ORANGE COUNTY TRANSPORTATION AUTHORITY AND LIGHT RAIL PLANNING

SUMMARY

The Orange County Transportation Authority's (OCTA) Board of Directors is scheduled to decide in December 1999 whether to proceed with the construction of a multi-billion dollar, 28-mile light rail system in the central Orange County "Corridor". That critical decision could commit the county to a significant financial and policy course and set the future of transit systems in Orange County. The Grand Jury has studied the process for that decision and found it wanting.

The OCTA has implicitly characterized the need for light rail is to lessen traffic congestion and pollution, and to promote economic development along the proposed line. The proposed light rail system is estimated by OCTA to carry, at best, a daily ridership of 60,000. Total Orange County daily ridership in 2020 is expected by OCTA to be 10 million people, up 2 million from today's ridership. The light rail portion would be less than 1% (0.6%) of total county ridership in the year 2020.

The national experience with urban light rail systems' ability to solve traffic congestion, air pollution and related urban problems has been poor. The Grand Jury examined the last 12 urban light rail systems developed in the U.S. The Grand Jury analysis strongly suggests that Orange County will experience that:

- Light rail will have negligible impact on traffic congestion because it attracts few automobile drivers from their cars.
- Demographic trends will make light rail much less effective than predicted by planners.
- Light rail is expensive. The most cost-effective, federally funded systems have required subsidies of $5,000 and more per new ride. New rides are those riders brought out of their cars and into the transit system.
- Light rail is inflexible once in place. The OCTA's bus system routes are adjusted three times a year.
- Light rail cost and ridership forecasts will be erroneous and biased in favor of light rail.
- Light rail will not spur development. Development along light rail corridors is spurred by tax subsidies, not light rail.
- Light rail will not improve commuter travel times, energy conservation and safety.

There is a promotion of light rail by OCTA in its public Outreach/Center Line documents and briefings, rather than a process of study, analysis and evaluation as to light rail's merits and cost benefit.

The Grand Jury recommends that:

- The OCTA Directors be made aware of the national experience in light rail over the past 18 years and light rail's documented inability to solve urban transit problems such as traffic congestion and pollution. Along those lines, we further suggest that *disinterested* experts from academia be invited to provide the historical perspective to the Directors.
- The Directors instruct the OCTA staff to amend Outreach Programs to include data regarding the recent and ongoing national experience regarding the cost-efficiency and efficacy of light rail in failing to solve urban problems of traffic congestion, pollution, etc.
- The OCTA establish and publish in their Outreach literature measurable goals for light rail regarding the amount of traffic congestion reduction, pollution abatement, and cost effectiveness issues which will be used as "build-no build" criteria for the development decision process.

INTRODUCTION AND PURPOSE

The OCTA Board of Directors is scheduled to decide whether to proceed with the development and construction of a 28 mile light rail system in the central Orange County "Corridor" by the end of 1999. This is a significant decision that will commit the county on an important long term financial and transit policy course. Large amounts of tax dollars are at stake. The capital and right-of-way costs from this project will run into billions of dollars. Annual ridership operating subsidies will run into the millions of dollars. The source of these funds is not clear.

The citizens and their representatives who make the "build-no build" decision should receive full disclosure of all the perceived benefits, drawbacks, costs and impacts that this project would have *before* it is approved or disapproved. This decision should not be based on public relations fluff; it should not be a "done deal" followed by a search for its justification. Rather, it should be an open, unbiased, rational search that takes into account economics, utility, and record of performance of recent light rail developments. The historical record of municipal light rail in the U.S. should not be ignored as it yields the accumulated experience of some 12 cities that built light rail recently for many of the same reasons Orange County is considering.

The 1998-99 Grand Jury studied the process by which this decision will be made, and how the information will be made available to the Board of Directors who will have to make the decision and the taxpaying public who will ultimately have to bear the cost burden.

METHOD

The Grand Jury gathered data from many sources including: the federal government, cities and agencies that have developed light rail, OCTA, academia, and technical sources listed in the Bibliography. The Grand Jury analyzed transit performance data and past forecasts to derive the actual performance of the light rail segment of transit systems as compared to past projections of that performance. Past projections compared to actual performances establish what Orange County could expect from a similar light rail system. The Grand Jury conducted interviews with the OCTA, transportation and economics experts in academia, and Los Angeles "Blue Line" operators and planners.

