A SMALL INVESTMENT COULD GO A LONG WAY TOWARDS MITIGATING

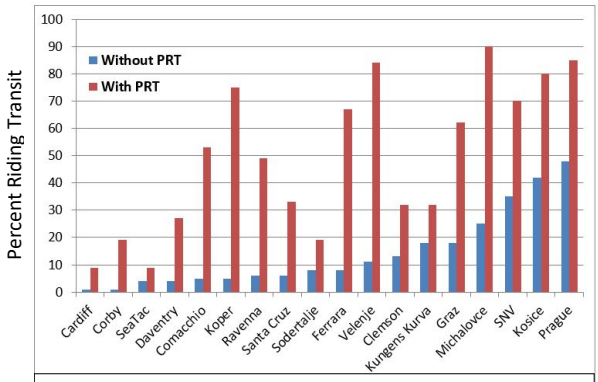
CLIMATE CHANGE AND CONGESTION

Climate change is now being labeled a catastrophe and congestion keeps getting worse, yet a significant proven mitigating technology is not being seriously considered in the U.S. Why is this and how could this technology be quickly implemented at a low cost?

Background

According to the United States Environmental Protection Agency, transportation accounts for 29% of U.S. greenhouse gas emissions. Road-based vehicles contribute 82% of the transportation emissions.

Personal rapid transit (PRT) is a driverless transit technology that utilizes its own dedicated (usually elevated) guideways. Many studies indicate it provides a higher level of service than light rail for about a quarter the cost while using a third of the energy per passenger. This high level of service has been consistently shown to produce a much higher level of transit mode share, thus significantly reducing both emissions and congestion by removing cars from roads. Furthermore, solar panels can be incorporated into stations and guideways providing renewable energy and further reducing carbon emissions. The technology has been around since the 1970s, but it has never really caught on in the U.S., yet large deployments are beginning to happen in Asia.



Transit Mode Share with and without PRT
Source: Studies in named cities

A very brief history

Morgantown PRT went into public service in West Virginia in 1975 after overrunning the schedule and budget and having the federal government turn their backs on it. It uses relatively large 22-passenger vehicles. This system has now completed over 200 million injury-free passenger miles, but few seem to care, and the world has largely ignored the technology. In 1999 a similar system, also with relatively large vehicles, went into service in the Netherlands. It is still in operation with zero injury accidents. From 2010 to 2013 three different modern PRT systems using small (4 – 12) passenger vehicles went into public service outside the U.S. All are still operating and there have still been no injury accidents.

Morgantown PRT

2getthere PRT

Why are there no new deployments?

In the view of PRT supporters, the three modern PRT systems all demonstrate that PRT technology works and can be implemented with few hiccups. The numerous studies dating back at least to 1978[1] showing high mode share and reduced emissions and congestion are correct and large deployments should now follow. However, the general observer and even the typical transportation professional only sees small applications, with few vehicles and stations, functioning like no more than an amusement-park ride and not anywhere near like an urban mass transit system.


Vectus PRT

Both views are correct. All present PRT deployments to date are small, niche operations. Some have captive riders who have no other choice. PRT professionals have worked long and hard to understand the hurdles involved in going from a small deployment to a widespread urban transportation system. They understand why PRT is infinitely scalable and use sophisticated simulation tools to validate how it will work. However, the public, our elected leaders and transportation professionals do not have the benefit of this inside knowledge and can be scared away by the unknowns. The result is that the few who want to implement PRT seek to mitigate risk by building a small deployment. This can be a mistake. Small deployments will not demonstrate the real capabilities and will seldom be self-sufficient.

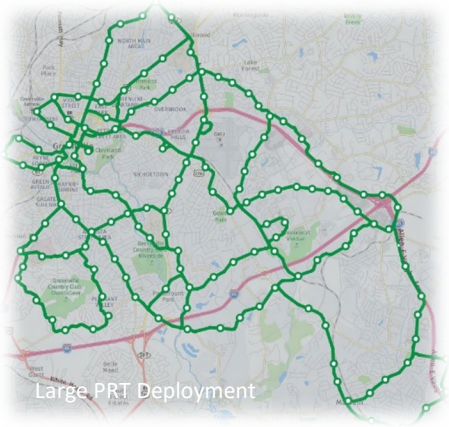

Modutram PRT

However, it is not wrong to build a small deployment provided the big picture is examined first. A small deployment will change little in the minds of people that see and ride it – its just a fun Disney-style ride. People must first see the ultimate plan, understand it and buy into its promise. Then the small pilot can be viewed in context as just the initial piece of the whole pie. Starting with the big picture may also be the ticket to getting a no-cost PRT deployment.

[1] Irving, Jack H., Fundamentals of Personal Rapid Transit, Based on a Program of Research, 1968-1976 at THE AEROSPACE CORPORATION, El Segundo, California, ISBN: 0-669-02520-8, Library of Congress Catalog Card Number 78-13604

Here is how that could work.

