

ETAAC Report Draft Discussion v2.0

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Comments by

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STATEMENT

Personal rapid transit (PRT) was presented at an earlier public meeting and was completely overlooked in this draft of the report. Other technologies are repeatedly discussed and PRT should be included among them where relevant.

PRT systems provide the public with an attractive alternative to automobiles as PRT offers the same convenient service characteristics. When compared to existing public transit solutions, PRT has the highest potential of reducing car trips with its on-demand, non-stop, point-to-point service.

PRT unlike all other surface transportation options has the highest likelihood of achieving two vital goals of California public policy, the reduction of congestion AND green house gases.

First and second generation PRT technology is a proven and demonstrated technical solution. PRT is more energy efficient and therefore potentially more effective in reducing GHG than unproven battery, fuel cell, hydrogen or other transportation technologies with even more limited histories of commercial deployment. PRT, by contrast, requires only a pilot commercial deployment to speed adoption and confirm its effectiveness. In this respect, the state of California is in a unique position to jumpstart this critical technology in the United States.

Of all the surface transportation technology options available for consideration by ETAAC, PRT has the fewest number of technological and financial hurdles in meeting CARB goals for GHG reduction in the shortest amount of time.

DRAFT COMMENTS

EXISTING DRAFT in italics with amended language in bold:

Discussion of Issues on Page 2-11

In the draft discussion of *Clean Transportation* the focus becomes more technology specific and fails to mention PRT as an option among, frankly, more speculative though better funded technologies.

*Clean Transportation. Support vehicle demonstrations of low and zero transportation options including light, medium and heavy duty plug-in hybrids, dedicated electric vehicles, **electric guideway personal rapid transit (PRT) systems** and hydrogen or other advanced fuels.*

Create a single or a series of financial vehicles to support demonstration finance for projects that have particularly high GHG abatement potential.

Discussion:

While not specifying any particular technology, reference to “*low and zero tailpipe*” options implies automobiles and the absence of PRT in the discussion does nothing to broaden the context of the transportation solutions the ETAAC draft needs to consider:

This may include but is not limited to clean generation technologies, energy efficiency industrial applications and vehicle demonstrations of new low and zero tailpipe transportation options.

However, the draft continues and identifies a crucial factor in the commercial adoption of many advanced technologies. In this regard, PRT is no exception if it is to succeed in a timely manner in California:

The absence of funding for project demonstrations is a significant impediment to the maturation of new technologies and is consistently identified by thought leaders as a major gap in the financial architecture of clean energy.

Discussion of Issues on Page 3-1

EXISTING DRAFT in italics

California will best achieve its GHG mitigation goals when surface transportation makes the successful transition from a liquid fuel based system to an electric powered system. Electric powered PRT will play a crucial and pivotal role in this transition as it offers the best hope of mitigating both congestion and GHG emissions, a problem the draft explicitly acknowledges. In fact, this is the single most important observation in the report:

“Levels of congestion on California’s roads and highways are also up, leading to still further increases in GHG emissions per trip.”

Assuming success in developing cheap, ubiquitous biofuels, fuel cells and/or hydrogen, Vehicle Miles Traveled (VMT) will only increase, making congestion even more devastating in the State of California. For this reason alone, the committee should identify PRT before all other surface transportation options as having the highest likelihood of achieving two vital goals of California public policy, the reduction of green house gases AND congestion.

Discussion of Issues on Page 3-3

Table 2 addition to Mobility (Personal travel) / RD&D box:
Personal Rapid transit demonstration system

Discussion of Issues on Page 3-4

Addition to table 4/ First row/ RD&D box:

Funding for high performance electric guideway personal rapid transit (PRT) demonstration system

Addition to table 4 / Goods movement / RD&D box:

Funding for electric guideway based freight system

Discussion of Issues on Page 3-4

EXISTING DRAFT with amended language in bold:

PRT should be included in the General Principals discussion under the category **Policies Should Aim for a Level Playing Field**. In this context, as the draft should be modified as follows ,

*However, the turnover of the automobile fleet is very slow (about 14 years), so introduction [PHEV, etc.] would have to occur quite soon to make a significant difference by 2020. By that time, liquid fuels with much lower carbon intensity than gasoline are also likely to be introduced and the prospects for battery electric vehicles (BEVs) fuel cell electric vehicles (FCEVs)¹² cars **and electric guideway personal rapid transit (PRT) systems** are also likely to be better than they are today. It is not clear what combination of all-electric, hydrogen, and advanced liquid fuels will best serve our transportation needs to meet the dramatic reductions in GHG emission by 2050.*

The degree of uncertainty associated with the aforementioned technologies highlights the need to make explicit the possibilities of PRT development and bring it at least up to the same level of legitimacy.