BACKGROUND

URBAN RAIL SYSTEMS

Urban rail systems-such as light rail, commuter rail, or heavy rail-are often proposed as a solution to the urban problems of air pollution and traffic congestion. The most significant traffic congestion occurs during weekday peak travel periods when the majority of workers ' travel to and from work. A major test of urban rail's success is the extent to which it reduces traffic congestion during weekday peak hours. Additionally, urban rail systems are given the positive attributes of promoting unsubsidized urban development along the rail corridors and offering energy savings compared to automotive alternatives. These rail systems are considered a significant portion of the entire transit system, which consists of buses, road and freeway enhancements, and rail systems. There are three types of urban rail:

- **Light Rail** (surface rail) which generally operates without grade separation (usually at street level) though it may have grade separation. Light rail cars are the current name for streetcars or trolleys that used to operate in most large U.S. cities from the late 19th century to the mid-20th century. Light rail cars are powered by electricity that is collected from overhead lines. The average speed for new U.S. systems is a little over 16 miles per hour. Light rail can theoretically carry up to 15,000 to 25,000 riders per hour in each direction in 3-car trains. Some examples of new light rail include the St. Louis Metrolink, Portland MAX, Los Angeles "Blue Line", and the San Diego Trolley.
- **Commuter Rail** (regional rail) operates over freight railroad rights of way to downtown railroad stations. Propulsion is either diesel or electric. The average operating speed is 33.2 miles per hour. Trains are often up to 10 cars long or more and may be double deck. Examples of commuter rail systems include the Los Angeles Metrolink, the Chicago Metro, and New York's Long Island Railroad.
- **Heavy Rail** (rapid rail) operates with grade separation and is often in subways or elevated structures. Heavy rail is normally electricity powered from a third rail and operates at an average speed of 19.5 miles per hour. Heavy rail is expensive to build. For example, costs in Los Angeles approached $300 million per mile before the project was cancelled. Rapid rail can carry up to 40,000 riders per hour in each direction in trains made up of 10 cars. Examples of heavy rail include the New York subway system, the Chicago El, Washington (DC) Metrorail, the Paris METRO, and the London Underground.

This Grand Jury report concentrates on light rail systems because light rail is the primary urban rail system under consideration by OCTA for development in central Orange County. There are no technical barriers to light rail development.

HISTORY OF OCTA

The OCTA was created by merging eleven transportation-related entities and funds into a single agency. This step was initiated by the passage of state legislation, and OCTA began serving the public on June 20, 1991. Eleven voting directors form the governing body of the Authority. The eleven voting members include 4 County Supervisors, 6 city council representatives, 1 public member, and 3 alternates. In addition, a representative appointed by the Governor of California serves in a non-voting capacity.

The OCTA defines its mission as "to create, coordinate, finance, and deliver an easy to use transportation network which keeps Orange County moving and meets the public needs." The OCTA, according to its Long-Range Financial Plan, is responsible for "... providing coordinated, efficient, and comprehensive transportation planning and services within Orange County." OCTA's long term strategy is to help meet future transportation demands in central Orange County and is based on the Corridor Major Investment Study (MIS) completed in July 1997. The OCTA Board of Directors approved a Locally Preferred Strategy (LPS) on June 9, 1997. Implementation of the LPS is to occur over the next 22 years.

The following three elements comprise the LPS (as described by the Long Range Financial Plan-1999 Edition):

1. Implementation of the Transportation Systems Management alternative, a 49 % increase in bus service.

2. Significant expansion of the Metrolink commuter rail system.

3. Advancement of a 28-mile urban rail system into the Preliminary Engineering/Draft Environmental Impact Statement phase to conclude with a final decision by the OCTA Board in December 1999 on whether to proceed with building the urban rail system.

The OCTA has established a Public Involvement Program (PIP) also known as the Outreach Program and, more recently, CenterLine. The PIP, as described in the OCTA Major Investment Study Final Evaluation Report (June 1997), "...provide(s) for the selection of transportation improvement alternatives for analysis which attract public support. The PIP also assure(s) these alternatives were evaluated according to criteria the general public viewed as important."

