PUBLIC PARTICIPATION AND CONSULTATION

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

2016 2040 RTPSCS

SUB APPENDIX PART 3 OF 5

Letters from Individuals

ADOPTED | APRIL 2016

2016 2040 RTPSCS

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COMMUNITY INPUT | PUBLIC PARTICIPATION AND CONSULTATION

LETTERS FROM INDIVIDUALS

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These ideas prompted by Southern California Association of Governments' (SCAG) 2016 RTP/SCS are **to** any interested people such as environmental professors, scientists or researchers, governing and authoritative groups such as SCAG, EPA, DOI, USGS.

From the writer of a blog titled Keshav's healthcare system thoughts (C.O.P.E.)[1]

There are different tendencies, or natures, of people including tendencies to control Nature more. This nature seems to have lead to mechanistic processes toward the best, quality products, which is then reproduced and made efficient; then strategically scaled and streamlined in an economic growth sense. This dominant activity has then been implicitly understood as akin to the following for various people (for examples): value (businessmen), "success" or how to improve our G.D.P./"Economy" (politicians), desirable activity or goals (the majority of the population who unsalmonly take the path of least resistance to make a living and survive).

Perhaps in a similar way to SCAGs' acknowledgment that "compact communities are not for everyone", also it may be balancingly helpful to consider the following **unconventional[2] hypothesis**: natural flows of our environment's "basic" elements (earth, water, fire, air) more undesirably flow (i.e. the phenomena of "climate change") in accord with the amount of "impact" of human-produced machines/computers have in that environment. Generally, I see this greater impact machines/computers have on humans and our thinking about our environment and our relationship to it in a longer context of History/Time, and thus more as an ephemeral fad that will wean in the generally near future from the currently greater emphasis on static, human/machine-controlled processes of life, to more dynamic, natural flows of life. This insight may be helpful in considering "a growing population with shifting priorities and desires".

Rather than being "prepared to confront and cope with the inevitable consequences of climate change (more downstream)", **let's shift more upstream** by recognizing symptoms and causes of our degraded environment to then prevent the imbalanced impacts of unnatural, machine-like processes to begin with (similar to that traditional, more downstream "biomedical" approach vs. a smarter, more upstream "human systems" approach to health and wellness.) After a "deeper understanding of all contextual elements beginning with watershed and ending with architectural detail," developmend with Nature/ecologically.

Keshav Boddula
[redacted]

[1] http://kboddula.blogspot.com/2015/12/keshavs-healthcare-system-thoughts-cope.html?showComment=1451065007723#c6332310414947567997

[2] "unconventional" in relation to an even "softer"/subtler epistemology than the usual understanding of "harder science" that is more clearly verifiable/falsifiable, reproducible, and systematizable though constrained by "Time and Tide" in respect to its unidirectional flow and mechanistically process-oriented nature, respectively.

[3] p. 72 from *Sustainable Cities: Concepts and Strategies for Eco-City Developmentd* by Bob Walter et. al 1992

Courtney Aguirre

From: Dr Michael Cahn <[redacted]>
Sent: Tuesday, December 1, 2015 10:54 PM
To: Alan Thompson
Subject: Re: Draft 2016-2040 RTP/SCS being released on Thursday

Hi Alan

(I think we met once on Venice Blvd on the way to ?Ciclavia?)

on table 12
d2016RTPSCS_ActiveTransportation.pdf
some additions and % look a bit odd:
Education and Encouragement Strategy $1.1 Billion 2%

I think the total would be more like 8 % and also, the 8 million for education campaigns looks oddly low

on page 50 under LA County #5 talk is about "Extend the pedestrian/bicycle path from Washington Street to the north jetty of Marina Del Rey and support the seasonal ferry service for pedestrians and cyclists across the channel to Playa del Rey." apart from a little lack of logic of del / Del capitalization, I think the road is properly called Washington Blvd, not Street

BTW the same error occurs in http://www.wearemdr.com/bm~doc/marina-del-rey_major-lip-amendment.pdf under # 22.46.1050, but it has been corrected on page 25 of that document.

Anyhow, where is all these billions coming from? and how does it compare with money for motor infrastructure?

Cheers!

On Tue, Dec 1, 2015 at 9:18 AM, Thompson, Alan <THOMPSON@scag.ca.gov> wrote:

> Dear Active Transportation Stakeholders:
>
> I hope you all had a great Thanksgiving. We wanted to remind you that on Thursday, December 3, SCAG's Regional Council will be considering the release of the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) and its Program Environmental Impact Report (PEIR) for public review and comments. Thank you for your participation and interest in the Draft 2016 RTP/SCS over the last year, your input on critical issues has been extremely valuable.
>
> Thursday's Regional Council meeting will begin at 9:30 am in SCAG's Board Room. To allow for additional time for public comment and discussion on the proposed draft 2016 RTP/SCS, the meeting is scheduled for 3 hours. The meeting agenda is available online at: http://scag.ca.gov/committees/Pages/Current-Agendas.aspx . If you aren't able to attend, you can also watch the Regional Council discussion online on SCAG-TV.

The proposed Draft 2016 RTP/SCS and Appendices may be accessed here: http://scagrtpscs.net/Pages/Draft2016RTPSCS.aspx and the proposed Draft PEIR may be accessed here: http://scagrtpscs.net/Pages/Draft2016PEIR.aspx .
The Active Transportation Appendix can be accessed here: http://scagrtpscs.net/Documents/2016/draft/d2016RTPSCS_ActiveTransportation.pdf

Many thanks for your time and commitment to these important regional issues. Please let me know if you have any questions.

Regards,

Alan Thompson
Senior Planner - Active Transportation
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Dr Michael Cahn

To: SCAG

From: Tressy Capps, [redacted]

Re: Comments regarding the Draft 2016 RTP/SCS

As a member of TOLL Free IE in San Bernardino County I can tell you that the public outreach for the TOLL lane project is just as bogus as SCAG's public outreach for this plan. The public is clueless and that is by design. The way SANBAG votes on the project without each member city getting input from the other council members or the community is fraudulent and criminal in nature. The way SCAG has conducted the public outreach on the plan is scandalous and demands an investigation. I attended all 4 public hearings and there was no real engagement. At one of the public hearings, the Riverside office did not even attend. **What happened there and how do you plan on correcting that situation?**

Shame on all for you for the way you are top down conducting this process all the while engaging in your bogus outreach that only the stakeholders participate in. Regional government is unconstitutional and SCAG needs to be abolished. 50 years and the public is weary of these schemes that serve only to line the pockets of your stakeholders and does very little to actually facilitate traffic movement. Hasan Ikhrata may have been a planner in the Soviet Union but his methods are not welcome here in the United States. Americans do not need to be coordinated. Hasan needs to stop running around Southern California using false statistics and population data in an effort to deceive the public and swindle taxpayers.

I testified regarding the plan at 3 of the 4 public hearings and want a transcript of my statements to ensure they are part of the report.

Tressy Capps 2-01-16

Comments SCAG PEIR RTP & SCS due 2.1.2016

You list the GUIDING POLICIES as:

Policy 1:
Transportation investments shall be based on SCAG's adopted regional Performance Indicators

Policy 2:
Ensuring safety, adequate maintenance, and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region.

Policy 3:
RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives.

Policy 4:
Transportation demand management (TDM) and active transportation will be focus areas, subject to Policy 1.

Policy 5:
High-Occupancy vehicle (HOV) gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1.

Policy 6:
The RTP/SCS will support investments and strategies to reduce non-recurrent congestion and demand for single occupancy vehicle use, by leveraging advanced technologies.

Policy 7:
The RTP/SCS will encourage transportation investments that result in cleaner air, a better environment, a more efficient transportation system, and sustainable outcomes in the long run.

Policy 8:
Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan.

The DRAFT POLICY GROWTH FORECAST does not match amongst the POPULATION, HOUSEHOLDS and EMPLOYMENT.

LOS ANGELES COUNTY has a POPULATION growth for cities/unincorporated of 10% and more at 1,226,100 or 10.65% of the total. That is 77.01% growth in 10 cities.

Cities/unincorporated with the largest expected growth comprise of 12.10% of the total with a population increase of 1,393,000.

LOS ANGELES COUNTY HOUSEHOLD increase is at 17.46%. LOS ANGELES COUNTY EMPLOYMENT is at 18.73%.

As with the other counties, we see no consistency in the model used, and therefore, no reality of real growth.

You have no substantiation for the following statements:

Like the 2012 RTP/SCS, the proposed land use strategies included in the 2016 RTP/SCS continue to focus new growth in HQTAs, existing suburban town centers, and more walkable, mixed-use communities:

- *Identify regional strategic areas for infill and investment;*
- *Structure the plan on a three-tiered system of centers development;11*
- *Develop "Complete Communities";*
- *Develop nodes on a corridor;*
- *Plan for additional housing and jobs near transit;*
- *Plan for changing demand in types of housing;*
- *Continue to protect stable, existing single-family areas;*
- *Ensure adequate access to open space and preservation of habitat; and*
- *Incorporate local input and feedback on future growth.*

In support of the foundation policies and guiding principles, the RTP/SCS includes six proposed land use strategies:

- *High Quality Transit Areas (HQTA)*
- *Livable Corridors*
- *Neighborhood Mobility Area*
- *Zero-Emission Vehicles and Electric Vehicle Charging Stations*
- *Natural Lands Preservation*
- *Balancing Growth Distribution between 500 Feet of Freeways and HQTAs*

Infrastructure needs to be analyzed. All Elements of all Cities/Unincorporated should be analyzed for General Plan consistency.

All Alternatives presented have no consistency with the DRAFT POLICY GROWTH FORECAST.

Material presented at the Southern California Economic Summit are not consistent with the DRAFT POLICY GROWTH FORECAST. If slower growth is expected, then this PEIR should reflect a timeline accordingly.

[redacted]

Attachment:
Draft Policy Growth Forecast

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
LOS ANGELES COUNTY

	POPULATION				
	2012	2040	Increase	Percent	% of Total
Agoura Hills city	20,500	22,700	2,200	9.69%	0.02%
Alhambra city	84,000	88,800	4,800	5.41%	0.04%
Arcadia city	56,700	65,900	9,200	13.96%	0.08%
Artesia city	16,600	18,000	1,400	7.78%	0.01%
Avalon city	3,800	5,100	1,300	25.49%	0.01%
Azusa city	47,100	55,000	7,900	14.36%	0.07%
Baldwin Park city	76,100	83,600	7,500	8.97%	0.07%
Bell city	35,700	36,900	1,200	3.25%	0.01%
Bellflower city	77,100	79,600	2,500	3.14%	0.02%
Bell Gardens city	42,300	44,000	1,700	3.86%	0.01%
Beverly Hills city	34,400	37,200	2,800	7.53%	0.02%
Bradbury city	1,100	1,200	100	8.33%	0.00%
Burbank city	103,300	118,700	15,400	12.97%	0.13%
Calabasas city	23,800	24,500	700	2.86%	0.01%
Carson city	92,000	107,900	15,900	14.74%	0.14%
Cerritos city	49,300	50,900	1,600	3.14%	0.01%
Claremont city	35,500	39,400	3,900	9.90%	0.03%
Commerce city	12,900	13,500	600	4.44%	0.01%
Compton city	97,300	100,900	3,600	3.57%	0.03%
Covina city	48,200	51,600	3,400	6.59%	0.03%
Cudahy city	23,800	23,800	-	0.00%	0.00%
Culver City	39,100	40,700	1,600	3.93%	0.01%
Diamond Bar city	56,000	63,900	7,900	12.36%	0.07%
Downey city	112,500	121,700	9,200	7.56%	0.08%
Duarte city	21,500	24,300	2,800	11.52%	0.02%
El Monte city	114,200	137,200	23,000	16.76%	0.20%
El Segundo city	16,700	17,300	600	3.47%	0.01%
Gardena city	59,400	68,700	9,300	13.54%	0.08%
Glendale city	193,200	214,000	20,800	9.72%	0.18%
Glendora city	50,500	54,300	3,800	7.00%	0.03%
Hawaiian Gardens city	14,300	15,900	1,600	10.06%	0.01%
Hawthorne city	85,300	87,000	1,700	1.95%	0.01%
Hermosa Beach city	19,600	20,400	800	3.92%	0.01%
Hidden Hills city	1,900	2,000	100	5.00%	0.00%
Huntington Park city	58,500	67,400	8,900	13.20%	0.08%
Industry city	500	500	-	0.00%	0.00%
Inglewood city	110,900	129,000	18,100	14.03%	0.16%
Irwindale city	1,400	2,000	600	30.00%	0.01%
La Cañada Flintridge city	20,400	21,600	1,200	5.56%	0.01%
La Habra Heights city	5,400	6,200	800	12.90%	0.01%
Lakewood city	80,600	84,700	4,100	4.84%	0.04%
La Mirada city	48,800	52,100	3,300	6.33%	0.03%
Lancaster city	158,300	209,900	51,600	24.58%	0.45%
La Puente city	40,100	50,200	10,100	20.12%	0.09%
La Verne city	31,800	32,900	1,100	3.34%	0.01%
Lawndale city	33,000	33,900	900	2.65%	0.01%
Lomita city	20,500	21,200	700	3.30%	0.01%
Long Beach city	466,300	484,500	18,200	3.76%	0.16%
Los Angeles city	3,845,500	4,609,400	763,900	16.57%	6.63%
Lynwood city	70,300	76,100	5,800	7.62%	0.05%
Malibu city	12,700	14,100	1,400	9.93%	0.01%