A PRT deployment with a few stations will never pay for itself except in unusual circumstances such as at an airport. In an urban deployment 50 or more stations will likely be needed before the fare-box revenue covers both operating costs and capital amortization costs. If a community undertakes a feasibility study and finds a large enough PRT deployment to be financially viable, they could attract large engineering, procurement and construction (EPC) companies teamed with PRT suppliers to design, build, finance, own, operate and transfer a PRT system for them with almost no community funding. Here are some details.


Large PRT Deployment

The feasibility study will need to be undertaken by a name-brand transportation consulting firm (probably supported by a PRT specialist firm). The ridership forecasts, willingness-to-pay and revenue forecast aspects must be robust and it would be wise to have them independently audited. Even then, revenue guarantees will likely be needed if private financing is to be obtained. The feasibility study therefore needs to carefully address the risks associated with the community guaranteeing the revenues. The community needs to understand that, even if the study shows the system will need no subsidy, circumstances could arise where it has to be subsidized for some period of time. This potential for subsidy should be much less than the upfront money plus ongoing subsidies many communities are presently putting into public transportation.

How do we do a small pilot project?

A pilot project can be desirable to confirm that the technology works locally and that enough people will ride the system. However, the pilot will likely lose money. If there is to be a gap in construction between the pilot portion and the remainder of the system, some extra funding will have to be made available. This will likely come from the community or the federal government, although bringing the government in for just a small fraction of the cost must be weighed against the added complexity involved.

Another approach could be to build the pilot as the first phase of the project with construction continuing while the pilot is deployed. If the technology fails to work, the EPC/supplier team (or their bonding company) must remove the infrastructure and return the site to its previous condition. If the forecasted ridership/revenue for the pilot fails to materialize, the community would have to decide what to do. The best way to mitigate this latter risk could be to build the pilot where a transit link is badly needed even if it is not self-supporting. This could be an airport deployment or a PRT-based intermodal facility.

Intermodal facility as PRT pilot project

Many communities are planning intermodal facilities to facilitate transfer between transit modes. The concept is to bring all modes together into one large facility that incorporates walkways, moving sidewalks, elevators, escalators, etc. to facilitate transfers. In addition, it usually also incorporates shops and restaurants. A different approach could be to bring the heavy modes within only about a mile of each other. This will help avoid a large multi-story facility and the high costs and inefficiencies of bringing numerous modes together in a small space. The largest mode could still incorporate a large building with

shops and restaurants. A small PRT deployment could then act as a horizontal elevator, quickly and conveniently interconnecting all modes. Transfers will be quicker. Wayfinding will be easier since passengers need only tell the PRT system which mode/line they wish to connect to. Transit vehicle location/schedule apps could allow passengers to wait in comfort in the large building until their vehicle is arriving.

The quid pro quo

The *community* undertakes a feasibility study at a cost of $1 million to $5 million providing credible ridership and revenue numbers for:

1. The overall deployment
2. The smallest viable deployment
3. A pilot project (if desired)

The *community* provides suitable PRT right-of-way easements within existing road rights-of-way in return for a small percentage of gross revenues. Being elevated, the surface footprint of a PRT project is relatively miniscule (less than one percent of that for bus rapid transit or light rail). The *community* guarantees a negotiated minimum annual revenue (the risks associated with this are addressed in the feasibility study).

The *EPC/Supplier* provides bonding guaranteeing the project will work or all infrastructure will be removed and the site returned to its original condition. The *EPC/Supplier* raises private financing to design, build operate and maintain the project through a special purpose vehicle (SPV – a company formed for the exclusive purpose of owning, operating and maintaining the project).

If the annual revenue falls short of the negotiated minimum, the *community* pays the difference. If a pilot project puts undue financial burden on the SPV and/or if private financing cannot be obtained for a pilot project, the *community* must forgo a pilot or provide the necessary funding.

At the end of an agreed term of around thirty years, the SPV hands the project over to the *community*. At this time the project should have a remaining life of twenty years or more and should be a debt-free money-maker for the *community*.

The bottom line

Communities can continue to invest many millions of dollars in conventional transit systems that will do little to alleviate congestion and greenhouse gases and are guaranteed to require subsidies for ever. Alternatively, they could invest a few million dollars in a study of a PRT solution that is likely to result in a self-financed project that will greatly improve mobility, while reducing congestion and greenhouse gases. A more cautious approach could be to invest one or two hundred thousand dollars in a pre-feasibility study before committing to the more rigorous feasibility study.


Ultra Global PRT

The bottom line is that a relatively small investment can set a community on a path to economic success enabled by improved mobility, while helping ensure a healthy and sustainable future for its citizens. This could help avoid the combined catastrophes of climate change and congestion.

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Opinions are those of the author