One of the goals of the PIP's Outreach/CenterLine program is to get public feedback and evaluation of the transportation alternatives. The Grand Jury scrutinized the PIP Outreach/CenterLine material and briefings from 1998 to date. The PIP furnished no cost effectiveness data regarding the alternatives presented in the Outreach literature and briefings brought to the public for evaluation. OCTA's Outreach/CenterLine program has not articulated or documented what the *tangible* goals of light rail should be for the County except in broad, nebulous generalities.

Similarly, the OCTA Outreach has not described what the tangible economic and environmental performance criteria should be for building light rail nor established what is the decision criteria for making such a large financial commitment. The Grand Jury can only speculate what those criteria might be:

- Efficiency as to how light rail removes congestion from the County's freeways and streets.
- Amount of pollution removed from County air.
- Amount of unsubsidized development that can be expected along the light rail tracks.

Additionally, the OCTA PIP has furnished citizens little or no data regarding the efficacy and cost effectiveness of urban light rail systems built recently in other cities over the past 18 years. The national experience regarding the cost effectiveness and the efficiency of urban light rail systems has been poor. The philosopher Santyana has commented that those who ignore history are doomed to repeat it.

The OCTA Long Range Financial Plan (LRP) identifies capital funding sources for urban rail system as federal grants, State Transportation Improvement Program funds, and Measure M. The OCTA estimates today that the "low cost alternative" light rail system will cost $1.316 billion ($47 million per mile) exclusive of right of way costs. Measure M funds identified for light rail will be about $340 million over the life of the Measure, leaving sources external to Orange County as the major contributor of capital. The OCTA cannot finance light rail unless it drastically amends its LRP or attempts a light rail ballot tax measure.

Operating revenues for urban rail are identified as "...measure monetary endowment, congestion management and air quality funds, fares and endowment interest earnings." In other words, it must be heavily subsidized since fares will probably recoup about 30 % of the operating expenses of light rail based on previous light rail experiences.

Measure M Funds and Expenditures-Orange County voters approved the Orange County Traffic Improvement and Growth Management Plan (Measure M) in November 1990. Financing for projects identified in the plan is provided by the one half percent state sales and use tax, which became effective April 1, 1991 and sunsets in 2011. The implementing Measure M Ordinance No. 2 requires that sales tax revenues be spent only on projects included in the ordinance. The Revised Traffic Improvement and Growth Management Plan of that measure regulates Measure M expenditures.

The plan specifically details the percentage of sales tax expenditures allocated for transit mode projects. That percentage is 25% and includes expenditures for light rail. The revised Expenditure Plan in OCTA's 1999 edition of the Long Range Financial Plan identifies some $340 million (in 1988 dollars) for rail transit spending over the 20-year life of Measure M. The LPS identified costs to develop "the Corridor" at from $1.3 billion (street level alternative) to $1.8 billion (for the elevated version) in 1998 dollars.

WHAT IS ORANGE COUNTY LIGHT RAIL'S JOB?

Light rail is being studied by the OCTA to service a 28-mile segment of Orange County from Fullerton to Irvine (the MIS "Corridor"). A plan to this end is undergoing conceptual engineering study that is to be completed by November 1999. The costs to build a street level alternative compared to an elevated alternative of the light rail project are projected by OCTA at this time to be $1.316 billion to $1.876 billion ($47 million to $67 million per mile), not counting right of way acquisition costs.

The proposed system is estimated by OCTA to carry, at best, a daily ridership of 60,000. Total Orange County daily trips in 2020 is expected by OCTA to be 10 million people, up 2 million from today's ridership. The light rail portion would be less than 1% (0.6%) of total county ridership in the year 2020.

The OCTA Outreach literature is silent on the goals of Orange County light rail. The OCTA Outreach literature states that today the County has "an extensive highway system, very little open space for new or expanded highways, a successful and growing bus system, Metrolink..." and poses a question "Is this sufficient for 2020?" The same Outreach literature poses a rhetorical question, "Why is congestion a problem?" and answers it by stating, "increasing congestion leads to declining: travel flexibility, economic vitality, tourism, appeal as a business center, property values, local investment,

workforce productivity, quality of life." It is left as an exercise for the reader to determine that the reduction of congestion is one of light rail's goals. "Build-no build" thresholds are not described. Just how much traffic congestion will be reduced in Orange County to merit the development of light rail is not stated.