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DRAFT POLICY GROWTH FORECAST
LOS ANGELES COUNTY

	POPULATION				
	2012	2040	Increase	Percent	% of Total
Manhattan Beach city	35,300	37,100	1,800	4.85%	0.02%
Maywood city	27,500	28,900	1,400	4.84%	0.01%
Monrovia city	36,800	40,300	3,500	8.68%	0.03%
Montebello city	63,000	67,300	4,300	6.39%	0.04%
Monterey Park city	61,300	65,000	3,700	5.69%	0.03%
Norwalk city	105,900	106,300	400	0.38%	0.00%
Palmdale city	154,200	201,500	47,300	23.47%	0.41%
Palos Verdes Estates city	13,600	13,900	300	2.16%	0.00%
Paramount city	54,500	58,000	3,500	6.03%	0.03%
Pasadena city	140,300	150,700	10,400	6.90%	0.09%
Pico Rivera city	63,400	69,100	5,700	8.25%	0.05%
Pomona city	150,500	190,400	39,900	20.96%	0.35%
Rancho Palos Verdes city	42,000	42,300	300	0.71%	0.00%
Redondo Beach city	67,200	74,400	7,200	9.68%	0.06%
Rolling Hills city	1,900	2,000	100	5.00%	0.00%
Rolling Hills Estates city	8,100	8,600	500	5.81%	0.00%
Rosemead city	54,300	60,800	6,500	10.69%	0.06%
San Dimas city	33,600	34,500	900	2.61%	0.01%
San Fernando city	23,900	26,900	3,000	11.15%	0.03%
San Gabriel city	40,100	46,900	6,800	14.50%	0.06%
San Marino city	13,200	13,300	100	0.75%	0.00%
Santa Clarita city	202,000	262,200	60,200	22.96%	0.52%
Santa Fe Springs city	16,600	21,700	5,100	23.50%	0.04%
Santa Monica city	90,700	103,400	12,700	12.28%	0.11%
Sierra Madre city	11,000	11,200	200	1.79%	0.00%
Signal Hill city	11,200	12,000	800	6.67%	0.01%
South El Monte city	20,300	22,500	2,200	9.78%	0.02%
South Gate city	94,700	111,800	17,100	15.30%	0.15%
South Pasadena city	25,800	27,100	1,300	4.80%	0.01%
Temple City city	35,900	40,600	4,700	11.58%	0.04%
Torrance city	146,500	159,800	13,300	8.32%	0.12%
Vernon city	100	300	200	66.67%	0.00%
Walnut city	29,800	33,800	4,000	11.83%	0.03%
West Covina city	107,000	116,700	9,700	8.31%	0.08%
West Hollywood city	34,800	41,800	7,000	16.75%	0.06%
Westlake Village city	8,300	8,800	500	5.68%	0.00%
Whittier city	85,900	96,900	11,000	11.35%	0.10%
Unincorporated	1,040,700	1,273,700	233,000	18.29%	2.02%
TOTALS	9,922,600	11,514,800	1,592,200	870.91%	13.83%

13.83%

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DRAFT POLICY GROWTH FORECAST
LOS ANGELES COUNTY

HOUSEHOLDS

	2012	2040	Increase	Percent	% of Total
Agoura Hills city	7,300	8,200	900	10.98%	0.02%
Alhambra city	29,300	31,900	2,600	8.15%	0.07%
Arcadia city	19,600	22,900	3,300	14.41%	0.08%
Artesia city	4,500	5,000	500	10.00%	0.01%
Avalon city	1,500	2,100	600	28.57%	0.02%
Azusa city	12,800	15,600	2,800	17.95%	0.07%
Baldwin Park city	17,200	19,300	2,100	10.88%	0.05%
Bell city	8,900	9,200	300	3.26%	0.01%
Bellflower city	23,700	24,400	700	2.87%	0.02%
Bell Gardens city	9,700	10,100	400	3.96%	0.01%
Beverly Hills city	14,900	16,200	1,300	8.02%	0.03%
Bradbury city	400	400	-	0.00%	0.00%
Burbank city	42,500	48,400	5,900	12.19%	0.15%
Calabasas city	8,700	9,100	400	4.40%	0.01%
Carson city	25,300	30,800	5,500	17.86%	0.14%
Cerritos city	15,500	16,000	500	3.13%	0.01%
Claremont city	11,700	13,200	1,500	11.36%	0.04%
Commerce city	3,400	3,600	200	5.56%	0.01%
Compton city	23,100	24,000	900	3.75%	0.02%
Covina city	15,900	17,200	1,300	7.56%	0.03%
Cudahy city	5,600	5,600	-	0.00%	0.00%
Culver City	16,800	17,500	700	4.00%	0.02%
Diamond Bar city	17,900	21,200	3,300	15.57%	0.08%
Downey city	33,900	37,300	3,400	9.12%	0.09%
Duarte city	7,000	8,200	1,200	14.63%	0.03%
El Monte city	27,800	34,700	6,900	19.88%	0.17%
El Segundo city	7,100	7,400	300	4.05%	0.01%
Gardena city	20,600	24,200	3,600	14.88%	0.09%
Glendale city	72,400	81,100	8,700	10.73%	0.22%
Glendora city	17,200	18,900	1,700	8.99%	0.04%
Hawaiian Gardens city	3,600	4,000	400	10.00%	0.01%
Hawthorne city	28,600	30,000	1,400	4.67%	0.04%
Hermosa Beach city	9,500	9,800	300	3.06%	0.01%
Hidden Hills city	600	600	-	0.00%	0.00%
Huntington Park city	14,600	17,400	2,800	16.09%	0.07%
Industry city	100	100	-	0.00%	0.00%
Inglewood city	36,600	43,300	6,700	15.47%	0.17%
Irwindale city	400	500	100	20.00%	0.00%
La Cañada Flintridge city	6,900	7,300	400	5.48%	0.01%
La Habra Heights city	1,800	1,900	100	5.26%	0.00%
Lakewood city	26,600	28,200	1,600	5.67%	0.04%
La Mirada city	14,700	15,800	1,100	6.96%	0.03%
Lancaster city	47,400	65,300	17,900	27.41%	0.45%
La Puente city	9,500	12,400	2,900	23.39%	0.07%
La Verne city	11,400	12,100	700	5.79%	0.02%
Lawndale city	9,700	10,100	400	3.96%	0.01%
Lomita city	8,100	8,400	300	3.57%	0.01%
Long Beach city	163,800	175,500	11,700	6.67%	0.30%
Los Angeles city	1,325,500	1,690,300	364,800	21.58%	9.24%
Lynwood city	14,700	16,200	1,500	9.26%	0.04%
Malibu city	5,300	5,600	300	5.36%	0.01%

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DRAFT POLICY GROWTH FORECAST
LOS ANGELES COUNTY

HOUSEHOLDS

	2012	2040	Increase	Percent	% of Total
Manhattan Beach city	14,000	14,800	800	5.41%	0.02%
Maywood city	6,600	6,900	300	4.35%	0.01%
Monrovia city	13,800	15,300	1,500	9.80%	0.04%
Montebello city	19,100	21,000	1,900	9.05%	0.05%
Monterey Park city	20,200	21,500	1,300	6.05%	0.03%
Norwalk city	27,100	27,200	100	0.37%	0.00%
Palmdale city	43,100	59,300	16,200	27.32%	0.41%
Palos Verdes Estates city	5,100	5,200	100	1.92%	0.00%
Paramount city	13,900	14,800	900	6.08%	0.02%
Pasadena city	58,900	62,400	3,500	5.61%	0.09%
Pico Rivera city	16,600	18,400	1,800	9.78%	0.05%
Pomona city	38,600	51,100	12,500	24.46%	0.32%
Rancho Palos Verdes city	15,600	15,700	100	0.64%	0.00%
Redondo Beach city	29,000	33,000	4,000	12.12%	0.10%
Rolling Hills city	700	700	-	0.00%	0.00%
Rolling Hills Estates city	3,000	3,100	100	3.23%	0.00%
Rosemead city	14,300	16,400	2,100	12.80%	0.05%
San Dimas city	12,000	12,400	400	3.23%	0.01%
San Fernando city	6,000	7,000	1,000	14.29%	0.03%
San Gabriel city	12,600	15,300	2,700	17.65%	0.07%
San Marino city	4,300	4,400	100	2.27%	0.00%
Santa Clarita city	67,300	90,300	23,000	25.47%	0.58%
Santa Fe Springs city	4,800	6,500	1,700	26.15%	0.04%
Santa Monica city	47,100	53,900	6,800	12.62%	0.17%
Sierra Madre city	4,800	5,000	200	4.00%	0.01%
Signal Hill city	4,200	4,600	400	8.70%	0.01%
South El Monte city	4,600	5,200	600	11.54%	0.02%
South Gate city	23,200	28,300	5,100	18.02%	0.13%
South Pasadena city	10,500	11,100	600	5.41%	0.02%
Temple City city	11,600	13,500	1,900	14.07%	0.05%
Torrance city	56,100	62,000	5,900	9.52%	0.15%
Vernon city	-	100	100	100.00%	0.00%
Walnut city	8,700	10,400	1,700	16.35%	0.04%
West Covina city	31,700	35,000	3,300	9.43%	0.08%
West Hollywood city	22,600	27,800	5,200	18.71%	0.13%
Westlake Village city	3,300	3,500	200	5.71%	0.01%
Whittier city	28,300	32,600	4,300	13.19%	0.11%
Unincorporated	292,700	392,400	99,700	25.41%	2.53%
TOTALS	3,257,600	3,946,600	689,000	987.05%	17.46%

17.46%

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
LOS ANGELES COUNTY

	EMPLOYMENT				
	2012	2040	Increase	Percent	% of Total
Agoura Hills city	12,500	15,300	2,800	18.30%	0.05%
Alhambra city	28,000	33,500	5,500	16.42%	0.11%
Arcadia city	28,900	34,400	5,500	15.99%	0.11%
Artesia city	5,000	5,800	800	13.79%	0.02%
Avalon city	2,500	2,500	-	0.00%	0.00%
Azusa city	16,600	20,600	4,000	19.42%	0.08%
Baldwin Park city	16,500	19,500	3,000	15.38%	0.06%
Bell city	12,400	13,700	1,300	9.49%	0.02%
Bellflower city	13,600	14,700	1,100	7.48%	0.02%
Bell Gardens city	9,400	10,500	1,100	10.48%	0.02%
Beverly Hills city	57,700	68,900	11,200	16.26%	0.21%
Bradbury city	100	200	100	50.00%	0.00%
Burbank city	106,800	145,000	38,200	26.34%	0.73%
Calabasas city	16,700	17,300	600	3.47%	0.01%
Carson city	58,500	69,700	11,200	16.07%	0.21%
Cerritos city	30,400	33,700	3,300	9.79%	0.06%
Claremont city	17,400	19,700	2,300	11.68%	0.04%
Commerce city	44,600	49,100	4,500	9.16%	0.09%
Compton city	25,400	28,200	2,800	9.93%	0.05%
Covina city	25,300	29,500	4,200	14.24%	0.08%
Cudahy city	2,900	2,900	-	0.00%	0.00%
Culver City	44,100	53,000	8,900	16.79%	0.17%
Diamond Bar city	15,400	19,300	3,900	20.21%	0.07%
Downey city	47,500	53,000	5,500	10.38%	0.11%
Duarte city	10,100	11,900	1,800	15.13%	0.03%
El Monte city	28,000	35,700	7,700	21.57%	0.15%
El Segundo city	38,400	45,400	7,000	15.42%	0.13%
Gardena city	28,900	33,500	4,600	13.73%	0.09%
Glendale city	111,300	127,000	15,700	12.36%	0.30%
Glendora city	20,000	23,000	3,000	13.04%	0.06%
Hawaiian Gardens city	4,800	5,600	800	14.29%	0.02%
Hawthorne city	27,200	32,100	4,900	15.26%	0.09%
Hermosa Beach city	7,400	10,000	2,600	26.00%	0.05%
Hidden Hills city	300	300	-	0.00%	0.00%
Huntington Park city	15,600	18,600	3,000	16.13%	0.06%
Industry city	67,700	74,700	7,000	9.37%	0.13%
Inglewood city	31,100	37,400	6,300	16.84%	0.12%
Irwindale city	18,800	21,500	2,700	12.56%	0.05%
La Cañada Flintridge city	6,500	8,300	1,800	21.69%	0.03%
La Habra Heights city	200	400	200	50.00%	0.00%
Lakewood city	18,900	21,400	2,500	11.68%	0.05%
La Mirada city	17,400	20,200	2,800	13.86%	0.05%
Lancaster city	45,800	59,600	13,800	23.15%	0.26%
La Puente city	6,300	8,700	2,400	27.59%	0.05%
La Verne city	12,200	14,300	2,100	14.69%	0.04%
Lawndale city	6,700	8,200	1,500	18.29%	0.03%
Lomita city	4,600	5,400	800	14.81%	0.02%
Long Beach city	153,200	181,700	28,500	15.69%	0.55%
Los Angeles city	1,696,400	2,169,100	472,700	21.79%	9.05%
Lynwood city	9,200	10,900	1,700	15.60%	0.03%
Malibu city	8,500	10,300	1,800	17.48%	0.03%

