THE GLOBE AND MAIL

Economy Lab

Delving into the forces that shape our living standards

Posted on Wednesday, August 3, 2011 6:24AM EDT

http://www.theglobeandmail.com/report-on-business/economy/economy-lab/the-economists/fifty-years-on-it-may-be-time-for-personal-rapid-transit/article2117084/

Fifty years on, it may be time for personal rapid transit

By Richard Gilbert
Globe and Mail Blog

PRT at London's Heathrow Airport (www.ultraprt.com)

The 1960s were abuzz with the promise of new ways of travelling within urban regions, particularly in the United States.

There, the post-war resumption of rapid growth in automobile ownership had been boosted by the development of the Dwight D. Eisenhower National System of Interstate and Defense Highways (usually known as the Interstate Highway System). A prominent result was sprawling, increasingly car-dependent cities with decaying, economically dysfunctional cores and congested, polluted inner suburbs.

In 1962, President Kennedy began a move towards achieving "good urban transportation, with properly balanced use of private vehicles and modern mass transport to help shape as well as serve urban growth." This led to the Urban Mass Transportation Act of 1964, amended in 1966 to mandate "a program of research, development, and demonstration of new systems of urban transportation that will carry people and goods within metropolitan areas speedily, safely, without polluting the air, and in a manner that will contribute to sound city planning."

The amendment prompted the commissioning of 17 studies each costing $500,000 ($500,000 then is equivalent to $3.5 million now). Their results were summarized in a 1968 report that introduced the term personal rapid transit (PRT), defined as "Small vehicles, traveling over exclusive rights-of-way, automatically routed from origin to destination over a network

guideway system, primarily to serve low- to medium-population density areas of a metropolis." The report explained further:

Empty passenger vehicles or 'capsules' would be available at each station on the network. The riders would enter one, select and register their destination, then be transported there automatically, with no stopping. The average speed would be essentially equal to the vehicle speed. … Propulsion … would almost certainly be electric.

The 1968 report recommended PRT as one of three topics for further research and development. The authors of one of the 17 reports concluded that "Computer models of cities suggest that in certain circumstances installing novel 'personal transit' systems may already be more economic than building conventional systems such as subways."

The U.S. government issued numerous development contracts for PRT, chiefly to aviation firms. Ford and General Motors started their own programs. A 1971 cover story of Popular Science urged, "For a fast, private, nonstop pushbutton ride, try PRT. It's the brand-new way to get where you're going. … Many experts think PRT is the only kind of public transportation attractive enough to persuade the city-bound motorist to leave his car at home." President Nixon's January 1972 budget included a further substantial allocation of funds for PRT development. Four companies were paid to set up demonstration systems at the U.S. International Transportation Exposition in Washington in May, 1972. PRT's time seemed to have come. Urban transportation was about to be revolutionized.

But it wasn't. No PRT system went into everyday operation. The only legacy of the 1960s' flurry of activity is the Boeing-made group rapid transit (GRT) system at Morgantown, West Virginia, connecting three university campuses and the downtown along a 13-kilometre route with three intermediate stations. GRT differs from PRT chiefly in that the vehicles are larger -- Morgantown's vehicles each carry up to 20 people -- requiring users to share vehicles with strangers.

GRT and PRT systems both have offline stations, visited on demand. Thus, GRT passengers can spend more time visiting stations than PRT passengers. GRT guideways need to be more substantial to support the larger vehicles and loads.

Morgantown's system worked with reliability superior to regular transit systems for 34 years until 2009 when it was taken out of service for three months for system diagnosis and repair. Advanced control and communications systems are gradually being introduced, as well as new propulsion systems manufactured by Canada's Bombardier Inc.

Morgantown usually has a relatively low unemployment rate. The then-mayor said in 2007, "We're a small town with big traffic issues, and the PRT [actually GRT] could be the reason we're able to continue our growth."

Another legacy of the 1960s' flurry of activity of activity was application of automation to other transit systems. Most notable was San Francisco's Bay Area Rapid Transit system, which began service in 1972. An earlier implementation had been the minirail system at Montreal's Expo 67, part of which is still in use at La Ronde park. Vancouver's Skytrain system is another example of driverless passenger trains, as are London's Docklands Light Railway, part of the Paris Metro, the metros in the French cities of Lille, Rennes, and Toulouse, the metro in Turin, Italy, and the Brown Line in Taipei, Taiwan. Such automated systems are found more often at airports, shuttling among terminals and parking lots.

Heathrow Airport in London is seeing the first implementation of true PRT, as defined above. It began service this year, linking a terminal to a car park. Go here for videos of the system's operation. Several jurisdictions are exploring implementation of PRT systems as a replacement, complement or supplement to regular public transit. For good examples of PRT concepts, both Scandinavian, see a video here (my favourite) and slides here.

Two factors delayed implementation of PRT across the decades. One was the availability of adequate control systems. The initial approach was to centralize control, as mostly happens for regular rail systems. The processing demands imposed by PRT -- with large numbers of small vehicles travelling a huge variety of routes in often unpredictable ways -- cannot be met by centralized systems. For safe, reliable operation, each vehicle has to have substantial 'intelligence,' which until recently has not been technically possible.

The second factor delaying implementation has been the growing excellence of the automobile. Now, the car's future is in doubt because of challenges concerning the availability, price, and impacts of the petroleum products that fuel nearly all motorized movement.

The move to electric traction could allow automobiles to remain humankind's primary movers. However, batteries may continue to be costly and lack storage capacity. The viable alternative to battery power is powering vehicles from the grid while they are in motion, as streetcars, trolley buses, and electric trains are powered. But, attaching individually owned cars to live rails or overhead wires may not be feasible. Thus, we may well move towards versions of PRT, whose vehicles can be powered directly from the grid. PRT could in principle provide almost all the convenience and privacy of the automobile as well as additional advantages such as freedom to read, watch videos or use cell phones while travelling.

Subsequent posts will discuss the finances of PRT (which seem highly advantageous compared with much regular transit) and how PRT could be implemented, especially in Canada's harsh climates.

Richard Gilbert is a Toronto-based consultant who focuses on energy and transportation. His latest book is Transport Revolutions: Moving People and Freight without Oil*, written with Anthony Perl.*