NATIONAL AND LOCAL DEMOGRAPHIC TRENDS

The documented failure of new light rail systems to make a material contribution to improving traffic congestion and air pollution isn't a failure of rail technology. Light rail can theoretically carry a lot of people that are attracted from their autos or other modes of transit. The reality is that it doesn't because light rail is obsolete with respect to the needs of most American urban commuters.

Urban areas have suburbanized considerably since World War II with residences and employment sprawling over larger areas at much lower densities (population or employment per square mile). Since 1950, the nation's top urbanized areas have experienced population growth of about 35 %. At the same time, the land area covered by the same urban areas has increased six times as fast (214 %). The result is a 45 % decline in population per square mile from 6,400 to 3,500 in 1990. Central city population has declined 5🗁%, while suburbs have increased 218 %. Even worse, among the central cities that have not made significant annexations, there has been a 22 % population loss from 22.1 million to 17.3 million. Their suburbs have increased population by 18.7 million.

As residences dispersed, employment tended to increasingly relocate to the suburbs. Downtown areas employ a smaller percentage of the work force. Therefore, work trip travel patterns are more random. In the past, a large percentage of work trips were from outlying central city or suburbs to the central area. Now, twice as many people commute from suburb to suburb as from suburb to a central city. Travel patterns are also more complex. Many of the work trips are segmented - they have more than one purpose. These segmented trips do not lend themselves to transit because speedy point-to-point service is generally not available for the trip segments.

These trends take a heavy toll on transit, especially high capacity modes such as light rail. Rail transit is most effective in moving large numbers of people traveling to and from the same general locations. Little of contemporary urban travel consists of that type of movement. As a result nationwide:

- Transit's share of land travel in the U.S. has dropped from approximately 6 % to less than 1% since 1950.
- Public subsidies have failed to reverse transit's trends. Transit subsidies have risen to nearly $20 billion a year from nearly zero in 1970. Yet in 1995, transit ridership dropped to its lowest level in 20 years.
- Percentage of work trips by transit has fallen from 13 % in 1960 to 5.1 % in 1990, a 60 % reduction.

LIGHT RAIL AND CONSUMER MISMATCH

Light rail may have been effective for the pre-World War II city, but it has been rendered obsolete by the demographic forces that have produced contemporary Orange County. Light rail's ability to move large numbers of people has virtually no value to the modern urban area because it doesn't

match the needs of the modern urban traveler. Demographic studies have shown the following factors important to the peak hour commuter:

- **Proximity** - Consumers want service that is conveniently close to both their trip origin and destination. The trip by auto or transit must begin near home and end near work.
- **Frequency** - Consumers want freedom to travel whenever they want or need. That equates to service that is frequent and available virtually all day, every day.
- **Travel time** - Consumers want to get where they are going as quickly as possible. Additionally, riders dislike transferring from one route to another.
- **Segmented trips** - The work trip has increasingly become segmented. A segmented trip is one with more than one purpose. Frequent and convenient point-to-point transit service is simply not available for those trips.
- **Cost** - Work trips must be affordable.

Proposed light rail lines are often criticized for "not going to the right place". Residential or employment densities in Orange County suburban areas are so low there is little difference between routes in their ability to generate traffic. Studies have shown that transit is exceedingly unattractive for the work trip to suburban areas. Transit has no advantage for those consumers who can afford to make a choice in deciding how to make peak hour trips in the urban area. The auto, on the other hand, provides the on-demand, rapid service point to point transportation commuters to suburban jobs want.

THE NATIONAL EXPERIENCE WITH LIGHT RAIL

Before any rational discussion can be made on the future of light rail for Orange County, a look should be taken at all the new light rail systems developed within the last 18 years and see how their performance matched up with expectations and predictions. Such historical perspective allows reasonable expectations of what a light rail system might do or not do for Orange County's urban transportation problems.

Light rail's historical experience has been disappointing in every case except one (San Diego), although disappointments have occasionally been trumpeted as victories by light rail proponents. The San Diego exception will be discussed separately. The OCTA occasionally uses the Portland experience as a light rail poster child. Portland realities are also discussed in this section.