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DRAFT POLICY GROWTH FORECAST
LOS ANGELES COUNTY

	EMPLOYMENT				
	2012	2040	Increase	Percent	% of Total
Manhattan Beach city	18,000	20,700	2,700	13.04%	0.05%
Maywood city	3,600	4,000	400	10.00%	0.01%
Monrovia city	19,700	23,300	3,600	15.45%	0.07%
Montebello city	27,500	30,800	3,300	10.71%	0.06%
Monterey Park city	32,500	36,500	4,000	10.96%	0.08%
Norwalk city	24,100	27,300	3,200	11.72%	0.06%
Palmdale city	29,300	40,300	11,000	27.30%	0.21%
Palos Verdes Estates city	2,300	2,900	600	20.69%	0.01%
Paramount city	19,600	22,300	2,700	12.11%	0.05%
Pasadena city	111,000	144,800	33,800	23.34%	0.65%
Pico Rivera city	18,900	22,400	3,500	15.63%	0.07%
Pomona city	55,100	67,200	12,100	18.01%	0.23%
Rancho Palos Verdes city	5,800	6,200	400	6.45%	0.01%
Redondo Beach city	24,000	29,800	5,800	19.46%	0.11%
Rolling Hills city	100	100	-	0.00%	0.00%
Rolling Hills Estates city	5,900	6,800	900	13.24%	0.02%
Rosemead city	13,700	16,200	2,500	15.43%	0.05%
San Dimas city	11,200	12,700	1,500	11.81%	0.03%
San Fernando city	10,900	12,700	1,800	14.17%	0.03%
San Gabriel city	14,100	16,800	2,700	16.07%	0.05%
San Marino city	3,600	4,200	600	14.29%	0.01%
Santa Clarita city	73,500	95,900	22,400	23.36%	0.43%
Santa Fe Springs city	54,600	62,000	7,400	11.94%	0.14%
Santa Monica city	89,600	103,700	14,100	13.60%	0.27%
Sierra Madre city	1,900	2,100	200	9.52%	0.00%
Signal Hill city	13,800	16,500	2,700	16.36%	0.05%
South El Monte city	15,700	17,800	2,100	11.80%	0.04%
South Gate city	20,400	24,000	3,600	15.00%	0.07%
South Pasadena city	9,300	10,500	1,200	11.43%	0.02%
Temple City city	6,900	8,400	1,500	17.86%	0.03%
Torrance city	102,300	117,600	15,300	13.01%	0.29%
Vernon city	43,200	46,100	2,900	6.29%	0.06%
Walnut city	8,400	9,900	1,500	15.15%	0.03%
West Covina city	29,500	34,300	4,800	13.99%	0.09%
West Hollywood city	29,800	37,300	7,500	20.11%	0.14%
Westlake Village city	13,300	15,900	2,600	16.35%	0.05%
Whittier city	26,900	31,700	4,800	15.14%	0.09%
Unincorporated	222,900	288,400	65,500	22.71%	1.25%
TOTALS	4,246,600	5,225,300	978,700	1362.58%	18.73%

18.73%

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DRAFT POLICY GROWTH FORECAST
IMPERIAL COUNTY

	POPULATION				
	2012	2040	Increase	Percent	% of Total
Brawley city	25,800	42,900	17,100	39.86%	6.06%
Calexico city	40,200	62,200	22,000	35.37%	7.80%
Calipatria city	7,600	9,600	2,000	20.83%	0.71%
El Centro city	44,100	61,000	16,900	27.70%	5.99%
Holtville city	6,100	8,000	1,900	23.75%	0.67%
Imperial city	15,800	25,400	9,600	37.80%	3.40%
Westmorland city	2,300	2,700	400	14.81%	0.14%
Unincorporated	37,700	70,300	32,600	46.37%	11.56%
TOTALS	179,600	282,100	102,500	246.50%	36.33%

36.33%

SCAG PEIR 2016-2040 Regional Transportation Plan
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DRAFT POLICY GROWTH FORECAST
IMPERIAL COUNTY

HOUSEHOLDS

	2012	2040	Increase	Percent	% of Total
Brawley city	7,600	15,000	7,400	49.33%	8.00%
Calexico city	10,200	19,300	9,100	47.15%	9.84%
Calipatria city	1,000	1,600	600	37.50%	0.65%
El Centro city	13,100	19,900	6,800	34.17%	7.35%
Holtville city	1,800	2,500	700	28.00%	0.76%
Imperial city	4,600	8,800	4,200	47.73%	4.54%
Westmorland city	600	700	100	14.29%	0.11%
Unincorporated	10,400	24,700	14,300	57.89%	15.46%
TOTALS	49,300	92,500	43,200	316.06%	46.70%

46.70%

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DRAFT POLICY GROWTH FORECAST
IMPERIAL COUNTY

EMPLOYMENT

	2012	2040	Increase	Percent	% of Total
Brawley city	8,000	16,800	8,800	52.38%	7.06%
Calexico city	8,300	17,500	9,200	52.57%	7.38%
Calipatria city	1,300	2,200	900	40.91%	0.72%
El Centro city	20,300	43,800	23,500	53.65%	18.86%
Holtville city	1,000	2,000	1,000	50.00%	0.80%
Imperial city	3,400	9,500	6,100	64.21%	4.90%
Westmorland city	300	500	200	40.00%	0.16%
Unincorporated	16,400	32,300	15,900	49.23%	12.76%
TOTALS	59,000	124,600	65,600	402.95%	52.65%

52.65%

SCAG PEIR 2016-2040 Regional Transportation Plan
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DRAFT POLICY GROWTH FORECAST
ORANGE COUNTY

	POPULATION				
	2012	2040	Increase	Percent	% of Total
Aliso Viejo city	49,300	51,000	1,700	3.33%	0.05%
Anaheim city	345,300	403,400	58,100	14.40%	1.68%
Brea city	41,100	50,600	9,500	18.77%	0.27%
Buena Park city	81,800	92,500	10,700	11.57%	0.31%
Costa Mesa city	111,200	116,400	5,200	4.47%	0.15%
Cypress city	48,500	49,700	1,200	2.41%	0.03%
Dana Point city	33,800	35,800	2,000	5.59%	0.06%
Fountain Valley city	56,000	59,300	3,300	5.56%	0.10%
Fullerton city	138,000	160,500	22,500	14.02%	0.65%
Garden Grove city	172,900	178,200	5,300	2.97%	0.15%
Huntington Beach city	193,200	207,100	13,900	6.71%	0.40%
Irvine city	227,100	327,300	100,200	30.61%	2.89%
Laguna Beach city	23,100	23,100	-	0.00%	0.00%
Laguna Hills city	30,600	31,500	900	2.86%	0.03%
Laguna Niguel city	63,900	72,000	8,100	11.25%	0.23%
Laguna Woods city	16,500	17,100	600	3.51%	0.02%
La Habra city	61,100	68,500	7,400	10.80%	0.21%
Lake Forest city	78,500	90,700	12,200	13.45%	0.35%
La Palma city	15,800	15,800	-	0.00%	0.00%
Los Alamitos city	11,600	12,100	500	4.13%	0.01%
Mission Viejo city	94,500	96,600	2,100	2.17%	0.06%
Newport Beach city	86,300	92,700	6,400	6.90%	0.18%
Orange city	138,500	153,000	14,500	9.48%	0.42%
Placentia city	51,500	58,400	6,900	11.82%	0.20%
Rancho Santa Margarita city	48,500	48,700	200	0.41%	0.01%
San Clemente city	64,400	68,000	3,600	5.29%	0.10%
San Juan Capistrano city	35,200	39,500	4,300	10.89%	0.12%
Santa Ana city	329,200	343,100	13,900	4.05%	0.40%
Seal Beach city	24,400	24,800	400	1.61%	0.01%
Stanton city	38,700	41,600	2,900	6.97%	0.08%
Tustin city	77,300	83,000	5,700	6.87%	0.16%
Villa Park city	5,900	6,100	200	3.28%	0.01%
Westminster city	91,000	92,800	1,800	1.94%	0.05%
Yorba Linda city	66,200	70,500	4,300	6.10%	0.12%
Unincorporated	120,700	180,100	59,400	32.98%	1.72%
TOTALS	3,071,600	3,461,500	389,900	277.20%	11.26%

11.26%

SCAG PEIR 2016-2040 Regional Transportation Plan
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DRAFT POLICY GROWTH FORECAST
ORANGE COUNTY

	HOUSEHOLDS				
	2012	2040	Increase	Percent	% of Total
Aliso Viejo city	18,500	19,400	900	4.64%	0.08%
Anaheim city	99,200	122,600	23,400	19.09%	2.03%
Brea city	14,500	18,100	3,600	19.89%	0.31%
Buena Park city	24,000	27,900	3,900	13.98%	0.34%
Costa Mesa city	40,000	42,500	2,500	5.88%	0.22%
Cypress city	15,700	16,300	600	3.68%	0.05%
Dana Point city	14,200	15,300	1,100	7.19%	0.10%
Fountain Valley city	18,700	19,900	1,200	6.03%	0.10%
Fullerton city	45,500	55,200	9,700	17.57%	0.84%
Garden Grove city	46,200	48,200	2,000	4.15%	0.17%
Huntington Beach city	74,900	81,200	6,300	7.76%	0.55%
Irvine city	81,800	123,400	41,600	33.71%	3.61%
Laguna Beach city	10,800	11,000	200	1.82%	0.02%
Laguna Hills city	10,400	10,900	500	4.59%	0.04%
Laguna Niguel city	24,300	27,700	3,400	12.27%	0.30%
Laguna Woods city	11,400	11,700	300	2.56%	0.03%
La Habra city	19,000	21,700	2,700	12.44%	0.23%
Lake Forest city	26,300	30,500	4,200	13.77%	0.36%
La Palma city	5,100	5,100	-	0.00%	0.00%
Los Alamitos city	4,100	4,200	100	2.38%	0.01%
Mission Viejo city	33,200	34,100	900	2.64%	0.08%
Newport Beach city	38,800	41,700	2,900	6.95%	0.25%
Orange city	43,600	49,300	5,700	11.56%	0.49%
Placentia city	16,600	18,900	2,300	12.17%	0.20%
Rancho Santa Margarita city	16,700	16,800	100	0.60%	0.01%
San Clemente city	24,000	25,300	1,300	5.14%	0.11%
San Juan Capistrano city	11,500	13,300	1,800	13.53%	0.16%
Santa Ana city	73,300	78,000	4,700	6.03%	0.41%
Seal Beach city	13,000	13,300	300	2.26%	0.03%
Stanton city	10,700	11,800	1,100	9.32%	0.10%
Tustin city	25,600	27,900	2,300	8.24%	0.20%
Villa Park city	2,000	2,000	-	0.00%	0.00%
Westminster city	26,200	26,800	600	2.24%	0.05%
Yorba Linda city	21,900	23,400	1,500	6.41%	0.13%
Unincorporated	37,800	56,900	19,100	33.57%	1.66%
TOTALS	999,500	1,152,300	152,800	314.06%	13.26%

13.26%

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DRAFT POLICY GROWTH FORECAST
ORANGE COUNTY

EMPLOYMENT

	2012	2040	Increase	Percent	% of Total
Aliso Viejo city	18,900	20,900	2,000	9.57%	0.11%
Anaheim city	177,900	245,600	67,700	27.57%	3.57%
Brea city	46,700	53,700	7,000	13.04%	0.37%
Buena Park city	34,300	39,800	5,500	13.82%	0.29%
Costa Mesa city	84,400	93,200	8,800	9.44%	0.46%
Cypress city	22,100	27,700	5,600	20.22%	0.29%
Dana Point city	11,900	14,100	2,200	15.60%	0.12%
Fountain Valley city	30,400	34,900	4,500	12.89%	0.24%
Fullerton city	60,800	94,100	33,300	35.39%	1.75%
Garden Grove city	51,700	58,500	6,800	11.62%	0.36%
Huntington Beach city	75,800	87,000	11,200	12.87%	0.59%
Irvine city	224,400	320,000	95,600	29.88%	5.03%
Laguna Beach city	12,100	14,100	2,000	14.18%	0.11%
Laguna Hills city	18,500	19,400	900	4.64%	0.05%
Laguna Niguel city	18,300	22,100	3,800	17.19%	0.20%
Laguna Woods city	4,400	6,500	2,100	32.31%	0.11%
La Habra city	17,300	19,900	2,600	13.07%	0.14%
Lake Forest city	39,200	49,000	9,800	20.00%	0.52%
La Palma city	7,700	8,500	800	9.41%	0.04%
Los Alamitos city	14,200	15,600	1,400	8.97%	0.07%
Mission Viejo city	37,100	39,100	2,000	5.12%	0.11%
Newport Beach city	76,000	79,100	3,100	3.92%	0.16%
Orange city	94,100	105,500	11,400	10.81%	0.60%
Placentia city	19,000	23,500	4,500	19.15%	0.24%
Rancho Santa Margarita city	17,200	19,500	2,300	11.79%	0.12%
San Clemente city	24,800	29,500	4,700	15.93%	0.25%
San Juan Capistrano city	14,700	17,900	3,200	17.88%	0.17%
Santa Ana city	154,800	166,000	11,200	6.75%	0.59%
Seal Beach city	11,000	12,300	1,300	10.57%	0.07%
Stanton city	7,200	8,500	1,300	15.29%	0.07%
Tustin city	37,600	66,400	28,800	43.37%	1.52%
Villa Park city	1,500	1,700	200	11.76%	0.01%
Westminster city	24,200	26,400	2,200	8.33%	0.12%
Yorba Linda city	15,600	17,700	2,100	11.86%	0.11%
Unincorporated	20,700	41,200	20,500	49.76%	1.08%
TOTALS	1,526,500	1,898,900	372,400	573.98%	19.61%

19.61%

SCAG PEIR 2016-2040 Regional Transportation Plan
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DRAFT POLICY GROWTH FORECAST
RIVERSIDE COUNTY

	POPULATION				
	2012	2040	Increase	Percent	% of Total
Banning city	30,100	37,600	7,500	19.95%	0.24%
Beaumont city	39,400	80,600	41,200	51.12%	1.30%
Blythe city	20,000	24,600	4,600	18.70%	0.15%
Calimesa city	8,100	24,800	16,700	67.34%	0.53%
Canyon Lake city	10,700	11,300	600	5.31%	0.02%
Cathedral City city	52,200	68,100	15,900	23.35%	0.50%
Coachella city	42,400	146,300	103,900	71.02%	3.28%
Corona city	156,000	172,300	16,300	9.46%	0.51%
Desert Hot Springs city	27,800	58,900	31,100	52.80%	0.98%
Eastvale City	56,500	65,400	8,900	13.61%	0.28%
Hemet city	80,800	126,500	45,700	36.13%	1.44%
Indian Wells city	5,100	7,200	2,100	29.17%	0.07%
Indio city	78,800	123,300	44,500	36.09%	1.40%
Lake Elsinore city	54,100	111,400	57,300	51.44%	1.81%
La Quinta city	38,300	47,700	9,400	19.71%	0.30%
Menifee city	81,600	121,100	39,500	32.62%	1.25%
Moreno Valley city	197,600	256,600	59,000	22.99%	1.86%
Murrieta city	105,600	129,800	24,200	18.64%	0.76%
Norco city	26,900	32,100	5,200	16.20%	0.16%
Palm Desert city	49,800	61,700	11,900	19.29%	0.38%
Palm Springs city	45,600	56,900	11,300	19.86%	0.36%
Perris city	70,700	116,700	46,000	39.42%	1.45%
Rancho Mirage city	17,600	25,000	7,400	29.60%	0.23%
Riverside city	310,700	386,600	75,900	19.63%	2.40%
San Jacinto city	45,100	79,900	34,800	43.55%	1.10%
Temecula city	104,100	137,400	33,300	24.24%	1.05%
Wildomar city	33,000	56,200	23,200	41.28%	0.73%
Jurupa Valley City	97,000	114,500	17,500	15.28%	0.55%
Unincorporated	359,500	487,500	128,000	26.26%	4.04%
TOTALS	2,245,100	3,168,000	922,900	874.04%	29.13%

