

# A TEN COUNT INDICTMENT OF CENTERLINE

## ORANGE COUNTY, CALIFORNIA, LIGHT RAIL MAKES TRAFFIC WORSE

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### EXECUTIVE SUMMARY

#### PERFORMANCE

1. **CenterLine will not benefit overall congestion.** Orange County Transportation Authority (OCTA) projects that CenterLine will reduce vehicle miles traveled (VMT) by less than ½ % [1].
2. **CenterLine will actually make traffic congestion worse.** Elevated or at-grade, the loss of street capacity due to lane taking for right-of-way is greater than the number of vehicles removed from the road. Volume/Capacity ratio and congestion will be worse.[2].
3. **CenterLine makes air quality worse.** More congestion = more emissions [3].
4. **CenterLine construction impacts outweigh lifetime benefits.** In terms of congestion, energy, and air quality, disruptive construction impacts are far greater than could be recovered by claimed benefits over its 30 year lifetime [4].
5. **CenterLine alignment is permanent.** If development patterns change, unlike bus routes, you're stuck with it forever. [5].

#### COST

6. **Road and Bus improvements would provide significantly greater benefits.** OCTA findings say with limited funding, we could buy 3 to 18 times more reduction of travel-time, freeway congestion, emissions, and energy consumption with roads and bus expansion rather than light-rail [6].
7. **National statistics confirm light-rail ineffectiveness.** Experience of actual operating systems, dollar-for-dollar, roads average over 40 times as much transportation benefit per dollar as light-rail [7].
8. **CenterLine will require large and continuing subsidies.** For every 30 cents taken in fares, 70 cents will have to be found elsewhere [8].
9. **CenterLine costs are understated.** OCTA's stated cost of \$2.33 Billion does not include right-of-way, operations, maintenance, or restoration (mitigation). Total cost is well over \$3 billion [9].
10. **CenterLine will monopolize available transportation funding for 20 years.** OCTA's Long Range Plan allocates only 16% of available funding to inadequate roads and freeways which will still have to carry 97% of county traffic [10].

#### THE 3 BILLION DOLLAR QUESTION:

**Does it make sense to spend over \$3 billion to address less than ½% of the problem, with a transportation project that makes congestion and air quality worse than doing nothing?**

**Detailed source notes and evidence follow:**

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## SOURCE AND EXPLANATORY NOTES

### THE HARD EVIDENCE

#### **Dichotomy**

OCTA's documentation of CenterLine must be considered in two distinct parts: 1) The up-front, general qualitative descriptions of results and executive summary, and 2) the hard quantitative analytic results. The two parts tell almost exactly opposite stories. The following indictment is based entirely on the hard, quantitative, analytic results in the OCTA documentation, referenced here.

**System Assumption:** CenterLine has been and will probably continue for some time to be a changing concept. As of now, January 2002, the system is defined as an 18 mile minimum operable segment. Ultimate conceptual plans are for a 188 mile network. However, the only system documented well enough to permit meaningful critique is the 28 to 30 mile "Corridor" alternative. All of the specific comments in the following are therefore directed at that alternative as documented in the CenterLine DEIS/R. of 12/1999 and SDEIS/R of 12/2000, and FTA Section 5309 report submissions of 2001.

- 1. CenterLine does nothing for overall congestion.** Our current (2002) congestion is the result of a roughly 30% Volume/Capacity ratio overload. OCTA projects that the CenterLine will afford only a ½% reduction of highway Volume ( "CenterLine Supplemental DEIR/S", OCTA, December 2000, Table 3.2-A., vehicle miles traveled) Any improvement in mobility or congestion would be, *at best*, imperceptible.
- 2. CenterLine will actually make congestion worse.** In fact, the rail capacity afforded by CenterLine is less than the loss of capacity due to Right-Of-Way taken from the streets, resulting in worse congestion. Evidence of this includes:
  - A detailed DHS analysis of street capacity loss, (on-line at [www.urbantransport.org/taking5.pdf](http://www.urbantransport.org/taking5.pdf)) based on the street area taken for ROW, found that the capacity loss exceeds the volume of traffic, V, removed from the roads, for all alternatives, either at-grade or elevated. This means the regional Volume/Capacity ratio (V/C) and congestion will be worse.
  - OCTA analyzed the effect on street traffic along the ROW, taking into account both the reduction in capacity (C) due to lanes taken and reduction in traffic volume (V) due to cars removed from the road, and determined the resulting V/C ratios of 82 links and 32 intersections, under the "no-build" and "build" (before and after) conditions. The results were summarized as no "significant" difference (OCTA CenterLine SDEIR/S, 12/2000, V. 2, Apx.. A). Careful analysis of the raw data, however, reveals a small (arguably insignificant) but uniformly *adverse, increase* of V/C under all alternatives, for links and intersections, for AM and PM. Increased V/C inevitably means *increased* congestion and emissions.