Twelve new light rail lines have been built in the U.S. over the past 18 years. Unhappily, they have provided virtually no reduction of traffic congestion and, consequently, no reduction in air pollution. The percentage of people using transit to get to work has declined in all major metropolitan areas, and the decline has been as significant in the metropolitan areas that built light rail as in the ones that did not.

LIGHT RAIL OBJECTIVES AND CLAIMS

OBJECTIVES

Light rail has been proposed as a solution to our urban transportation problems. The OCTA planners imply that light rail can reduce traffic congestion (and thereby air pollution?) and do so for lower costs than other alternatives (e.g., freeway expansion or bus line expansion). This principal

benefit has been implied in Outreach literature and public meetings to obtain voter or public agency approval for the proposed light rail system currently under study.

BENEFITS CLAIMED

The following claims are made for the adoption of light rail.

- **Reduction of Traffic Congestion:** Light rail's theoretical capacity for traffic reduction is considerable. Advocates frequently point out that a single light rail line has the capacity to carry the same number of people as six lanes of freeway. Capacity, however, does not equate to usage.
- **Reduction of Air Pollution:** Autos (private vehicles) are the principal mobile sources of air pollution. To the extent that light rail is successful in reducing traffic congestion and the number of autos on the road, air pollution may be reduced by a corresponding amount.
- **Cost Effectiveness:** Because it can carry higher passenger volumes per vehicle and per transit employee, light rail is claimed to be more cost effective than other transit alternatives, including buses. For example, a single driver can operate a bus with up to 60 to 75 passengers; a two-car light rail train can carry up to 400 passengers.
- **Additional Benefits Claimed:**
- -Encouragement of more dense commercial and residential development which would also reduce overall levels of auto usage
- -Improved travel times
- -Improved safety
- -Reduced transit deficits (subsidies) as higher passenger volumes on light rail improve the percentage of total costs recovered from passenger fares.

The Grand Jury examined and studied each of the claimed benefits in light of the experiences of the 12 light rail systems developed recently. They had no merit for solving urban transportation problems in Orange County.

LIGHT RAIL REALITIES IN THE UNITED STATES

Twelve new light rail lines have been opened in the United States in the past 18 years. Those light rail systems were located in Baltimore, Buffalo, Dallas, Denver, Los Angeles, Miami, Pittsburgh, Portland, Sacramento, San Diego, San Jose, and St. Louis. For example:

- The Los Angeles Blue Line which carries approximately 50,000 riders per day.
- San Diego carries about 60,000 riders on its two new light rail lines.
- St. Louis carries more than 45,000 riders per day on two light rail corridors.
- Lines in Portland, Buffalo, Sacramento, San Jose, and Baltimore carry more than 20,000 riders per day.
- Denver's light rail line carries more than 15,000 riders per day.

The OCTA documents estimate an Orange County Corridor system will carry 45,000 to 60,000 daily riders. Based on other cities' experience, this daily ridership prediction appears high and unlikely to be achieved. However, even if realized, that represents less than 1 % of the daily trip requirement in Orange County for the 2020 time period.

Nationally, light rail carries from a maximum of 30 % of total transit ridership (Sacramento) to less than 5 % (Los Angeles). Therefore, the capability of light rail to reduce traffic congestion in peak hours is necessarily less than the overall capacity of transit to reduce traffic congestion.

TRAFFIC CONGESTION AND LIGHT RAIL

According to OCTA's Outreach documents, a fundamental purpose of light rail appears to be the reduction of traffic congestion. Daily trips in Orange County are expected to reach 10.0 million by the year 2020, an increase of 2.0 million over the 8.0 million trips made now. The proposed light rail system is estimated by OCTA to carry at best, a daily ridership of 60,000. Total Orange County daily ridership in 2020 is expected by OCTA to be 10 million people, up 2 million from today's ridership. The light rail portion would be less than 1% (0.6%) of total county ridership in the year 2020.

The most intractable and predictable traffic congestion occurs during the weekday morning and evening peak periods. Rush hours are generally 7 AM to 9 AM, and 4 PM to 6 PM. Traffic congestion can occur at times other than rush hour, but is less predictable, more geographically confined and often the result of temporary disruptions due to accidents and construction. Peak hour traffic congestion results from the fact that the majority of work trips occur during peak periods-without these work trips, peak hour traffic congestion would be as infrequent as during off-peak times.