29.13%

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SCAG PEIR 2016-2040 Regional Transportation Plan
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DRAFT POLICY GROWTH FORECAST
RIVERSIDE COUNTY

HOUSEHOLDS

	2012	2040	Increase	Percent	% of Total
Banning city	10,800	14,000	3,200	22.86%	0.31%
Beaumont city	12,400	27,200	14,800	54.41%	1.41%
Blythe city	4,500	6,200	1,700	27.42%	0.16%
Calimesa city	3,300	10,900	7,600	69.72%	0.72%
Canyon Lake city	3,900	4,100	200	4.88%	0.02%
Cathedral City city	17,100	26,000	8,900	34.23%	0.85%
Coachella city	9,200	40,100	30,900	77.06%	2.95%
Corona city	45,300	52,000	6,700	12.88%	0.64%
Desert Hot Springs city	9,100	21,900	12,800	58.45%	1.22%
Eastvale City	14,100	16,500	2,400	14.55%	0.23%
Hemet city	30,300	52,200	21,900	41.95%	2.09%
Indian Wells city	2,800	4,400	1,600	36.36%	0.15%
Indio city	23,800	39,300	15,500	39.44%	1.48%
Lake Elsinore city	15,200	35,000	19,800	56.57%	1.89%
La Quinta city	14,900	19,100	4,200	21.99%	0.40%
Menifee city	28,400	48,100	19,700	40.96%	1.88%
Moreno Valley city	51,800	73,000	21,200	29.04%	2.02%
Murrieta city	32,800	43,500	10,700	24.60%	1.02%
Norco city	7,000	9,200	2,200	23.91%	0.21%
Palm Desert city	23,400	31,400	8,000	25.48%	0.76%
Palm Springs city	22,900	31,300	8,400	26.84%	0.80%
Perris city	16,600	32,700	16,100	49.24%	1.54%
Rancho Mirage city	8,900	13,600	4,700	34.56%	0.45%
Riverside city	92,400	118,600	26,200	22.09%	2.50%
San Jacinto city	13,200	27,600	14,400	52.17%	1.37%
Temecula city	32,500	42,900	10,400	24.24%	0.99%
Wildomar city	10,100	18,100	8,000	44.20%	0.76%
Jurupa Valley City	25,000	30,400	5,400	17.76%	0.52%
Unincorporated	112,700	159,200	46,500	29.21%	4.43%
TOTALS	694,400	1,048,500	354,100	1017.07%	33.77%

33.77%

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
RIVERSIDE COUNTY

	EMPLOYMENT				
	2012	2040	Increase	Percent	% of Total
Banning city	7,300	14,200	6,900	48.59%	0.59%
Beaumont city	5,900	18,000	12,100	67.22%	1.03%
Blythe city	3,700	6,600	2,900	43.94%	0.25%
Calimesa city	1,300	5,900	4,600	77.97%	0.39%
Canyon Lake city	1,200	2,700	1,500	55.56%	0.13%
Cathedral City city	10,800	21,200	10,400	49.06%	0.89%
Coachella city	8,500	34,400	25,900	75.29%	2.21%
Corona city	66,400	88,400	22,000	24.89%	1.87%
Desert Hot Springs city	3,700	12,900	9,200	71.32%	0.78%
Eastvale City	4,300	9,800	5,500	56.12%	0.47%
Hemet city	21,000	45,500	24,500	53.85%	2.09%
Indian Wells city	4,000	7,000	3,000	42.86%	0.26%
Indio city	16,000	36,800	20,800	56.52%	1.77%
Lake Elsinore city	11,800	31,700	19,900	62.78%	1.69%
La Quinta city	12,400	21,500	9,100	42.33%	0.77%
Menifee city	10,300	23,500	13,200	56.17%	1.12%
Moreno Valley city	31,400	83,200	51,800	62.26%	4.41%
Murrieta city	23,200	45,100	21,900	48.56%	1.86%
Norco city	13,200	25,700	12,500	48.64%	1.06%
Palm Desert city	36,900	53,600	16,700	31.16%	1.42%
Palm Springs city	26,300	45,800	19,500	42.58%	1.66%
Perris city	15,100	32,200	17,100	53.11%	1.46%
Rancho Mirage city	12,300	20,500	8,200	40.00%	0.70%
Riverside city	120,000	200,500	80,500	40.15%	6.86%
San Jacinto city	5,900	17,800	11,900	66.85%	1.01%
Temecula city	43,000	63,500	20,500	32.28%	1.75%
Wildomar city	5,000	13,500	8,500	62.96%	0.72%
Jurupa Valley City	24,500	32,600	8,100	24.85%	0.69%
Unincorporated	71,300	160,200	88,900	55.49%	7.57%
TOTALS	616,700	1,174,300	557,600	1493.33%	47.48%

47.48%

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
SAN BERNARDINO COUNTY

	POPULATION				
	2012	2040	Increase	Percent	% of Total
Adelanto city	31,100	70,000	38,900	55.57%	1.42%
Apple Valley town	70,200	100,600	30,400	30.22%	1.11%
Barstow city	23,100	35,100	12,000	34.19%	0.44%
Big Bear Lake city	5,100	6,900	1,800	26.09%	0.07%
Chino city	79,400	120,400	41,000	34.05%	0.015
Chino Hills city	75,800	94,900	19,100	20.13%	0.70%
Colton city	52,800	69,100	16,300	23.59%	0.60%
Fontana city	200,200	280,900	80,700	28.73%	2.95%
Grand Terrace cit	12,200	14,200	2,000	14.08%	0.07%
Hesperia city	91,100	129,100	38,000	29.43%	1.39%
Highland city	53,700	66,900	13,200	19.73%	0.48%
Loma Linda city	23,400	29,300	5,900	20.14%	0.22%
Montclair city	37,200	42,700	5,500	12.88%	0.20%
Needles city	4,900	7,000	2,100	30.00%	0.08%
Ontario city	166,300	258,600	92,300	35.69%	3.38%
Rancho Cucamonga city	170,100	204,300	34,200	16.74%	1.25%
Redlands city	69,600	85,500	15,900	18.60%	0.58%
Rialto city	100,800	112,000	11,200	10.00%	0.41%
San Bernardino city	211,900	257,400	45,500	17.68%	1.66%
Twentynine Palms city	25,900	37,300	11,400	30.56%	0.42%
Upland city	74,700	81,700	7,000	8.57%	0.26%
Victorville city	119,600	184,500	64,900	35.18%	2.37%
Yucaipa city	52,300	72,500	20,200	27.86%	0.74%
Yucca Valley town	21,000	26,300	5,300	20.15%	0.19%
Unincorporated	295,600	344,100	48,500	14.09%	1.77%
TOTALS	2,070,012	2,733,340	663,300	613.95%	24.27%

24.27%

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
SAN BERNARDINO COUNTY

HOUSEHOLDS

	2012	2040	Increase	Percent	% of Total
Adelanto city	7,900	18,100	10,200	56.35%	1.19%
Apple Valley town	23,700	34,800	11,100	31.90%	1.30%
Barstow city	8,100	12,900	4,800	37.21%	0.56%
Big Bear Lake city	2,200	3,000	800	26.67%	0.09%
Chino city	21,000	34,000	13,000	38.24%	1.52%
Chino Hills city	23,000	28,300	5,300	18.73%	0.62%
Colton city	15,000	20,800	5,800	27.88%	0.68%
Fontana city	49,600	74,000	24,400	32.97%	2.85%
Grand Terrace cit	4,400	5,700	1,300	22.81%	0.15%
Hesperia city	26,400	39,100	12,700	32.48%	1.48%
Highland city	15,500	20,600	5,100	24.76%	0.60%
Loma Linda city	8,800	11,800	3,000	25.42%	0.35%
Montclair city	9,600	11,600	2,000	17.24%	0.23%
Needles city	1,900	2,800	900	32.14%	0.11%
Ontario city	45,100	75,300	30,200	40.11%	3.53%
Rancho Cucamonga city	55,400	73,100	17,700	24.21%	2.07%
Redlands city	24,800	32,400	7,600	23.46%	0.89%
Rialto city	25,400	31,500	6,100	19.37%	0.71%
San Bernardino city	59,300	77,100	17,800	23.09%	2.08%
Twentynine Palms city	8,300	11,400	3,100	27.19%	0.36%
Upland city	25,900	28,900	3,000	10.38%	0.35%
Victorville city	33,100	55,400	22,300	40.25%	2.60%
Yucaipa city	18,400	28,200	9,800	34.75%	1.14%
Yucca Valley town	8,300	12,200	3,900	31.97%	0.46%
Unincorporated	94,200	111,300	17,100	15.36%	2.00%
TOTALS	617,312	856,340	239,000	714.94%	27.91%

27.91%

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
SAN BERNARDINO COUNTY

	EMPLOYMENT				
	2012	2040	Increase	Percent	% of Total
Adelanto city	3,900	7,800	3,900	50.00%	0.38%
Apple Valley town	15,400	27,600	12,200	44.20%	1.18%
Barstow city	8,100	16,800	8,700	51.79%	0.84%
Big Bear Lake city	3,800	5,400	1,600	29.63%	0.16%
Chino city	42,600	50,600	8,000	15.81%	0.78%
Chino Hills city	11,500	18,600	7,100	38.17%	0.69%
Colton city	16,800	29,200	12,400	42.47%	1.20%
Fontana city	47,000	70,800	23,800	33.62%	2.31%
Grand Terrace cit	2,200	5,300	3,100	58.49%	0.30%
Hesperia city	14,900	28,300	13,400	47.35%	1.30%
Highland city	5,500	10,200	4,700	46.08%	0.46%
Loma Linda city	16,700	21,100	4,400	20.85%	0.43%
Montclair city	16,500	19,000	2,500	13.16%	0.24%
Needles city	2,200	3,800	1,600	42.11%	0.16%
Ontario city	103,300	175,400	72,100	41.11%	7.00%
Rancho Cucamonga city	69,900	104,600	34,700	33.17%	3.37%
Redlands city	31,700	53,400	21,700	40.64%	2.11%
Rialto city	21,100	30,500	9,400	30.82%	0.91%
San Bernardino city	88,900	128,900	40,000	31.03%	3.88%
Twentynine Palms city	4,300	8,500	4,200	49.41%	0.41%
Upland city	31,700	43,500	11,800	27.13%	1.15%
Victorville city	29,800	52,700	22,900	43.45%	2.22%
Yucaipa city	8,200	15,000	6,800	45.33%	0.66%
Yucca Valley town	6,100	10,000	3,900	39.00%	0.38%
Unincorporated	57,400	91,100	33,700	36.99%	3.27%
TOTALS	661,512	1,030,140	368,600	951.80%	35.78%

35.78%

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
VENTURA COUNTY

	POPULATION				
	2012	2040	Increase	Percent	% of Total
Camarillo city	66,300	79,900	13,600	17.02%	1.41%
Fillmore city	18,800	21,800	3,000	13.76%	0.31%
Moorpark city	34,800	43,000	8,200	19.07%	0.85%
Ojai city	7,500	8,400	900	10.71%	0.09%
Oxnard city	200,100	237,300	37,200	15.68%	3.85%
Port Hueneme city	21,800	22,400	600	2.68%	0.06%
San Buenaventura (Ventura) city	106,700	125,300	18,600	14.84%	1.93%
Santa Paula city	29,800	39,600	9,800	24.75%	1.02%
Simi Valley city	125,100	142,400	17,300	12.15%	1.79%
Thousand Oaks city	127,800	131,700	3,900	2.96%	0.40%
Unincorporated	96,700	113,600	16,900	14.88%	1.75%
TOTALS	835,400	965,400	130,000	148.50%	13.47%

13.47%
-
-

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
VENTURA COUNTY

	HOUSEHOLDS				
	2012	2040	Increase	Percent	% of Total
Camarillo city	24,800	30,200	5,400	17.88%	1.73%
Fillmore city	5,200	6,300	1,100	17.46%	0.35%
Moorpark city	10,600	13,100	2,500	19.08%	0.80%
Ojai city	3,100	3,300	200	6.06%	0.06%
Oxnard city	50,100	60,100	10,000	16.64%	3.20%
Port Hueneme city	7,100	7,300	200	2.74%	0.06%
San Buenaventura (Ventura) city	40,700	48,400	7,700	15.91%	2.47%
Santa Paula city	8,500	11,500	3,000	26.09%	0.96%
Simi Valley city	41,300	47,400	6,100	12.87%	1.95%
Thousand Oaks city	45,900	47,200	1,300	2.75%	0.42%
Unincorporated	32,100	37,500	5,400	14.40%	1.73%
TOTALS	269,400	312,300	42,900	151.88%	13.74%

13.74%

SCAG PEIR 2016-2040 Regional Transportation Plan
and Sustainable Communities Strategy
DRAFT POLICY GROWTH FORECAST
VENTURA COUNTY

	EMPLOYMENT				
	2012	2040	Increase	Percent	% of Total
Camarillo city	35,800	47,300	11,500	24.31%	2.74%
Fillmore city	3,000	5,300	2,300	43.40%	0.55%
Moorpark city	11,300	16,600	5,300	31.93%	1.26%
Ojai city	5,100	5,300	200	3.77%	0.05%
Oxnard city	58,100	79,200	21,100	26.64%	5.03%
Port Hueneme city	6,400	6,700	300	4.48%	0.07%
San Buenaventura (Ventura) city	60,700	66,000	5,300	8.03%	1.26%
Santa Paula city	7,800	11,700	3,900	33.33%	0.93%
Simi Valley city	44,000	61,100	17,100	27.99%	4.07%
Thousand Oaks city	68,200	81,900	13,700	16.73%	3.26%
Unincorporated	31,800	38,700	6,900	17.83%	1.64%
TOTALS	332,200	419,800	87,600	238.44%	20.87%

20.87%

Daniel Tran

From: Maria I. Lopez
Sent: Thursday, February 4, 2016 1:25 PM
To: Daniel Tran
Subject: Fwd: New Interchange @ I-15

I think this is for you.