Discussion of Issues on Page 3-12

EXISTING DRAFT in italics with amended language in bold:

Traffic volumes are projected to continue growing, too.²⁰ Convenient and efficient public transportation and transportation demand management (TDM) systems are critical measures to reduce VMT and GHG emissions.

Improved planning such as Smart Growth and Transit Villages;

*Improved transit systems such as **electric guideway personal rapid transit (PRT)** ,Electric Freight Rail and Bus Rapid Transit. Some other possible approaches to managing passenger and freight vehicle traffic were originally developed as methods to reduce congestion and improve traffic flow. They could reduce GHG emissions from the perspective of reducing time spent idling in traffic with a traditional gasoline or diesel engine (if no additional trips resulted). However, it unclear whether strategies to reduce traffic congestion – in particular those strategies that make driving faster without providing incentives to use alternate modes of transportation - will in fact reduce travel overall, in part due to latent travel demand. . **Electric powered guideway personal rapid transit (PRT) systems potentially offer an attractive alternative to automobiles***

as PRT offers the same convenient characteristics. PRT has the highest potential of any public transit technology of reducing car trips with its on-demand, non-stop, point-to-point service.

Discussion of Issues on Page 3-17

EXISTING DRAFT in italics with amended language in bold:

There are a number of planning measures that can reduce GHG emissions. A direct measure is to integrate GHG emissions into transportation planning, such as including GHG emission reductions in guidelines for the California Environmental Quality Act. This change to CEQA is extremely important and is already underway with a January 1, 2010 deadline for new guidelines to address global climate change ⁴³ (and thus is not an area of focus for this ETAAC report.) There are also a number of measures that improve transportation planning generally, with reduced GHG emissions as one of a number of co-benefits, as described in policies E and F below.

Smart growth, for example, is an urban planning and transportation strategy that emphasizes growth near city centers to prevent urban sprawl. This approach includes promoting mixed-use development, transit and bicycle and pedestrian-friendly infrastructure, and other land-use strategies, such as reduced non-residential speed limits, roundabouts, “parking maximums, shared parking, flexible zoning for increased densities and mixed uses, innovative strategies for land acquisition and development, and design emphasis on a sense of place.” ⁴⁴

*Smart-growth policies play a critical role in reducing GHG emissions while improving the economy. Proponents of smart growth – instead of the business-as-usual urban sprawl -- point out that this alternative reduce driving, increased walking, spur transit use, curb obesity, and promote cleaner air.⁴⁵ Transit villages, one form of smart growth, are generally mixed-use residential and commercial areas that are designed to maximize encourage access to mass transit systems. They are typically located within one-quarter to one-half mile (0.4 to 0.8 kilometer) of a mass transit station. **The use of low cost, high efficiency electric powered guideway personal rapid transit (PRT) systems could substantially broaden the reach of transit oriented development by expanding beyond existing transit corridors and form networks that reach perpendicularly into the urban environment. Environmentally, PRT offers an attractive alternative to light rail and buses due to its quieter, zero emission and lower impact operation.***

CalTrans estimates that the average household living in a transit village could emit 2.5 to 3.7 tons less CO₂ yearly than a traditional household. ⁴⁶ This estimate is based on a CARB study estimating transit village household private vehicle mileage reductions of approximately 20 to 30 percent annually⁴⁷.

Discussion of Issues on Page 3-20

EXISTING DRAFT in italics with amended language in bold:

Projects that increase roadway capacity and speeds are rated favorably even though they increase VMT, discourage non-motorized transportation, and tend to decrease quality-of-life in the communities where they are located. In-fill housing projects, or a dedicated lane for bus rapid transit, would be rated unfavorably under LOS despite the overall decrease in VMT and GHG emissions that would be the end result. Such projects may be beneficial from an accessibility perspective, but they would be considered unbeneficial from a motor vehicle traffic perspective.⁵⁶ As an alternative low cost, high efficiency electric powered guideway personal rapid transit (PRT) systems that do not interfere with surface traffic should be demonstrated as a public transit mode that can reduce costs, congestion, reduce parking needs, reduce emissions, and enable transit oriented development .

