new Amtrak service in 2006.¹⁸

Future Vision for Long-distance Trains

Except for Alaska Railroad, Amtrak is the only passenger service for long-distance routes in the U.S. Amtrak's mission is "to provide America with safe and reliable intercity rail passenger service in an economically sound manner that exceeds customer expectations."

The recent focus on the short-distance corridor systems is very important, but the long-distance trains have been neglected. For those areas that are serviced by Amtrak, the low on-time performance has discouraged potential passengers from choosing the train, which further reduces revenue to support the long-distance service. And, many areas of the country have no passenger service at all. Their congressional representatives are less likely to support Amtrak funding.

NARP has a future vision of long-distance passenger rail service.¹⁸ The current Amtrak intercity system uses 22,000 miles

¹² Amtrak Annual Report 2006 <amtrak.com/pdf/AmtrakAnnualReport_2006.pdf>

¹³ Harris Poll #13 February 7, 2006 <harrisinteractive.com/harris_poll

¹⁴ National Transportation Statistics, 2006, Table 2-4: Distribution of Transportation Fatalities by Mode <bts.gov/publications/national_transportation_statistics/2006/>

¹⁵ Senator Daniel Patrick Moynihan <greatamericanstations.com/site-resources/benefits-of-restoration

¹⁶ Federal Highway Administration <fhwa.dot.gov/policy/ohim/hs03/html/hf10.htm>

¹⁷ Amtrak Annual Report 2006 <amtrak.com/pdf/AmtrakAnnualReport_2006.pdf>

¹⁸ National Association of Railroad Passengers, 2007 <narprail.org/cms/index.php/resources/more/download_packet_of_vision_material/>

Figure 2. Current Amtrak Passenger Train Routes (June 2007)

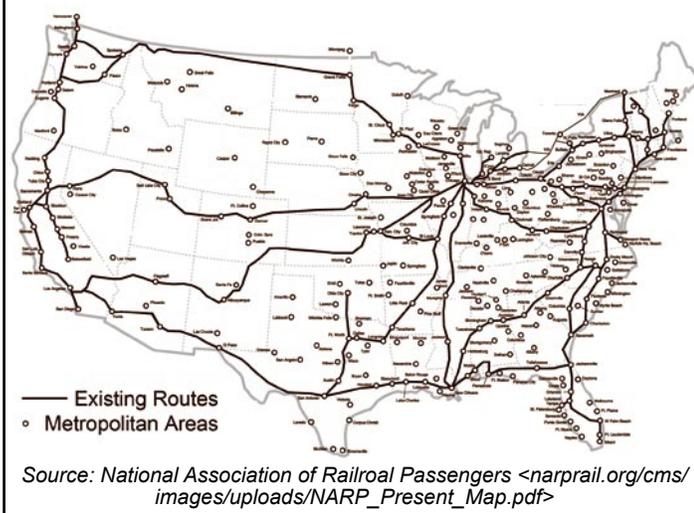
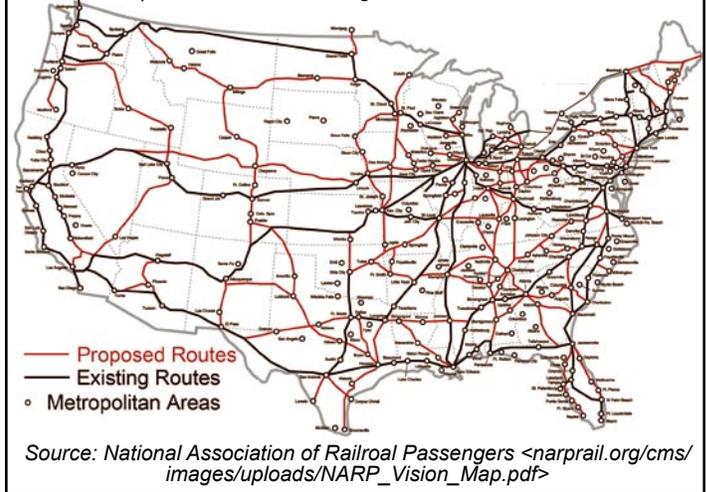


Figure 3. National Association of Railroad Passengers Proposed National Passenger Train Network



of track (Figure 2). The NARP vision, which would serve much of the U.S., includes 45,000 miles of track (Figure 3). By comparison, the Interstate Highway system has 47,000 miles of highways.

Using travel data from the Bureau of Transportation, the additional routes were chosen to serve areas not now served, using existing rail lines, current rights-of-way, and land currently zoned for tracks. Most of these would have to be upgraded, which would also benefit freight trains. The proposed system includes links to existing systems, such as commuter lines. No cost estimates for the proposed system have yet been determined. The articulation of the vision is the first step. Funds for detailed planning must be allocated to proceed toward realization of the vision.

In the face of our current global climate crisis, we must increase the energy-efficiency of our transport of goods and people. Rail transportation is the most efficient of all modes, but it has been neglected in the U. S. for many years. The infrastructure has deteriorated and considerable investment is required to revitalize it. In the meantime, other countries, such as Europe and Japan, have continued to invest in their rail systems and developed new technologies that bring rail systems into the modern age. The technology required for fast, safe rail transportation is available.

Our love affair with the private automobile, and the huge corporate system that supports it, has led us to concentrate our public investment in much less energy-efficient modes of transportation. Will the threat of global warming and the call for energy efficiency in all sectors be enough to redirect public policy to make the large investments required for a fast, reliable, and convenient passenger railroad system?

For Further Information

Federal Railroad Administration <fra.dot.gov>

National Association of Railroad Passengers <narprail.org>

Perl, Anthony, 2002. *New Departures: Rethinking Rail Passenger Policy in the 21st Century*. Lexington KY: University Press of Kentucky <kentuckypress.com>

Transportation Research Board, 2007. *Research to Enhance Rail Network Performance*. <<http://pubsindex.trb.org/default.asp>>

What Can Friends Do?

1) Using rail transportation is support for improvement in the systems.

- Use rapid transit and commuter options whenever possible. While you travel, you can use the time creatively to work, read novels, or plan your day. You will arrive at work relaxed and ready for your day.
- Consider the train when you need to travel between cities within the corridor systems. Travel from city center to city center in about the same time as flying.
- Take the train on long-distance trips. It is a very relaxing way to see the country. Think of the train ride as a big part of your vacation. You can concentrate on being with your family instead of driving and navigating.
- Share your experiences to encourage others to use rail transportation.

2) Let your state and federal legislative representatives know that you support investment in rail transportation.

- Support Senate bill #294, Passenger Rail Investment and Improvement Act, in the 110th Congress.
- Encourage a multi-year federal funding commitment to Amtrak with matching funds for State funding.

3) Let your local representatives know that you support investment in upgrading railroad stations.

Judy Lumb has been a rail passenger her whole life. Her grandfather worked as a machinist in the Rock Island Railroad shops and she rode the Rock Island Rocket to and from college. The overnight Southern Crescent was a convenient way to get from her home in Atlanta to Washington, D.C. Now she is a frequent Amtrak passenger when visiting the U.S. She is a member of Atlanta Friends Meeting, but has lived in Belize since 1987.