Thanks

Sent from my iPhone

Begin forwarded message:

> **From:** <noreply@scag.ca.gov>
> **Date:** February 4, 2016 at 1:08:38 PM PST
> **To:** <lopez@scag.ca.gov>
> **Subject: New Interchange @ I-15**
>
> **Customer Name :** Om Garg
>
> **Customer Email Address :** [redacted]
>
> **Message :** Please inform the requirements for getting a new Interchange on I-15 in SB County included in RTP. Thanks!

2016 PEIR

From: T Goller <[redacted]>
Sent: Sunday, January 31, 2016 4:19 PM
To: 2016 PEIR
Subject: response letter to scag
Attachments: Response to SCAG.docx

Enclosed are my comments about the plan.
Terry Goller

Response to SCAG (scagrtpscs.net)

This Federal Reginal SCAG plan would be a grandiose state endeavor to further burden the taxpayer and their individual rights. With a $556 billion expenditure and a $275 billion operating and maintenance cost, there would be a $200 billion difference resulting in tax increases.

Allowing the state and cities to solve their own transportation problems and working with Cal Trans is a more feasible solution. Even curtailing the rail plans would be a monetary benefit as there are existing construction impossibilities. This would free up funds to improve California needs and not federal mandates and more taxes.

Yes, we have transportation issues. This can be solved with more park and ride-share incentives along with rewards for car-pooling and using bus services that are not utilized. The DMV should be made more aware of enforcing legal valid drivers with more stringent retail auto sales verifications.

When the state mandates housing to live near transportation, this differs from the American Way. Such regional living borders on the sci-fi “Hunger Games” mentality. Living near railroad stations with increased walking and biking to work with untold restrictions are not a priority.

Like the Obama Plan, this has too many mandates and loop-holes with the benefits siding with the provider companies. This tact can be seen as a forcible way to eliminate the American “know-how” of entrepreneurship. I commend the designers of this document as it contains all legal-binding, freedoms and taxes that would restrict the California citizen. If the draft is predominately from an environment persuasion, then it is not reflecting a balanced voice.

Since SCAG is a voluntary association, I recommend that Southern California does not participate in this Federal plan. Our state should not accept assistance with regional housing, energy, transportation or the environment. Voting for 86 more government officials to implement this would restrict California from making their own decisions. Please do not accept this draft.

Sincerely,

Terry Goller

Anita Au

From: Sandra Dix <[redacted]>
Sent: Monday, February 1, 2016 4:26 PM
To: 2016 PEIR
Subject: Fwd: SCAG Comments - 2016
Attachments: SCAG - Draft 2016 RTP-SCS - Comments - Ezequiel Gutierrez.doc

---------- Forwarded message ----------
From: **Ezequiel Gutierrez** <[redacted]>
Date: Mon, Feb 1, 2016 at 4:00 PM
Subject: SCAG Comments - 2016
To:[redacted]

Please see attached. Thank you.

On 08/20/15, Sandra Dix<[redacted]> wrote:

EZEQUIEL GUTIERREZ, ESQ.

February 1, 2016

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNENTS
818 West Seventh Street, 12th Floor
Los Angeles, California 90017

Attn: Courtney Aguirre

Email: *2016PEIR@scag.ca.gov*

Re: **DRAFT 2016 RTP/SCS - Comments**

Ladies and Gentlemen:

The following brief comments are offered on behalf of individuals who live and work throughout the SCAG region, regarding SCAG's DRAFT 2016 RTP/SCS (DRAFT).

While SCAG its constituent membership and participants in the process leading to the DRAFT are to be commended, the DRAFT falls short and represents an incomplete and non-inclusive planning process and outcome, in that the DRAFT fails to acknowledge the communities and environment of the High Desert which spans extensively, eastward from the Antelope Valley to Adelanto, Victorville, Hesperia and Apple Valley; and northward from the northern base of the San Gabriel / San Bernardino Mountains into southern portions of Kern County.

These comments will focus on the High Desert (excluding Palmdale and Lancaster). Indeed, the High Desert can be seen as a populated sub-region of SCAG, requiring inclusion in its regional planning. Because of the omission of the High Desert from any meaningful treatment in the DRAFT, in effect, treated essentially as a barren landscape, these comments will be brief but will review obvious but significant issues that should have been included in the DRAFT for it to be inclusive of the entire geographic region.

THE SETTING

Many of the residents of the High Desert (HD) work in and around the Los Angeles / Orange County basin and commute "down the hill" to employment and other activity via the Cajon Pass.

Commuting in the Cajon Pass during work week is intense and voluminous, a process which reverses at the end of a work day. It can only be expected to intensify throughout the planning period of the DRAFT with massive adverse environmental impacts, in many critical aspects.

The High Desert with its extensive buildable areas in several HD communities can be expected to absorb a significant portion of the regional population increase to 22,000,000 residents, as anticipated in the DRAFT. One has only to personally see the several HD, haphazardly distributed new home development projects which have been slowed, but remain vacant, as a result of the 2008 recession, to understand the enormous growth potential in the HD.

A regional planning document which fails to plan for population growth in and environmental impacts generated from such an extensive constituent area is inadequate and incomplete. As a result, redraft of the document is compelled

with greater efforts at inclusion of the several HD communities than evident. Without engaging in extensive review of the DRAFT which is substantially if not completely exclusive of the HD communities and environment, two regional maps in Chapter 5 of the DRAFT startling reveal the omission. Exhibit 5.2, 2040 Transit Network Planned and Existing, reveals the absence of the HD in any transit future for the SCAN region. It is indeed a picture worth a 1000 words, only Palmdale/Lancaster are included. Similarly, Exhibit 5.4, Major Highway Projects, does not show an adequate highway scheme for the HD. The only significant infrastructure represented is the High Desert Corridor (HDC) which after considerable planning forums has been admitted not to include any on and off points between Highway 14 in the Antelope Valley and Highway 15 to the east of the Adelanto/Victorville communities. As such, it will not serve nor is it planned to serve HD communities. Its only apparent purpose is to drain dollars away from the SCAG region (and California, generally) to Vegas. It will be a toll road so any benefit to HD communities will have to be purchased.

THE POTENTIAL

The High Desert has enormous potential to accomplish any of the objectives of the DRAFT. Its relatively undeveloped areas represents, in essence, a blank slate in which to plan and develop nodal transit oriented communities (the High Quality Transit Areas (HQTA’s) of the DRAFT.

As with the coming METROLINK Perris Valley Line reviewed in the DRAFT, a similar METROLINK line can be developed eastward from its Palmdale station toward Hesperia, using and expanding the existing right of way freight line of the Union Pacific railroad.

Such a commuter transit line could be developed with periodic HQTA nodes, creating the type of living environments for people envisioned in the DRAFT while protecting the natural environment of the HD. It would help link HD commuters with employment opportunities “down the hill,” thus, mitigating the growing traffic load in the Cajon Pass and its adverse environmental impacts.

Such a METROLINK line would serve to economically integrate the HD to the greater economy of the region, as a whole. It would serve to channel and direct population growth into new HQTA’s along the new METROLINK line, away from the haphazard pattern which based on current building would otherwise develop.

The HD would thus actually become showcase for the goals set out in the DRAFT. HQTA’s along route would encompass the best environmental justice objectives, representing inclusivity rather than the exclusionary characteristic of the SCAG region with the numerous lower income HD areas geographically excluded from the remainder of the region. Such a new METROLINK line would benefit the HD (in contrast to the non-access HDC), and would thus integrate the HD into the SCAG region. The entire SCAG region itself could be transformed.

Further review and planning of the DRAFT document is requested to create a truly inclusive and integrated SCAG region.

Thank you.

Very truly yours,

Ezequiel Gutierrez, Esq.

January 31, 2016

TO: SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

FROM: Mrs. Patricia Bell Hearst

RE: DRAFT 2016 - RTP/SCS
LA-RTP 996425

Gentlemen:

As a resident of Brentwood, I travel through the Sepulveda Pass - using Sepulveda Boulevard to conduct business in the San Fernando Valley and points north.

For 15 years I have reviewed studies, reports and opinions amounting to 10 file boxes regarding the I-405 Sepulveda Pass Improvement Project.

After reviewing the Draft 2016-RTP/SCS regarding a Reversible Lane (LA-RTP-996425) through the Mulholland Tunnel, please be advised that:

There are no studies or evidence to support the need for a reversible lane within the Mulholland Tunnel.

The I-405 Sepulveda Pass Improvement Project provided an additional North Bound Lane from the new Skirball Ramps on Sepulveda - to the new Skirball Center Bridge.

This new North Bound lane provides great ease in North Bound traffic movement during peak hours of traffic, thereby eliminating any need of a reversible lane in the Mulholland Tunnel.

Thank you for the opportunity to comment on your Draft.

Sincerely,

Mrs. Patricia Bell Hearst

[redacted]

Richard M. Helgeson
Attorney at Law
[redacted]

February 1, 2016

Hasan Ikhrata
Executive Director
Southern California Association of Governments
1818 West 7th Street, 12th Floor
Los Angeles, CA 90017

Courtney Aguirre and Luhin Sun
Southern California Association of Governments
818 West 7th Street, 12th Floor
Los Angeles, CA 90017

RE: Request for Compete Removal of SR-710 Freeway Tunnel Project from 2015-2040 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS). Comments to the Draft Program Environmental Impact Report for the 2016-2040 RTP/SCS [State Clearing House Number 2015031035] pursuant to the California Environmental Quality Act.

Dear Mr. Ikhrata, Ms. Aguirre and Ms. Sun:

I join with a growing number of people, organizations and public entities in requesting that SCAG act responsibly in the preparation of the 2015-2040 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS) and remove all references which could be construed to support inclusion of the SR-710 Freeway Tunnel Project from that instrument. Even though the 710 North Project alternatives are undergoing environmental review and no alternative should have yet been selected pursuant to the current EIR process it is obvious that SCAG has already "pre-determined" the SR-710 Tunnel alternative. This patently illegal action by SCAG unfortunately opens the door to the very type of "post hoc rationalization" under the California Environmental Quality Act which California appellate courts have uniformly condemned. (See for example Laurel Heights Improvement Association v. Regents of the University of California (1988) 47 Cal. 3rd 376). A number of references which point solely to the tunnel still remain in the in the RTP/SCS.

Given the circumstances of the Seattle SR 99 Alaskan Way Viaduct project in the State of Washington, any attempt to carry forth the SR-710 North Freeway Tunnel would represent the very height of local governmental irresponsibility. As I will demonstrate subsequently, the Washington Alaskan Way Viaduct Project is the only other project in the world in which the proposed tunnel boring technology which is contemplated for the SR-710 Freeway Tunnel has ever been attempted. The catastrophic consequences which have followed from that project provide every reason for concluding that the SR-710 Tunnel Project should never be seriously considered or pursued. The State of Washington, of course, rues the day it ever gave thought to attempting to construct the Alaskan Way Viaduct tunnel.

Given all of this and given the current status of the CalTrans SR-710 North EIR/EIS process, the only reasonable transportation solution now posed for the SCAG RTP/STS is to reject all 710 tunnel alternatives. Any further transportation matters associated with this ill-conceived and controversial tunnel project should be carried forth by examining the community based alternatives which have been submitted within the currently pending CalTrans EIR/ EIS process which seek to address transportation issues in the West San Gabriel Valley without the tunnel.

The comments set forth herein are also being submitted in connection with the SCAG Draft Program Environmental Impact Report for the 2016-2040 RTP/SCS (California State Clearing House Number 2015031035) which is currently circulating and currently within the requisite comment period. Pursuant to the California Environmental Quality Act I ask that these comments be considered in connection with SCAG's suggestion in this instrument that a freeway connection between Valley Boulevard in Alhambra and California Boulevard in Pasadena be part of SCAG's Regional Transportation Plan. As you are aware various freeway tunnel alternatives which purport to do precisely this are presently under study in connection with the CalTrans Draft EIR/EIS pertaining to the SR-710 North Study. The Draft EIR/EIS pertaining to the SR-710 North Study circulated during mid 2015 and comments to this DEIR are currently under study. While CalTrans' Draft SR-710 North EIR/EIS sets forth five potential project alternatives, only the alternative which entails the various SR 710 North freeway tunnel configurations appear to be the type of state highway alternatives fitting the description provided for this particular freeway route in the Draft PEIR for the SCAG RTP/SCS.

The 710 North tunnel has a dark and tumultuous history which has been fueled in no small part by the pressures of special interests. As a preliminary matter I would ask that SCAG bear in mind the loud public outcry and the fierce public opposition which has characterized the 710 North project for more than fifty years, as well as the bitter enmity which this project has often evoked in Southern California in the past. This opposition has occurred in no small part because of the devastating environmental degradation which this project would have wreaked upon a significant geographic area of Los Angeles County. I am hopeful that, with appropriate reflection, SCAG will have the vision to free itself from the irrational tunnel vision, which over and over creates more congestion on this region's freeway systems and that SCAG, as a more progressively responsible organization, will

instead work to help develop a responsible transportation paradigm which can better serve the region in the generations to come.

To some it has seemed puzzling that this imprudent freeway project has survived the heated debate and substantial public opposition which it has generated for more than half a century. However, despite all of this, and despite the enormous, costs, risks and environmental consequences which are involved, various engineering and construction special interests have breathed continued life into this project, even though it can never represent a responsible transportation solution.