Discussion of Issues on Page 3-21

EXISTING DRAFT in italics with amended language in bold:

Improving transportation systems is another way to reduce GHG emissions in the transportation sector. Full funding of public transit systems is there a very fundamental need. Introduction of low cost, high efficiency electric powered guideway personal rapid transit (PRT) systems as another public transit mode to reduce costs, congestion, reduce parking needs, reduce emissions, and enable transit oriented development is a high priority Other sections of this report identify economic and technological innovations for transit systems linked to roadway pricing and improved transportation planning. Policies G, H and I below discuss electric freight rail and human-powered transportation alternatives. Other options include improved use of today's cars and trucks through improved driving behavior and simple maintenance issues such as proper tire inflation on motor vehicles. [ETAAC is exploring further recommendations like those below, and will coordinate with the California High Speed Rail Authority and with electrification efforts being evaluated in the South Coast Air Basin.]

Discussion of Issues on Page 3-22

EXISTING DRAFT in italics with amended language in bold:

Ease of Implementation: Most rail systems are privately owned. Even Amtrak operates for the most part on private rail Rights-of-Way, with freight transport taking precedence. Creating new tracks that allow the separation of passenger and freight operations would be a first step toward improving both transport delivery systems. The small footprint of electric powered guideway freight systems provides an alternative to the acquisition of additional right of way.

• *Co-benefits / Mitigation Requirements: A strategy for rail improvements ideally would be launched near ports and the routes into and out of the ports, where serious Environmental Justice problems result from the concentration of air emissions from diesel ships, trains and trucks. Public health would obviously benefit from a shift in transportation priorities toward electrified rail or guideway systems.*

• *Responsible Parties: Private operators, regional and state transport agencies, Amtrak, Federal Rail Administration.*

Problem: A large portion of the cargo coming in and out of California currently relies on the trucking industry and congested highways.

*Possible Solution: Standard rail transport systems emit far fewer CO₂ emissions per tonmile than long-haul trucking (the exact benefit varies with distance). Electrified rail travel, including shipments from truck to rail as well as from diesel rail to electric rail, would reduce emissions and lower oil imports. **Electric powered guideway freight systems potentially offer the lowest emission and cost solution.***

Discussion of Issues on Page 3-24

With respect to the 2007 ZEV Panel Vehicle Projections chart, PRT needs to be included in any analysis of zero emission vehicles.

Discussion of Issues on Page 3-29 thru 3-31

Recommendation add to box Next Generation Transportation Energy:

7) Develop electric powered guideway personal rapid transit (PRT) systems that can reduce congestion, reduce parking needs, reduce emissions, and enable transit oriented development.

Personal rapid transit is a unique technology that solves long standing transportation problems for lower cost than highway widening or light rail.

Next Generation Transportation Energy

EXISTING DRAFT in italics with amended language in bold:

*Many opportunities exist for development of advanced zero-emission and low GHG vehicles, **electric guideway systems**, and fuels. There will be multiple widening areas of overlap between electricity generation and transportation fuels, as noted below, compared to a relatively smaller overlap today (such as refinery use of natural gas and electricity to produce vehicle fuels, and natural gas use as a vehicle fuel). Infrastructure planned today for electricity supply will need to accommodate near-term deployment of Plug-in Hybrids (as noted in the Energy Chapter) **and electric guideway personal rapid transit (PRT) systems**. In addition, full performance battery electric vehicles, fuel cell vehicles (which could be powered by hydrogen produced via hydrolysis) **and electric guideway personal rapid transit (PRT) systems** will be fully commercialized by the 2025 to 2030 timeframe (based on the CARB Zero Emission Vehicle review panel) – well within the expected lifetime of electric generation, transmission and distribution system that will result from the decisions made today. Therefore, careful planning will be necessary to capture the advantages of synergies between energy sources that can be used for traditional electricity use, or as a vehicle energy source, and make sure that infrastructure developed today will serve the needs of*

the future.