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- The “CenterLine DEIR/S”. 12/2000, page S-27 provides this frank summary of impacts:  
*Compared to the No Build Alternative, all build alternatives would have more adverse impacts on the environment (without mitigation) for traffic circulation, displacements, public services, visual quality, cultural resources, noise/vibration, hazardous materials, water resources, natural resources, parks/trails, and environmental justice. Mitigation measures are proposed to reduce these impacts.* (underline added)

It must be pointed out that at the time of this analysis (and as yet), specific mitigation had not been planned, priced, approved, or evaluated so the implications of the last sentence are purely speculative.

The “mitigation” referred to consists of rebuilding street capacity, including necessary condemnation/taking of adjoining private properties, to make up for the capacity lost in the taking of street lanes for CenterLine. In other words, the light rail system itself has negative impacts on all these factors. However, by *bundling* a road building program with it, we can compensate for that negative impact and insure a positive overall impact. This begs the question, “Wouldn’t it be better then to simply skip the light-rail and build only the roads?”

- “Travel-Time savings” aren’t. In recent FTA submissions (CenterLine Section 5309 New Starts submissions to FTA, September 28, 2001 and November 28, 2001, Template 3) OCTA has claimed travel-time savings of the order of 16 million person-hours per year for the “tri-cities”, 18 mile build alternative. This is about twice the time savings previously estimated for a system twice as long. Further, since travel-time savings are the primary measure of congestion reduction, how can this result be reconciled with the above findings that congestion is worse? DHS asked this same question and after a long and tortuous journey, we now do understand.

Briefly, the data item called “travel-time savings” in Template 3 of the report and statements derived from it are *not* travel-time savings in any ordinarily understood sense. The key is in the footnote to FTA Template 3 in the FTA submissions which reads as follows:

“The user benefit (travel time savings) is calculated using the transit logsums at the highest level of the transit nest divided by the in-vehicle coefficient. The Delta between New Start and the No Build is multiplied by the No Build transit trip table to obtain the travel time savings for existing riders. This delta is multiplied by the change in transit trip table and by 0.5 to obtain the new riders travel time savings”.

This calculation has been proposed by the contractors, Parsons-Brinkerhof, to FTA as a better and more easily computed surrogate, for real travel-time saving assessments. It is proposed to be implemented as a stand-alone post-processor called “SUMMIT” into which go the local agency’s modal choice model outputs, and out of which comes “the benefit assessment” called “travel time savings”. FTA has it under trial for that purpose. It depends on, but is a very complex function of travel-time savings. Under some circumstances it may be a reasonably good approximation to travel-time -- or it can be very different. As of now it has a number of serious disadvantages:

- It has not been fully documented
- It has not been reviewed and critiqued by the peer modeling community.
- It has not yet been fully approved by FTA

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- As described above it measures only the benefit to transit users ignoring adverse impacts to road users.
- Provides a benefit measure the real meaning of which can not be simply explained nor understood (like actual “travel-time savings”) nor compared with common sense sanity checks of actual travel-time.
- While it may approximate travel-time, its actual relationship to travel time and even the statistical range of error in representing travel time is a complex function of the modal choice model structure, coefficients, and attributes in any particular case, in other words, for all practical purposes, unknowable.
- Since sanity cross checks fail, gross errors input data or execution errors can easily go undetected.

In DHS’ view the use of this technology is premature and rash. It is not travel time savings, and to call it that, with nothing more than generally unintelligible, technical jargon, fine-print footnote qualifications, is grossly misleading.

### 3. **CenterLine makes air quality worse.** OCTA calculated two measures of air quality impacts, local and regional.

- **Local air quality impacts** were estimated in terms of Carbon Monoxide (one- and eight-hour concentrations) at standard sensor locations for a dozen or so intersections along each alternative alignment. For the elevated alternative (EA2) which is the most nearly comparable to the present “tri-cities” alignment, only 5 intersections were common to, and could therefore be compared between the “no-build” (NB) and elevated (EA2) build alternative to permit before/after comparisons. With 12 sensor locations specified around each intersection, this provided 60 before/after comparative locations.