The history of the 710 North Project has been chronicled by a long series of failed attempts by large environmentally insensitive organizations which have vainly sought to carry out what would otherwise have become an enormous environmental travesty. Construction of the 710 North project originally contemplated a massive multiple lane freeway which would have torn through numerous historic neighborhoods and would have bulldozed scores of structures on local, state and national historic registries in Los Angeles, South Pasadena and Pasadena. In fact, the entities tasked with freeway planning and construction attempted to initiate the construction without even completing the required environmental review pursuant to the National Environmental Policies Act of 1969 (NEPA) or the 1970 California Environmental Quality Act (CEQA). As a result in 1973 the City of South Pasadena and others brought an action in the United States District Court for the Central District of California to enjoin this proposed construction. This action, as reported in South Pasadena et. al. v. Volpe et. al., 418 F. Supp 854 (USDC Central CA., 1976), resulted in an injunction barring the project due to the failure to prepare the required Environmental Impact Statement under NEPA and the required Environmental Impact Report under CEQA.

Subsequent to the Volpe decision more than two decades passed, with at least four more draft EIR's, before the required Environmental Impact Statement and Environmental Impact Report were finalized. In a second lawsuit a United States District Judge in 1999 in South Pasadena et. al. v. Slater et. al., 56 F. Supp. 2d 1106 (USDC Central CA., 1999) issued another injunction against the project because the environmental review by the governmental organizations charged with preparing these instruments was inadequate.

Today, the current volley of histrionics which we see coming from the tunnel proponents represents the third such campaign to extend 710 freeway. And this campaign has culminated in still another inadequate environmental document. The 710 North Draft EIR/EIS and all of the preliminary work which has gone into it have cost Los Angeles County taxpayers well in excess of forty million dollars. These are moneys which have been poorly spent and would have been better devoted to more responsible solutions to Los Angeles County's transportation challenges, as the current SR710 North Project EIR/EIS is a deeply flawed instrument.

The SR-710 Tunnel project currently being touted by the tunnel proponents represents a proposal to extend the 710 freeway in a manner which is now described in the CalTrans Draft EIR/EIS to entail either one or two sixty foot diameter tunnels which will

traverse an underground course through the west San Gabriel Valley for over four and one half miles.

In this current third 710 North freeway campaign SCAG has received a number of comments from the tunnel proponents purporting to support the inclusion of the SR-710 Tunnel Project in the RTP/SCS. However, there is large money driving the proponents of the tunnel. Englander, Knabe and Allen, which in a filing with the Los Angeles City Ethics Commission appears as one the highest grossing lobbying firms in the City, is on the payroll of proponents of the tunnel. And it appears that the inducements of the tunnel have also attracted a number of others who have submitted comments which, in their attempt to advance the tunnel, are contradicted by a number of highly qualified experts concerning the environmental consequences of this project. Unfortunately it is one of those insidious realities that such commentators sometimes appear to be driven more by their own personal interests than those of the general public where their loyalties should more appropriately reside. A number of letters have parroted the following statement: "Most importantly the freeway would significantly improve air quality and reduce cancer risk for the majority of the study area." These people fail to disclose that the United States Environmental Protection Agency has been very critical of the current air quality analysis relating to the tunnel and has called for a supplement to the existing draft EIR/EIS relating to the 710 tunnel because it is inadequate and does not properly address the adverse air quality impacts of this project. Proponents of the tunnel also frequently omit to disclose that both the South Coast Air Quality Management District and learned medical school professors at the Keck School of Medicine have raised serious concerns about the 710 tunnel's effects on air quality. The tunnel proponents also state that: "A freeway tunnel also maximizes mobility and flow of traffic throughout the Los Angeles Region." Actually this assertion is directly at odds with the Duranton and Turner studies which are later referenced herein, as well as the many other traffic studies which are cited in the attachments to this comment letter. So a number of the comments made by the proponents of the 710 tunnel significantly misstate the facts and do not accurately reflect the true impact which the tunnel would predictably cause for the area.

The proponents of the 710 tunnel state that "the freeway tunnel has strong local support and is consistent with voter mandate and local plans." Actually, Southern California is emerging into a new changing transportation paradigm in no small part because of the passage some seven years ago of Measure R. However, the voter mandate was not necessarily motivated by a desire to build irresponsible freeway tunnels but instead the electorate was motivated to develop new modes of urban transportation. Irrespective of what anyone may suggest to the contrary, the average voter never intended Measure R revenues to be used to build more and more freeways. Instead the actual expectations of the people who approved this initiative was to change the transportation landscape of Southern California so that all Los Angeles County could benefit more fully from mass transit projects.

Although some "freeway improvements" were mentioned in passing, it is clear that building an entirely new freeway, such as the SR 710 North, was the last thing the voters had in mind when they passed measure R. The fact that freeway expansion does not

relieve freeway congestion is well established and can be seen in over twenty different well respected transportation studies conducted by transportation experts during the past two decades. Many studies, which will be addressed in the following section, show that freeway expansion simply results in traffic inducement which in turn causes more overcrowding and more freeway congestion. Based on people's long experience with freeway expansion projects the answer to our twenty first century transportation challenges, embraced in Measure R, was never contemplated to be more freeways, but rather, the development of other transportation methodologies.

The 710 Gap Closure (Tunnel) Project was not expressly referenced in the actual ballot measure which was placed on the ballot in front of the voters in the 2008 election. Instead this project was obscurely referenced, along with scores of others, in an attachment, "Attachment A", to an ordinance - Ordinance 08-01 - which, while passed by the Metro Board, was never fully reproduced for the Voters in the Measure A ballot materials.

The official title of Measure R by Metro was "Traffic Relief, Rail Extensions, Reduce Foreign Oil Dependence." Based on all the circumstances associated with Measure R it doesn't appear that freeway expansion was the purpose of the measure at all in the minds of voters. This can be seen in the description which appeared on the original ballot measure, the impartial analysis by the Los Angeles County Counsel and the various ballot arguments presented for and against Measure R, as well as the positions taken by various Los Angeles County cities on the Measure.

If one carefully examines the news articles surrounding Measure R at the time it is clear that the debate centered on a skepticism by the cities in Eastern Los Angeles County that their transit needs would not be addressed and that Measure R monies would predominantly benefit other parts of Los Angeles County. The argument of the Eastern Los Angeles County cities was that Measure R was simply a device designed by Mayor Villaraigosa to build his "subway to the sea", which was not seen as benefiting those in the eastern part of the county.

While the ballot initiative contained some references to freeway traffic flow improvements which might have been directed at improvements in off-ramps and on-ramps, and in freeway flow and freeway interchanges, it was not understood by the average voter to contemplate construction of a whole new freeway. Measure R's purpose, in the mind of the average voter, was to improve mass transit. To the average voter it was intended to free us of the irrational over-congestion of the region's freeway systems and to develop a responsible mass transit paradigm which would serve Los Angeles for generations to come. It's passage represented the hope and the vision of the electorate to free our children and our children's children from the obstructive gridlock and air pollution of congested freeways. SCAG, however, needs to take irresponsible projects such as the SR 710 North tunnel off the table altogether if this hope and this vision is ever to become a reality.

As you are aware the SCAG RTP/SCS PEIR process, among other things, is supposed to provide decision makers and the public with detailed information about how the pursuit of the SCAG RTP/SCS is likely to affect the environment. (See California Public Resources Code Sections 21002, 21002.1(a) and 21061.) I intend to demonstrate in the Draft PEIR discussion which follows, the lack of complete information in the Draft PEIR which should properly be considered to assess impacts of decisions made pursuant to the RTP/SCS, the flawed perspective through which this project would be undertaken if the SR-710 Tunnel Project is ever seriously considered, the perils inherent in underground road tunnels which are not addressed in the Draft PEIR and the availability of other more responsible solutions to transportation challenges for our people who, in the end, are really supposed to be the beneficiaries of SCAG's transportation planning processes.

THE DRAFT PEIR FAILS TO APPROPRIATELY ADDRESS FORMS OF TRAFFIC INDUCEMENT AND INDUCED DEMAND WHICH AFFECT FREEWAY EXPANSION PROJECTS

The concept of induced demand is never adequately dealt with in the Draft PEIR for the SCAG RTP/SCS. For more than twenty years traffic engineers and transportation departments have been aware of an ever increasing number of studies which convincingly demonstrate that freeway expansion simply results in traffic inducement which in turn begets greater overcrowding and more significant freeway congestion. This in turn, results in more and greater gridlock into which a greater and greater number of motorists become mired on the now extended freeway system. Based on a long series of empirical studies of freeway expansion projects, transportation experts have consistently concluded that the answer to twenty first century challenges associated with transportation congestion does not lie in expanding our freeways. If there has been any abiding truth which has emerged in the past two decades, it is that you can't build your way out of congestion. It is the expansion of the roads itself which induces greater traffic demand and which thereupon causes more traffic.

The concept of induced demand associated with freeway expansion is a concept which is well understood by CalTrans and has been seen again and again in a number of empirical verifications. Induced demand or traffic inducement is simply a somewhat intuitive principle which holds that an increase in the supply and availability of a resource such as a freeway will cause more and more people to shift their decision making to utilize this freeway resource. Though some traffic engineers made note of this phenomenon at least as early as the 1960s, it is only in recent years that social scientists have collected enough data to show how this happens in almost all instances when we build new roads. These findings imply that the way we traditionally go about trying to mitigate traffic congestion through freeway expansion does not work.

In 2011, two economists—Matthew Turner of the University of Toronto and Gilles Duranton of the University of Pennsylvania—published a very definitive and well documented study, which between 1980 and 2000, compared in terms of kilometers, the number of new highways which were built in different U.S. cities and compared this to the

total number of kilometers traveled in those cities during the same period. It is probably appropriate that studies of induced demand, like these, are the province of economists because the study of demand for a particular product, service or resource is clearly within their particular area of expertise. These two economists found that there was a perfect correlation between these two variables - that is an elasticity of demand coefficient of 1.0, or virtually a 100% relationship of kilometers of new roads built to additional kilometers traveled by motorists. In other words their study verified that for every kilometer of roads and highways that were built during this period there was a perfectly proportional increase in kilometers traveled by motorists in each city. In every instance these figures changed at the same rate. If a city had increased its road capacity by 10 percent between 1980 and 1990, then the amount of driving in that city went up by 10 percent. If the amount of roads in the same city then went up by a specified percentage between 1990 and 2000, the total number of miles driven also went up by that same specified percentage.

The introductory paragraph from the Duranton and Turner traffic study reads as follows:

> " We investigate the effect of lane kilometers of roads on vehicle-kilometers traveled (VKT) in US cities. VKT increases proportionately to roadway lane kilometers for interstate highways and probably slightly less rapidly for other types of roads. The sources for this extra VKT are increases in driving by current residents, increases in commercial traffic, and migration. Increasing lane kilometers for one type of road diverts little traffic from other types of road. We find no evidence that the provision of public transportation affects VKT. We conclude that increased provision of roads or public transit is unlikely to relieve congestion. " See Duranton. and Turner. 2011. *The Fundamental Law of Road Congestion: Evidence from US Cities.* American Economic Review, 101: 2616-2652. (emphasis added)

However, in addition to the findings in the Duranton and Turner studies, there are numerous other the studies associated with the induced travel phenomenon. It is notable that the CalTrans Draft EIR/EIS indicates that under the Freeway Tunnel Alternative vehicle miles traveled will increase slightly and that the traffic will made up mostly from vehicles diverted from what otherwise would have been trips on surrounding surface streets in the area. The tunnel proponents, referred to earlier, parrot the same thing. However, a substantial number of studies show that this induced demand for freeways arises from new trips not just those which would otherwise have been taken on adjacent surface streets. In 2014 Susan Handy, a professor at the University of California, Davis, and Marlon Boarnet, a professor at the University of Southern California published two articles which compiled the findings concerning traffic inducement in a substantial number of traffic studies over the past two decades. Similarly to the Duranton Turner studies, these transportation studies described the same phenomenon - that freeway expansion creates greater demand for freeway utilization and does nothing to relieve congestion. The Handy - Boarnett analysis pointed out that similar conclusions arise from approximately twenty different studies and that the quality of evidence linking increases in highway capacity to vehicle miles traveled was fairly high:

> "The quality of the evidence linking highway capacity expansion to VMT increases is

relatively high, although tying changes in VMT to changes in capacity is challenging. The cited studies use time-series data and sophisticated econometric techniques to estimate the effect size. These studies control for other factors that might also affect VMT, including population growth, increases in income, other demographic effects, and changes in transit service." (citing Noland and Lem, 2002). See Susan Handy and Marion G. Boarnet, *Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions*, Policy Brief, September 30, 2014, California Air Resource Board.

Because of the importance of these articles in dispelling traditional conceptions about ways to mitigate traffic congestion, both of the Handy - Boarnet articles are set forth on the California Air Resources Board web site. See Handy & Boarnett, Policy Brief at: **http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf** and Handy & Boarnet, Technical Background Brief at: **http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_bkgd.pdf** I have attached both of these two short papers as they contain a great deal of information on the harmful environmental impact of freeway expansion which appears to have been overlooked in the SCAG RTP/SCS Draft PEIR.

Relief from traffic congestion is one of the goals which is also touted in the CalTrans Draft EIR/EIS by the freeway tunnel alternative. Yet, from the more than twenty traffic studies during the last twenty years which have been compiled by Professor Handy and Professor Boarnet, the conclusions of the experts in these studies would suggest that traffic congestion will not be relieved by any proposed extension of the SR 710 North. It would be irresponsible for SCAG in its consideration of any freeway project to ignore the conclusions in all of these traffic studies which have consistently found substantial traffic inducement in connection with every freeway expansion.