A test of light rail's success is not how many people are on the trains; it is how many cars light rail has removed from the road, especially during peak hours. Unfortunately, light rail does not reduce traffic congestion because it attracts few auto drivers. For example, approximately 20% of Washington, D.C. rapid rail ridership formerly drove autos for their trips, while 25% of San Diego's light rail riders were former auto drivers. The majority of new light rail riders are:

- Former bus riders who have been forced to transfer to rail because their bus routes now feed rail stations instead of the former destinations (usually downtown).
- Riders in “free fare” downtown zones (such as Portland, St.Louis, and Buffalo). For example, all light rail and bus service in downtown Portland is operated without fares.
- Drivers who use free downtown peripheral parking at rail stations to avoid downtown parking charges and ride short distances to their jobs. This reduces auto use by a very small amount and has little positive effect on pollution as well.
- Former car pool riders whose car pools continue to operate or have become single-occupant trips. The autos stay on the road.

Light rail has not reduced traffic congestion on nearby freeways.

- For example, in Portland, traffic on the adjacent freeway has continued to grow and is now at least 58 % higher that before light rail was opened. During rush hour, adjacent freeway lane carries seven times as many riders as light rail inbound to downtown. In the reverse direction, a single freeway lane carries over 80 times the passengers on the light rail line.
- In St. Louis, freeway traffic in the light rail corridor has continued to grow at rates twice as fast as the total St. Louis metropolitan area. Since light rail opened, 1 out of 33 new passenger miles has been traveled on transit; or, to say it another way, 32 out of 33 new passenger miles have *not* been on transit of which light rail is an integral part.

AIR POLLUTION AND LIGHT RAIL

Considerable progress has been made in improving air quality in the United States and California's Los Angeles basin. From 1970 to 1992, annual road travel increased by more than 100%. At the same time, transportation-related carbon monoxide emissions fell 32%, volatile organic compound emissions fell 53%, and nitrogen oxide emissions rose only 1%. Unhealthy air quality days dropped by more than two thirds in U.S. metropolitan areas from 1987 to 1996, and auto pollution is expected to drop about 25% more from 1996 to 2010 despite continuing growth in miles traveled. The best year for air pollution in the Los Angeles area for the past 50 years was 1997-despite a tripling of the basin's population. *Most of the improvement in air quality is improved vehicle emission technology.* Virtually none of the pollution improvement is attributable to transit. Because light rail does not appreciably reduce auto use, U.S. Department of Transportation reports state it cannot materially reduce air pollution. For example:

- The Washington, DC, rapid rail system, which carries more than twice as many riders as the combined new light rail lines in nine urban areas, is credited with removing about 1% of emissions in the area.
- New light rail systems make only modest air quality improvements because only part of the additional ridership of these systems is drawn from single occupant vehicle users. Others are drawn from buses, car pools, and latent demand (new riders who are riding because the rail system is now available and couldn't use autos or buses). Attracting riders from autos does not reduce airpollution. Of the few auto drivers attracted to light rail, many drive to rail stations (Park and Ride). The shorter trips to the stations may produce nearly as much pollution as the former longer trips. The shorter trips still entail cold starts and subsequent engine cool down. This portion of a driving trip generates the bulk of hydrocarbon emissions because of the auto's relative inefficiency and higher emission rates while warming up and higher gasoline evaporation rates while cooling down

LIGHT RAIL AND COST EFFECTIVENESS

Since the early 1970s, public transit operating costs per mile have risen at more than double the rate of the Consumer Price Index. Transit is the only passenger or freight transportation mode that has not improved its cost effectiveness since 1980. As a result, transit has become much more expensive than even the auto. In 1995:

- The full cost per passenger mile of operating an auto was $0.16. Transit expenditures per passenger mile were $0.60 - nearly 4 times that of the auto.
- Transit fares, exclusive of subsidized costs, have become more costly than the full cost of the auto -$0.17 per passenger mile.
- Light rail is expensive relative to other transit modes-1996 light rail expenditures per vehicle revenue mile in urbanized areas exceeding 200,000 population were twice the bus rates per mile.