The OCTA analysis (OCTA CenterLine DEIS/R, 12/2000, Table 4.9) showed that none of the one-hour or eight-hour concentrations at any of the 60 comparison locations exceeded either the federal or state standards for CO concentration, either before or after build, and therefore simply dismissed them as “not significant.” However, this hides the important question, of whether *any* improvement was realized. Comparing No-Build to EA2 (before to after) the data show, for both one and eight-hour concentrations:

<b># of EA2 locations for which CO2 concentration was:</b>		
<b>Worse</b>	<b>Same</b>	<b>Better</b>
39	21	None

Thus *every* test location showed CO concentrations after the EA2 build either the same or worse (within 0.1 ppm) than doing nothing (i.e. NB).

- **Regional air quality impacts** were estimated by calculating the regional ambient (i.e., No-Build) total emissions, then scaling these in proportion to the calculated reduced Vehicle-Miles-Traveled (VMT) under the build alternative. This comparison, of course, indicated tiny emissions reductions of about ½%, just like the VMT reductions.

However, there is a major flaw in this procedure. It fails to take into account the so-called “speed factors”, *essential* elements of both the CARB and EPA emissions models. It is these

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speed factors that account for the well-known fact that congested traffic generates more emissions than free-flowing traffic. The reductions in VMT that are counted as air quality benefits, are in part the result of the congestion and road travel-time increase under the build alternative. By ignoring the speed factors, the increase in emissions due to this slow-down has not been taken into account.

Exactly the same error was made in the early versions of the 1997 OCTA Major Investment Study. Initially, emissions for the roads addition alternative were estimated, following misleading FTA guidelines without speed factors and indicated an *increase* of emissions, in exact proportion to increase of VMT, +12.9%, worst of all alternatives. When this error was pointed out to the project managers, accepted and corrected to take into account speed factors, the 12.9% increase was more than reversed resulting in a final estimate of 1.6% *reduction* of emissions, a greater reduction than for any other alternative. In other words, in that case at least, speed factors (ignored here and initially there) were a more important factor than change in VMT.

The finding of 0.5% improvement in regional emissions is erroneous and inconsistent with the finding in #2 of overall congestion increase.

- CEQA guidelines at Section 15126.6(e)(2) require that *if no-build is the environmentally superior alternative*, the EIR must identify the environmentally superior alternative from among the other alternatives. The December 2000 OCTA DEIS implicitly acknowledges that this is the case by providing that exact required statement at section 4.21.3.

In view of this evidence, there can be little doubt that CenterLine makes air quality worse.

#### 4. CenterLine construction impacts far outweigh operational benefits.

- **Congestion** CenterLine is a massive construction project that will take place largely in the middle of some of our most important arterial streets. It will block up to five lanes (“20 feet on each side” of the minimal 8 foot footing, CenterLine DEIS/R, 12/1999, section 2.2.6.) for much of the three-year construction phase. The person hours of delay caused by this activity would far exceed even the *claimed* lifetime congestion savings.
- **Energy consumption.** OCTA findings show a small reduction of annual *operating* energy as compared to the no-build alternative. At the same time, however, they compute the one-time additional construction energy consumption. Then, following FTA guidelines they compute an “energy payback period”, the number of years of annual operations saving it would take to recoup the construction energy. These payback periods range from 290 to 1120 years! (CenterLine DEIS/R 12/2000, Table 4.19H). The project lifetime, however, is 30 years or less for all structures, trackwork, pavement, and vehicles. This means that over its useful life, only a tenth or less (30/290 to 30/1120) of the initial energy investment will be recovered. Overall, the CenterLine project does not in any meaningful sense result in a reduction of energy consumption, but rather costs a significant overall energy waste.
- **Emissions.** For fossil fuels, emissions generally follow roughly in proportion to energy consumption. For Carbon Dioxide, a principal greenhouse gas this is almost exactly true. It therefore follows with near certainty from the energy findings discussed, as well as point #3 above, that the cumulative emissions impacts of the construction phase would never be recovered by project benefits.

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5. **CenterLine is permanent.** OCTA carries out periodic realignments of their bus routes to improve efficiency and service in response to changing demographic patterns. This is not possible with a fixed guideway rail system.
6. **Road and Bus Improvements would provide greater benefits.** The following is a summary of OCTA's 1997 MIS study comparative benefit/cost projections. Numbers are Benefit/Cost, relative to the OCTA Choice, now called CenterLine.