THE INCLUSION OF THE SR-710 TUNNEL, EITHER IMPLICITLY OR EXPLICITY, INTO THE SCAG RTP/SCS WOULD BE A SERIOUS MISTAKE. THE PEIR FAILS TO ADDRESS THE SIGNIFICANT IMPACTS WHICH WOULD OCCUR IN THE EVENT OF A CATASTROPHIC TUNNEL BORING MACHINE FAILURE

The SR-710 Tunnel Project which is referenced in the communications to SCAG by the tunnel proponents contemplates the employment of either four separate sixty foot diameter tunnel boring machines in connection with the Dual Bore Tunnel configurations in the CalTrans 710 North DEIR or two such tunnel boring machines with respect to the Single Bore Tunnel configurations in the 710 North DEIR. Despite the fact that these sixty foot diameter tunnel boring machines are prototypes and have never been successfully used anywhere in the world, neither CalTrans nor SCAG makes any allowance for the probable environmental impacts, much less the untoward consequences, which would follow should any one of these such machines suffer a failure. The only tunnel boring machine of similar design and dimension used anywhere in the world is that which is

currently being employed in connection with the Seattle SR 99 Alaskan Way Viaduct project in the State of Washington.

The Washington Department of Transportation has denominated the SR 99 Alaskan Way Viaduct tunnel boring machine as "Bertha", described on its website as follows:

> "Bertha was shipped from her manufacturing facility in Japan to Seattle in spring 2013. She was then reassembled in an 80-foot-deep pit to the west of Seattle's stadiums. After a series of thorough tests, Bertha was launched into the soils beneath Seattle on July 30, 2013."
> http://www.wsdot.wa.gov/Projects/Viaduct/About/Tunneling

This tunnel boring machine, "Bertha", has suffered serious catastrophic failure and had only proceeded about one thousand feet between the time the Washington tunnel boring operation began in 2013 and the end of 2015. The Washington Department of Transportation has described this failure as follows:

> "In December 2013, STP stopped tunneling approximately 1,000 feet into the tunnel drive after measuring increased temperatures in the tunneling machine. While investigating the cause of the high temperatures, STP discovered damage to the machine's seal system and contamination within the main bearing. STP is working to repair the seal system and replace the main bearing so that crews can resume tunneling." http://www.wsdot.wa.gov/Projects/Viaduct/About/Tunneling

> "In summer 2013, Bertha, the world's largest tunneling machine, began digging the SR 99 tunnel beneath downtown Seattle. In December 2013 , Seattle Tunnel Partners, the contracting team hired to design and build the tunnel, stopped excavation approximately 1,000 feet into the dig after measuring increased temperatures in the tunneling machine. While investigating the cause of the high temperatures, STP discovered damage to the machine's seal system and contamination within the main bearing."
> http://www.wsdot.wa.gov/Projects/Viaduct/About/FollowBertha

> "Bertha lifted to the surface for repairs
>
> On March 30, 2015, Seattle Tunnel Partners safely placed the front end of the SR 99 tunneling machine on the repair platform located just south of the access pit. The piece - along with three others - was lifted from the 120-foot-deep pit crews built to access and repair the machine. With the necessary pieces now at the surface, STP is making repairs and enhancements. "
> http://www.wsdot.wa.gov/Projects/Viaduct/About/FollowBertha

Tunneling in the Washington Alaskan Way Viaduct project did not resume again until late 2015 and then stopped again. While the same unprecedented large tunnel boring machines, having the same "Bertha" design, are slated to be employed for the SR-710

Tunnel project, nothing in the SCAG RTP/SCS or the Draft PEIR ever attempts to determine the affects which such a failure would cause should it occur with respect to the tunnel boring machines which are contemplated to be used here. It is unlikely that a catastrophic failure due to conditions in the shield of these tunnel boring machines could be remedied from underground because of safety concerns for the affected workers. Because of overriding considerations for worker safety such a tunnel boring machine rescue would have to be undertaken by way of excavation from above.

California Labor Code Section 6401 provides:

> "Every employer shall furnish and use safety devices and safeguards, and shall adopt and use practices, means, methods, operations, and processes which are reasonably adequate to render such employment and place of employment safe and healthful. Every employer shall do every other thing reasonably necessary to protect the life, safety, and health of employees."

California Labor Code Section 6403 provides:

> "No employer shall fail or neglect to do any of the following:
> (a) To provide and use safety devices and safeguards reasonably adequate to render the employment and place of employment safe.
> (b) To adopt and use methods and processes reasonably adequate to render the employment and place of employment safe.
> (c) To do every other thing reasonably necessary to protect the life, safety, and health of employees."

Title 8 Section 8410 (a) of the California Code of Regulations, which is part of the California Tunnel Safety Orders promulgated by the State of California Division of Industrial Safety, provides that "The employer shall ensure that every reasonable effort is taken for the safety of employees, whether or not provided for in these orders."

There is a very significant likelihood that OSHA requirements, tunnel safety orders and the provisions of Title 8 of the California Code of Regulation would require that any rescue of a failed tunnel boring machine be effectuated by means of a fully shored excavation from above, as occurred in Washington. Despite this it does not appear that SCAG, in preparing the RTP/SCS or the Draft PEIR, ever attempted to assess how such an event would impact resources and structures on the surface. Although this would have catastrophic consequences for resources on the surface there is no mention of this, and no mention is made as to how such an eventuality would be dealt with.

It needs to be emphasized that the prospect of a tunnel boring machine failure with respect to this project is more than a speculative possibility. It has already happened with respect to the only other tunnel boring machine in the world similar to those which are being proposed for the SR-710 Tunnel Project. The machines contemplated with respect

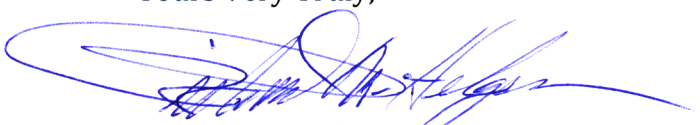
to the 710 Freeway Tunnel Project are prototypes and have no record of any operating history other than that associated with the catastrophic failure which occurred in connection with the Seattle, Washington Alaskan Way Viaduct project. The environmental and economic consequences of such a failure should counsel a more responsible transportation solution than attempting the SR-710 tunnel.

GIVEN WHAT HAS BEEN SET FORTH HERE,
THERE ARE MUCH MORE DESERVING TRANSPORTATION PROJECTS
THAN THE SR-710 FREEWAY TUNNEL

In 2011 the Second Appellate District of the California Court of Appeal handed down a decision which explained that Measure R did not necessarily commit Metro to those items listed as "potential projects" in Attachment A of the Metro ordinance passed in advance of Measure R. (See *City of South Pasadena et. al. et al., Plaintiffs and Appellants, v. Los Angeles County Metropolitan Transportation Authority, Defendant and Respondent; California Department of Transportation, Real Party in Interest.* California Court of Appeals, Second District, Division Six, 2d Civil No. B221118 (2011). In light of this SCAG should be guided by the reality that construction of a 710 tunnel through the West San Gabriel Valley would represent a project fraught with substantial uncertainty and danger, and that there are wiser and more compelling transportation solutions to which our limited resources should appropriately be devoted.

The numerous traffic studies compiled by Susan Handy and Marion Boarnet illustrate that little will be accomplished in terms of reducing induced demand or traffic congestion by the proposed expansion of the 710 Freeway through the SR-710 Tunnel Project. And if one seriously considers the enormous environmental and financial risks this project poses, there are far better solutions to traffic congestion in Los Angeles County which are represented in extensions of the Gold Line, the Purple Line, the Crenshaw Line and other mass transit projects that would better serve our twenty-first century transportation needs, than to burrow a freeway tunnel through the bowels of the West San Gabriel Valley. Given the environmental consequences of the SR-710 Freeway Tunnel our limited transportation resources should be better used for worthwhile twenty-first century Los Angeles County transportation projects and not the SR-710 Freeway Tunnel.

Yours Very Truly,



Richard M. Helgeson

Attachments

Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions

Policy Brief

Susan Handy, University of California, Davis
Marlon G. Boarnet, University of Southern California

September 30, 2014

Policy Brief:
http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf

Technical Background Document:
http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_bkgd.pdf

California Environmental Protection Agency
Air Resources Board

Policy Brief on the Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions

Susan Handy, University of California, Davis
Marlon G. Boarnet, University of Southern California

Policy Description

Because stop-and-go traffic reduces fuel efficiency and increases greenhouse gas (GHG) emissions, strategies to reduce traffic congestion are sometimes proposed as effective ways to also reduce GHG emissions. Although transportation system management (TSM) strategies are one approach to alleviating traffic congestion,[1] traffic congestion has traditionally been addressed through the expansion of roadway vehicle capacity, defined as the maximum possible number of vehicles passing a point on the roadway per hour. Capacity expansion can take the form of the construction of entirely new roadways, the addition of lanes to existing roadways, or the upgrade of existing highways to controlled-access freeways.

One concern with this strategy is that the additional capacity may lead to additional vehicle travel. The basic economic principles of supply and demand explain this phenomenon: adding capacity decreases travel time, in effect lowering the "price" of driving; when prices go down, the quantity of driving goes up (Noland and Lem, 2002). An increase in vehicle miles traveled (VMT) attributable to increases in capacity is called "induced travel." Any induced travel that occurs reduces the effectiveness of capacity expansion as a strategy for alleviating traffic congestion and offsets any reductions in GHG emissions that would result from reduced congestion. If the percentage increase in VMT matches the percentage increase in capacity, congestion (a function of the ratio of VMT to capacity) is not alleviated at all.

Conversely, some communities have decreased roadway capacity, in part motivated by the goal of reducing VMT. While temporary reductions in highway capacity are common (e.g. through the closure of lanes for construction or emergencies), permanent reductions are relatively rare. San Francisco eventually removed two elevated freeway segments damaged in the 1989 Loma Prieta earthquake, replacing them with street-level boulevards. Many European cities have closed selected streets in their

[1] See the separate policy brief on traffic incident clearance programs: http://arb.ca.gov/cc/sb375/policies/policies.htm

commercial cores to car traffic. This strategy is less common in U.S. cities, but one notable example is the recent elimination of vehicle traffic in Times Square in New York City. Increasingly common in the U.S. are "road diet" projects that re-allocate a portion of the public right-of-way for modes other than cars, though such projects do not necessarily decrease the capacity of the roadway as measured by vehicle throughput.

Impacts of Highway Capacity Expansion

Increased highway capacity can lead to increased VMT in the short run in several ways: if people shift from other modes to driving, if drivers make longer trips (by choosing longer routes and/or more distant destinations), or if drivers make more frequent trips (Noland and Lem, 2002; Gorham, 2009; Litman, 2010). Longer-term effects may also occur if households and businesses move to more distant locations or if development patterns become more dispersed in response to the capacity increase. Capacity expansion can lead to increases in commercial traffic as well as passenger travel (Duranton and Turner, 2011).

The induced-travel impact of capacity expansion is generally measured with respect to the change in VMT that results from an increase in lane miles, determined by the length of a road segment and its number of lanes (e.g. a two mile segment of a four-lane highway equates to eight lane miles). Effect sizes are usually presented as the ratio of the percent change in VMT associated with a one percent change in lane miles. The expectation is that this ratio, also called an "elasticity," will be positive: an increase in lane miles will lead to an increase in VMT. An elasticity of 1 or greater means that the new capacity is entirely filled by additional VMT, producing no reduction in congestion or GHG emissions; for elasticities between 0 and 1, the closer the elasticity is to zero, the smaller the increase in VMT relative to the increase in capacity, and thus the greater the reduction in congestion and GHG emissions.

Impacts are also sometimes measured as the change in VMT associated with the change in travel time (that results from the change in highway capacity). Many studies analyze the change in the number of vehicles per day on that road segment (a metric called "average daily traffic"). No studies focused on travel time or average daily traffic are included here.

Effect Size

Studies consistently show that increased capacity induces additional VMT. Elasticity estimates of the short-run effect of increased highway capacity range from 0.3 to 0.6,

though one study produced a lower estimate of 0.1 (Table 1). Estimates of the long-run effect of increased highway capacity are considerably higher, mostly falling into the range from 0.6 to just over 1.0. The more recent studies have produced the highest estimates of long-run elasticities using more sophisticated methodologies that are better able to illuminate the impact of highway capacity on VMT (as discussed in the accompanying Technical Background Document). Thus, the best estimate for the long-run effect of highway capacity on VMT is an elasticity close to 1.0, implying that in congested metropolitan areas, adding new capacity to the existing system of limited-access highways is unlikely to reduce congestion or associated GHG in the long-run.

Table 1. Impact of Capacity Expansion on VMT

Study	Study location	Study year(s)	Results	
			Change in VMT/ change in lane miles	*Time period*
Duranton and Turner, 2011	U.S.	1983 - 2003	1.03	10 years
Cervero, 2003	California	1980 - 1994	0.10	Short term
			0.39	Long term
Cervero and Hansen, 2002	California	1976 - 1997	0.59	Short term (1 year)
			0.79	Intermediate term (5 years)
Noland, 2001	U.S.	1984 - 1996	0.30 to 0.60	Short term
			0.70 to 1.00	Long term
Noland and Cowart, 2000	U.S.	1982 - 1996	0.28	Short term
			0.90	Long term
Hansen and Huang, 1997	California	1973 - 1990	0.20	Short term
			0.60 to 0.70	Long term – counties
			0.90	Long term – metro areas

Even the earlier studies were skeptical about the potential of capacity expansion to reduce VMT, particularly in the long-run. In 1997, Hansen and Huang found that population growth is the most consistent contributor to VMT growth, but that the contribution from increases in lane miles is significant: "...Our results suggest that the urban [state highway lane miles] added since 1970 have, on the whole, yielded little in the way of level of service improvements." Noland (2001) concluded that "Increased capacity clearly increases vehicle miles of travel beyond any short run congestion relief

that may be obtained." More recently, Duranton and Turner (2011) echoed these earlier studies: "We conclude that increased provision of roads… is unlikely to relieve congestion."
The effect size appears to depend on the size (whether in terms of population or geographic extent) of the metropolitan area. On a percentage basis, the effects are larger for smaller areas (Schiffer, et al. 2005), likely for a number of reasons. In smaller areas, capacity increases are likely to represent larger percentage increases in total capacity, which then produce larger percentage increases in VMT (Noland and Cowart, 2000). Note that the amount (rather than the percentage) of induced travel is likely to be greater in larger areas than in smaller areas (Hansen and Huang, 1997).