Cost per New Ride index, as described by the Federal Transit Administration, captures the annual capital and operating cost of a transit project in relation to the increase in ridership attributable to the project. (If a rider transfers his ridership from a bus to light rail, this does not count as a new ride since it is effectively a transfer of ridership internal to the transit system.) The fewer new riders, the higher the cost per new rider. The cost per new ride can be used to estimate the cost per each new individual rider traveling to and from work by light rail. Up until the early 1990s, The Federal Transit Authority considered $6 per ride to be a maximum reasonable cost-effectiveness index for new transit development. The daily cost per new rider is double the cost per ride since the worker has to get to and return from work. The cost per new ride for recently developed light rail systems has averaged

nearly $17.89, or about $8,040 annual cost per new commuter rider in 1994 dollars. By comparison, in 1995, the full cost per average auto commute was estimated to be $2.88 each way - $5.76 per day, $ 1,300 per year. All of the auto cost is borne by the user. The cost per new ride of new light rail systems is heavily subsidized since fare box recovery tends to be about a third of the cost - around $4.00 to $6.00 per round trip.

The bottom line is that the high cost per new ride reflects the fact that new urban light rail systems attract relatively few new riders, and as a natural result, few trips are attracted from autos.

LIGHT RAIL AND ENERGY CONSUMPTION

Public transit is less fuel-efficient than the auto. Only commuter rail, such as Metrolink, is more energy efficient than the auto. In 1995, light rail consumed 13 % more energy than the auto per passenger mile. A principal factor in the energy intensiveness of the electric rail modes (light rail and heavy rail) is the great amount of energy needed to produce electricity. For instance, coal generation of electricity consumes three times as much energy as it produces in electricity.

COMMERCIAL AND RESIDENTIAL DEVELOPMENT AND LIGHT RAIL

Light rail has been credited with encouraging new development. For example:

- Portland claims that light rail played an important part in the placement of a new basketball arena and a new convention center in central Portland.
- St. Louis claims that light rail was important in the placement of a new domed football stadium, a new basketball and hockey arena, and a new convention center in downtown St. Louis.

These claims are less persuasive when examined closely. All the sports facilities above were partially or fully tax funded-arising from governmental decisions, not by the decisions of private investors who were attracted to develop land along light rail lines. Convention centers are normally built with tax subsidies and in metropolitan areas near the central business district adjacent to hotels and downtown shopping.

Portland, Oregon is offering 10 years of property-tax forgiveness for qualifying projects within walking distance of light rail stations because there has been virtually no high-density development adjacent to most light rail stations. If light rail drove development, it would not be necessary to subsidize private developments along the route. The critical element in such development is tax subsidies.

If light rail were having significant positive effects on development, it would follow that the areas best served - namely the downtown areas - would be thriving with rising employment share and lower office-vacancy rates than in the suburbs. However, the central areas of some new light rail cities are having difficulty. For example:

Portland's central-city employment has risen 1,000 jobs from 1990 to 1994 while suburban

Portland grew by nearly 94,000 jobs. The central city share of metropolitan employment fell by 9% over that period. Downtown office vacancies continue to be higher than in the suburbs. The city of Portland has recently relaxed parking development restrictions to make downtown more competitive and at least three multi-story parking structures have been recently constructed along the light rail line. It would seem that a downtown area that had been transformed by light rail would have an excess of parking, not a shortage.

- Downtown Baltimore has experienced major job losses during the 1990s. Downtown population loss rate has more than doubled.
- Downtown St. Louis' office-vacancy rates are among the highest in the country and triple the rate in the suburbs. The population loss rate has accelerated since light rail opened.
- Dallas opened three light rail lines in 1996 and continues to have the nation's highest downtown office-vacancy rate, triple that of its suburbs and double that of Ft. Worth which is not served by light rail.

If light rail were driving regional development trends, then the downtown areas they service would be prospering relative to their suburban areas. As of 1997, downtown office vacancies were above suburban vacancies in all reported light rail urban areas except Sacramento. The downtown vacancy rate averaged 70 % above the suburban rate. The average, non-rail, downtown-area vacancy rate was 15% below that of the light rail downtowns.

Light rail is not a catalyst for private developments except where governments provide subsidies to developers.