BENEFIT/COST re OCTA CHOICE	MF ROADS	49% BUS	116% BUS	HOV LANES	Light Rail	OCTA CHOICE
Travel Time Saving	5.3	3.8	2.4	0.4	1.2	1.0
Freeway Decongestion	17.9	0.0	1.0	4.4	0.5	1.0
Arterial Decongestion	7.1	2.4	2.1	2.2	1.1	1.0
CO Emissions	5.0	3.8	2.4	0.2	1.1	1.0
Energy Consumption	4.3	3.6	2.5	0.2	1.2	1.0
TOTAL RELATIVE BENEFIT/COST	7.76	2.79	2.12	1.41	1.04	1.0

(From Corridor Major Investment Study, June 1997, Summary Evaluation Table S-1.)

By these OCTA results, depending on the benefit measure, unrestricted, mixed-flow roads would provide from 4 to 18 times more benefit per dollar of cost than CenterLine.

7. **National actual performance data show rail even less effective.** Bad as the above OCTA light-rail projections may be, actual national experience of operational light rail systems is worse. Based on DOT published annual performance data, (Section 15 "Transit Profiles, 1999" and "Highway Statistics 1999") actual costs per unit transportation (person-mile) of all capital, administrative, law enforcement, and operational costs at all levels of government (federal, state and local) for all operational US light rail systems and US roads were as follows:

### Cost of Transportation, \$/person-mile

	Light-Rail	Highways
<b>Gross cost, (before user fees)</b>	<b>\$1.29</b>	<b>\$0.026</b>
<b>Net Cost (after user fees)</b>	<b>\$1.15</b>	<b>NA</b>

The gross government cost of light rail is 50 times as much as highways for the same transportation (person-miles). The Net cost of roads (after subtraction of user fees) is less than zero, that is, not a cost at all but rather a profit. As of 1993, the government made a substantial net profit of 56% or \$49 billion on roads ("Highway Subsidies" at [www.urbantransport.org](http://www.urbantransport.org)). The more important view of these data, however, is that for a given level of available transportation funding, on the national averages, we could provide *50 times as much capacity and reduction of congestion and emissions with roads as with light-rail.*

8. **CenterLine will require large and continuing subsidies.** Farebox revenue projections (CenterLine DIES/R, 12/2000, Table 5.D, page 5-15) range from 14 to 31% of operations costs.

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The completed EA2 is shown as 25%. The remainder, 75% is subsidy to be made up from as yet unauthorized local taxes. 70% is probably a low-side estimate of the subsidy that must be assumed ongoing forever.

- 9. CenterLine costs are understated.** OCTA’s stated cost of \$2.33 billion (1998 \$) does not include operations and maintenance, nor mitigation, nor capital replacement. The present value of that ongoing operating subsidy (even though initially funded by an endowment) is \$1.02 billion, bringing the total cost to \$3.35 billion.

In weighing the significance of any such light rail financial projection, it would be well to bear in mind the findings of J.E.D. Richmond of the Taubman school of Economics, Harvard University, (“New Rail Investments – a Review” June 1998) that in the period before they were fully committed, 11 out of 12 recent light rail projects overestimated ridership by factors of two to three and underestimated costs by factors of two and three.

- 10. CenterLine monopolizes funding for the next 20 years.** The following table summarizes the latest “OCTA Long Range Financial Plan, 1999”.

OCTA Long Range Financial Plan 1999-2018					\$ millions (escalated)		
Fund					Modal Allocation		
	Sources		Uses		Roads	Transit	
	Cap	Op	Cap	Op		Existing	Centerline
Transit	954	3960	799	3893	0	4692	
Commuter Rail	69	95	72	201	0	273	
Measure M	1196		1196		1196	0	
Motorists Services		141		142	142	0	
Capital Projects	58		36		36	0	
Urban Rail	1917	636	1917	266	0		2183
<b>Total</b>	<b>4195</b>	<b>4833</b>	<b>4020</b>	<b>4501</b>	<b>1373</b>	<b>4965</b>	<b>2183</b>
<b>Percentage Modal Allocation:</b>					<b>16%</b>	<b>58%</b>	<b>26%</b>
					<b>84%</b>		

CenterLine, added to existing transit plans, is projected to consume 84% of projected available transportation funds for the next 20 years for transit which will serve at most 3% of our transportation, leaving only 16 % for the roads that will be required to serve the other 97%. Measured by objective standards of equity, balance, and need, roads are in far greater true need of funding than transit ([www.urbantransport.org/rtequity.pdf](http://www.urbantransport.org/rtequity.pdf)). The 16% or \$1.4 billion allocated to roads is not nearly enough to keep up with OCTA’s growth projections. County traffic is projected to increase by 40% while road system capacity will increase less than 3%, resulting in a doubling of congested travel time, worse than anything ever experienced anywhere nationally today.

***That unprecedented level of congestion would be the real legacy of CenterLine.***