Key policy goals for CARB, the California Energy Commission, and the California Public Utilities in partnership with other government agencies and other public and private organizations should include:

- *Develop low-cost, sustainable production processes for low GHG biofuels and hydrogen fuels*
- **Demonstrate commercial applications of electric guideway personal rapid transit (PRT) systems to assess the viability of early and rapid statewide deployment.**
- *Increase renewable electricity development in order to maintain renewable goals during expanded use to supply vehicle energy*
- *Assess plug-in hybrids, full performance battery electric cars and other electric vehicles, and hydrogen (produced by electrolysis) fuel cell vehicles and electric guideway personal rapid transit (PRT) systems as energy storage to facilitate increased renewables with a high percentage of off-peak generation; and as a potential source of peaking power during times of highest electricity demand*
- *Plan and implement electric metering infrastructure and tariffs that allow customers with these vehicles to access the lower cost of off-peak power, and higher prices for sale of on-peak power*
- *Develop fuel distribution & dispensing infrastructure of low and zero GHG alternate fuels*
- *Create an overall system that optimizes energy use across both sectors, and creates flexibility to adapt to future circumstances, as the future vehicle mix will depend largely on technology and economic developments*

Additional section for inclusion in Appendix

Personal Rapid Transit (PRT) is a system of elevated guideways (or tracks) and small vehicles that offer automated, on-demand transportation. PRT service architecture is a significant improvement over line-haul systems like rail and buses. PRT resembles small train or monorail systems, as sometimes seen at airports. However its non-stop, point-to-point service is more convenient than conventional line haul systems. In general, PRT is designed to be a public transit system that is much more personalized and avoids many of the undesirable features of ordinary public transit. A first generation system built by the federal government 30 years is still in operation and has demonstrated the superior cost, safety and performance characteristics of PRT service architecture when compared to line haul. Second generation PRT systems are under construction at London's Heathrow airport and Uppsala, Sweden. PRT costs (*\$15 million/mile, high \$50 million/mile*) Source: Carnegie, Jon A. and Hoffman, Paul S. *Viability of Personal Rapid Transit In New Jersey*. Trenton: New Jersey Department of Transportation. faculty.washington.edu/jbs/itrans/big/PRTfinalreport.pdf are lower when compared to light rail costs (\$30m - \$200m per mile) Source: FY 2000 and 2001

In a PRT system, individual riders or small groups would order a vehicle ahead of time board a vehicle on-demand and would have exclusive use of the vehicle during the trip, which would take them directly to their stop. This provides a level of privacy and safety like an automobile (perceived, at least) that ordinary mass transit does not, and avoids the need to rely on scheduled service. PRT vehicles are electrically powered, like a subway or light rail system, and so could lower GHG emissions relative to cars if the electricity provided to them had a lower GHG emission profile than the fuels that were displaced. The lightweight and high degree of energy efficiency make them uniquely suited among all surface transportation options to operate largely on solar PV and wind power.

PRT has the highest potential to mitigate GHG emissions *and* significantly reduce congestion.

CO2 Abatement Potential:

The actual GHG reductions attached to a Personal Rapid Transit (PRT) program depends upon how clean the regional electricity grid is. Daytime transportation could be completely offset by solar panels on the guideway (and even provide excess power back to the grid). Nighttime transportation could still be partially provided by wind, ocean, wave and nuclear with the balance coming from fossil sources. Since the electricity demand from PRT is less than EV or PHEV vehicles, the GHG reductions would be higher than autonomous vehicles. Batteries could also be deployed in the guideways to allow daytime excess power to be stored for nighttime use. Significantly fewer batteries compared with electric vehicles due to the lower power requirements.

A 2004 study for New Jersey noted that “PRT systems are approaching but not yet ready for public deployment.”[2] However, the development of the PRT system at Heathrow and possibly other locations in the near future may provide those first examples of public deployment. Construction times are thought to be similar or less than

Technological: There are no major technological barriers, however a demonstration system is needed to work out engineering tradeoffs and provide cities with the opportunity to evaluate different solutions.

Financial: Large upfront investment would be needed, but the total investment would be less than replacing the entire automotive fleet with PHEV or EV or hydrogen fuel cell vehicles.

Institutional:

In the United States it appears that most potential customers (cities or regional transportation boards) seem unwilling to take the risk on building the first such system.

Regulatory:

The only operating PRT like system in the US (Morgantown, WV) has been operating

without any injuries for 30 years. However, higher speed systems would require safety approvals.

Burke, Catherine. (1999) Innovation and Public Policy: Case of Personal Rapid Transit. Advanced Transit Association.

Lowson, Martin. (2002) The Ultra Personal Rapid Transit System. SAE International. Report 2002-01-0174.

[2] Ibid. p. 4

Thank you for considering these amendments to the draft document.