TRAVEL TIMES AND LIGHT RAIL

A principal reason that urban light rail has not attracted significant numbers of commuters from autos is its slower operating speed. Light rail does not improve commuting speeds for auto commuters because the national experience has been that few riders abandon their cars for light rail.

Light rail is slower than the auto. The average commuter speed is 34.7 miles per hour for autos. This is more than double that of new light rail systems. There also is a waiting time associated with light rail, which increases the advantage of the auto. The average transit commute trip is some 31 minutes longer than the average commute by auto - more than an hour a day. The average auto work trip is about 19 minutes while the average transit work trip is 50 minutes.

Light rail offers no advantages over express buses. Express buses have an average operating speed of 26 miles per hour, which is about 60 % faster than light rail's 16.2 miles per hour. Two factors make express buses faster than light rail: 1) buses carry passengers from residential areas to downtown, making fewer stops than rail; and 2) express buses operate on freeways. Light rail routes are fixed, while buses can adjust with passenger demand-the OCTA adjusts bus routes three times a year.

THE SAN DIEGO EXCEPTION

The San Diego light rail was the earliest rail system developed (1982) that was analyzed by the Grand Jury for historical relevance to Orange County. It was built under a mandate to minimize costs and has emphasized tight management since opening. San Diego made a decision not to seek federal funds on the initial southbound phases of construction. This allowed lower costs to be incurred in the

construction process by avoiding federal mandates on all aspects of planning and construction. The "Tijuana Trolley" portions of San Diego light rail were completed under budget at $116.6 million. Fare box recovery has. been up to 70 % for the San Diego to Tijuana segment of the transit system. Overall San Diego transit system farebox recoveries are 47 % for bus services. San Diego has the unique advantage, not available to other light rail cities, of connecting a large, densely populated city (San Diego) with a densely populated border city that provides much of San Diego's labor force. The San Diego model does not apply to Orange County.

FINDINGS

According to *Penal Code* §933 and §933.05, responses are required to all findings. The **Orange County Transit Authority Board of Directors** is required to respond to all the findings presented below.

1. The national experience regarding the cost effectiveness and the efficacy of urban light rail systems to solve traffic congestion, air pollution and other urban problems has been poor. No mention of these performances has been found in OCTA Outreach literature or briefings.

2. The OCTA Outreach/CenterLine documentation is alleged to "...educate the public as to the transportation choices available to Orange County..." One of the goals of Outreach/CenterLine is to get public feedback and evaluation of the transportation alternatives. However Outreach/CenterLine documentation does not describe what the light rail system is *supposed* to do in a quantitative environmental, economic, or financial sense.

3. There is a promotion of light rail by OCTA in its Outreach/CenterLine documents and briefings, rather than a process of study, analysis and evaluation as to its merits and cost benefit.

RECOMMENDATIONS

In accordance with *Penal Code §933* and *§933.05,* responses are required to all recommendations. The **Orange County Transit Authority Board of Directors** is required to respond to all the Recommendations below. Based on the findings, the *1998-99* Orange County Grand Jury recommends:

1. The OCTA Directors be made aware of the national experience in light rail over the past 18 years and light rail's documented inability to solve urban transit problems such as traffic congestion and pollution. Along those lines, we further suggest that *disinterested* experts from academia be invited to provide the historical perspective to the Directors. Inputs should come from a variety of sources, especially experts in economics, transit and light rail, *who do not have a vested interest in the promotion of light rail for the County.* (Finding Number 1)

2. The Directors instruct the OCTA staff to amend Outreach Programs to include data regarding the recent and ongoing national experience regarding the cost-efficiency and efficacy of light rail in failing to solve urban problems of traffic congestion, pollution, etc. (Findings I and 2)

3. The Directors instruct OCTA staff to develop, and publish in a timely manner, quantifiable "build-no build" criteria on light rail's effect on, for example, urban traffic congestion, pollution abatement and ability to support unsubsidized developments in Orange County. These criteria should be approved and in place for the Directors and the taxpaying public so they can be utilized in the "build-no build" decision processes scheduled for December 1999. That information will enable reasoned and meaningful citizen evaluation on the various transportation alternatives, including light rail, that OCTA has presented for public support. To date, that data has not been forthcoming in the OCTA Outreach Program. (Findings 1, 2 and 3)

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