Other factors may also influence the effect size. As noted above, the effect is larger in the long-run than in the short-run, with one study concluding that the full impact of capacity expansion on VMT materializes within five years (Hansen and Huang, 1997) and another concluding that the full effect takes as long as ten years (Durantan and Turner, 2011). The level of congestion is important, as capacity expansion will produce a larger reduction in travel time and thus a larger increase in VMT when congestion is high than when it is low and driving speeds are unconstrained (Schiffer, et al. 2005). In addition, the effect size may depend on fuel prices: when fuel prices are lower, the induced travel effects of expanded capacity tend to be higher, as travel time is a greater share of the cost of travel in this situation (Noland and Lem, 2002). Whether the form of capacity expansion (i.e. new roads or expanded roads) matters is not clear (Schiffer, et al., 2005).

An important question is whether increased VMT on highways following capacity expansion is partially offset by decreases in VMT on other roads. This would be the case if drivers shifted from slower and more congested roads to the new or newly expanded highways. However, Hansen and Huang (1997) found "no conclusive evidence that increases in state highway lane-miles have affected traffic on other roads," while more recently Duranton and Turner (2011) concluded that "increasing lane kilometers for one type of road diverts little traffic from other types of road." In other words, capacity expansion leads to a net increase in VMT, not simply a shifting of VMT from one road to another.

Another important question is whether increased highway capacity impacts public transit ridership, or vice versa. The potential interactions are complex. Increased highway capacity could lead public transit riders to shift to driving, thereby contributing to the induced travel effect. Conversely, increased public transit service could entice drivers to replace some driving with public transit, thereby reducing highway traffic and in effect freeing up additional capacity that could then lead to induced traffic. Duranton and

Turner (2011) found no evidence that public transit service affects VMT, suggesting that whatever interactions do occur tend to cancel each other out. In other words, adding transit capacity does not help to reduce congestion, as any freed up capacity is consumed by additional driving.

As noted, some communities have decreased roadway capacity, in part motivated by the goal of reducing VMT. Evidence on the effects of roadway removals or capacity decreases is sparse, however. A 1998 study of 60 locations where road space was taken away from cars in the UK, Canada, Tasmania, and Japan found that, on average, 25 percent of VMT seemed to go away, though the effect size varied widely (Goodwin, et al. 1998). A study of a fourteen-month closure of an important bridge in Calgary, Canada found only a small reduction in trips and little change in behavior with respect to mode (Hunt et al., 2001). Researchers also found limited changes in behavior during the temporary closing for construction of a stretch of Interstate 5 through downtown Sacramento in 2008 (Ye et al., 2012). Studies of the removal of the Central Freeway in San Francisco documented a significant drop in traffic: counts on the boulevard that replaced the freeway were roughly 50 percent less than counts on the freeway (Cervero et al., 2009). Effects on VMT rather than traffic counts have not been assessed.

Evidence Quality

The quality of the evidence linking highway capacity expansion to VMT increases is relatively high, although tying changes in VMT to changes in capacity is challenging. The cited studies use time-series data and sophisticated econometric techniques to estimate the effect size. These studies control for other factors that might also affect VMT, including population growth, increases in income, other demographic effects, and changes in transit service (Noland and Lem, 2002).

Although these studies show a strong correlation between capacity increases and increases in VMT, the direction of causality is an important question in that the anticipation of growth in VMT is generally the rationale for capacity expansion. One study showed that a 10 percent increase in VMT is associated with a 3.3 percent increase in lane-miles (Cervero and Hansen, 2002). However, Fulton, et al. (2000) found that growth in lane-miles precedes growth in VMT, and Duranton and Turner (2011) concluded that "roads are assigned to [metropolitan areas] with little or no regard for the prevailing level of traffic." The cited studies have found a significant influence of capacity expansion on VMT even after accounting for the reverse effect.

Caveats

Many of the studies focus on California, and the results for these studies are similar to those for the national studies, suggesting that the effects are relatively uniform across the U.S. However, as noted above, the effect size may depend on size of the metropolitan area, existing levels of congestion, and fuel prices, and it is likely to be higher in the long run than in the short run.

GHG Emissions

The effect of capacity expansion on GHG emissions depends on two competing effects: the increase in VMT (which increases GHG emissions), and the reduction in traffic congestion (which tends to decrease GHG emissions). As noted above, any induced travel that occurs reduces the effectiveness of capacity expansion as a strategy for alleviating traffic congestion and offsets any reductions in GHG emissions that would result from improved traffic flow. Noland (2001) predicted that the growth in VMT attributable to increased lane miles would produce an additional 43 million metric tons of CO_2 emissions in 2012 nationwide. Conversely, any reductions in VMT resulting from reductions in capacity will reduce GHG emissions, though if traffic congestion increases as a result of the capacity reduction, the benefits will be offset to some degree.

Co-benefits

Given the induced travel effect, capacity expansion has limited potential as a strategy for reducing congestion. The additional vehicle travel induced by capacity expansion increases GHG emissions as well as other environmental effects, including increased air, water, and noise pollution. On the other hand, capacity expansion potentially generates economic and social benefits, at least in the short run, even if the new capacity is completely filled by induced travel. The additional benefits derive from the fact that the expanded highway is carrying more people, each of whom benefits from his or her travel. However, most studies of the impact of capacity expansion on development in a metropolitan region find no net increase in employment or other economic activity, though highway investments do influence where within a region development occurs (Handy, 2005; Funderberg et al., 2010).

In addition, the construction process itself generates both positive and negative effects. Most obviously, highway construction projects create jobs that can boost the local economy. On the other hand, highway construction projects often have substantial negative effects on the communities through which they are sited, particularly if construction necessitates the removal of homes or businesses. Historically, low-income

and/or minority communities were and continue to be disproportionately affected by such projects.

In contrast, reductions in road capacity tend to produce positive social and environmental effects, and they can also generate economic benefits. For example, many cities in Europe have adopted the strategy of closing streets in the central business district to vehicle traffic as an approach to economic revitalization (Hajdu, 1988; Rodriguez, 2011). Road diet projects are becoming increasingly popular in California and elsewhere in the U.S. as a way to support modes other than driving and enhance the local environment, though their economic impacts have not yet been systematically documented.

Examples

California continues to expand its highway system, though at a far slower rate than during the era of interstate highway construction. According to the national Bureau of Transportation Statistics, California had 31,435 miles of freeways, highways, and arterial roadways in 2010, a 1.6 percent increase from 2005.

As noted above, San Francisco removed two segments of elevated freeway damaged in the 1989 Loma Prieta earthquake. The Central Freeway was replaced with Octavia Boulevard, while the removal of the Embarcadero Freeway enabled substantial improvements to the at-grade Embarcadero Boulevard. Both projects sparked an on-going revitalization of their surrounding areas (Cervero, et al. 2009).

The strategy of closing central business district streets to car traffic is uncommon in California but not unknown. Cities in California that have or have had "pedestrian malls" include Burbank, Oxnard, Pomona, Redding, Redlands, Sacramento, and Santa Cruz. The Fulton Mall in downtown Fresno, closed to traffic in the 1960s, has struggled, despite several revitalization efforts. In contrast, Santa Monica's Third Street Promenade, closed to traffic in the 1960s, is widely seen as a success in promoting economic activity and creating a thriving community core.

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Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions

Technical Background Document

Susan Handy, University of California, Davis
Marlon G. Boarnet, University of Southern California

September 30, 2014

Policy Brief:
http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf

Technical Background Document:
http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_bkgd.pdf

California Environmental Protection Agency
Air Resources Board

Technical Background Document on the Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions

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Marlon G. Boarnet, University of Southern California

Study Selection

Research on the effects of highway capacity expansion on vehicle travel focuses on the "induced travel" effect. Induced travel is defined as the increase in vehicle travel that occurs because of capacity expansion. The primary mechanism underlying this effect is an increase in travel speed, which enables more trips and longer distance trips in a given amount of time.

Although research on this topic goes back several decades, a surge of studies in the late 1990s and early 2000s, many focused on California, produced relatively consistent results using somewhat different methods. Included in the accompanying *Policy Brief on the Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions* are studies from California and the U.S. that focus on effects on vehicle-miles traveled (VMT) and that control for factors other than capacity expansion that influence VMT. Six studies published between 1997 and 2011 were included (see Table 1). The brief excludes studies that focused on traffic counts or average daily traffic (ADT) (e.g. Mokhtarian et al. 2002) or on the relationship between VMT and changes in travel time (i.e. travel-time elasticities) (e.g. Barr, 2000), as they do not have a direct relationship with greenhouse gas emissions.

No systematic studies of the effect on VMT of permanent capacity reductions in the U.S. were identified. Hunt et al. (2002) describe the challenges associated with studying the effects of permanent capacity reductions.

Methodological Considerations

The six selected studies all use a combined cross-sectional and time-series approach with aggregate data, though with different units of analysis (Table 1). Several studies analyze effects at the level of metropolitan regions (e.g. Noland and Cowart, 2000; Hansen and Huang, 1999) or counties (e.g. Cervero and Hansen, 2001 and 2002; Hansen and Huang, 1999). One study analyzes effects at the state level (Noland, 2001), while another examines effects for projects (Cervero, 2003). Region- or county-level analysis may be most effective in capturing the effect of the shifting of travel from

one roadway to another in determining the net effect of capacity expansions (Cervero and Hansen, 2002).

Table 1. Descriptions of Selected Studies

Study	Study location and years	Unit of analysis and sample Roadway types	Method	Dept Var	Indept Var	Fixed effects	Instru-ments	Controls	Lags
Duranton and Turner, 2011	US 1983 – 2003	Metro Areas: 192 MSAs with urban interstates at three time points Interstate Highways	Multiple models. Final model: Two-stage least-squares regression with instrumental variables	VKT	Lane km	Decade	Historic routes	Population, geographic variables, census division variables,	n/a
Cervero, 2003	California 1980 - 1994	Freeway projects: 24 projects at 15 time points Projects in small- and medium-sized cities in suburban areas	Path model accounting for speed and development as mediating variables	VMT	Lane miles	Project Year	n/a	Population density, employment density, race/ethnicity	7-8 years
Cervero and Hansen, 2002	California 1976 - 1997	Counties: 34 urban counties at 22 time points State-owned roadways	Multiple models: simultaneous equation analysis (three-state least squared regression); distributed lag model	VMT	Lane miles	County	n/a	Population, income per capita, fuel price, employment density	1 to 5 years
Noland, 2001	US 1984-1996	States: 50 states at 13 time points All roadway types as reported by US DOT in *Highway Statistics*	Multiple models: fixed-effects ordinary least squares models, distributed lag models; for all roads and disaggregated by road type	VMT	Lane miles per capita	State	n/a	Population, income per capita, fuel cost	2 and 5 years
Noland and Cowart, 2000	US 1982 - 1996	Metro areas: 70 areas at 15 time points Freeways and arterials	Multiple models: distributed lag model, two-stage least-squares regression with instrumental variables	VMT per capita	Lane miles per capita	Metro area Year	Urbanized land area, population density	Population density, income per capita, fuel cost	1 year
Hansen and Huang, 1997	California 1973 – 1990	Counties: 30 counties at 19 time points Metro areas: 14 metro areas at 19 time points State-owned highways	Multiple models: fixed-effects ordinary least square models, distributed lag models with fixed effects	VMT	Lane miles	County/ metro area Year	n/a	Population, population density, income per capita, fuel price	2 and 4 years

The dependent variable in most studies is vehicle-miles of travel (VMT), though one study uses VMT per capita (Noland and Cowart, 2002) and one uses vehicle-kilometers of travel (VKT) (Duranton and Turner, 2011). Similarly, capacity is measured as lane miles, lane miles per capita (Noland and Coward, 2000; Noland, 2001), or lane kilometers (Duranton and Turner, 2011). Most studies focus on state-owned or maintained highways (including federal highways as well as state highways), but the Duranton and Turner (2011) study includes only interstate highways, and Noland (2001) uses data for all roadway types. In all cases, the log or natural log of both VMT and lane miles are used in estimating the statistical model, so that the coefficient for lane miles is equivalent to the elasticity of VMT with respect to lane miles.

The studies employ similar econometric techniques in estimating statistical models, though with notable variations, as described in more detail below. All six studies pool data for multiple places and points in time and then estimate models with fixed effects for geography and/or for time. Including fixed effects in the model (in the form of a dummy variable for geography or time) compensates for the lack of information on all of the factors that might influence VMT. The models generally control for factors other than capacity expansion that may influence changes in VMT, such as population, income per capita, and fuel price.

However, the studies use different approaches to addressing simultaneity bias, the possibility that VMT growth causes capacity expansions at the same time that capacity expansions cause VMT growth. Most common is the use of two-state least squares regression with instrumental variables (Noland and Cowart 2000; Duranton and Turner 2011). This approach involves "instrumenting" the independent variable of interest (i.e. lane miles) with an estimator based on exogenous variables that do not directly affect the dependent variable (i.e. VMT) (Hansen and Huang, 1997). For example, Duranton and Turner (2011) use three instrumental variables: miles of routes of major expeditions of exploration between 1835 and 1850, major rail routes in 1898, and proposed routes of interstate highways in preliminary plans. The analysis used these three variables to predict lane kilometers in cities, then used this estimate in a second equation to predict the effect of road capacity on VMT. Finding appropriate instrumental variables for which data are available is challenging, however (Hansen and Huang, 1997; Duranton and Turner, 2011).

Several other methods to address simultaneity bias have also been used. Cervero and Hansen (2002) estimated simultaneous equation models (equivalent to a three-stage least squares model) to account for the bi-directional relationship between capacity expansion and VMT. They also used a Granger test of time precedence to further

confirm that capacity expansion precedes VMT growth, but VMT growth also precedes capacity expansion.

The question of short-term versus long-term effects is addressed in some studies through the inclusion of lagged effects in the models (e.g. Cervero and Hansen, 2002). "Lagged effects" refers to the lag between the timing of the capacity expansion and the timing of the observed effect. In the studies reviewed, the lags range from 1 year to 8 years, with lags of 1 to 2 years considered "short term" and lags of 4 years or more considered "long term." Cervero (2003) used a path model to demonstrate both short-term effects resulting from increases in travel speed and long-term effects resulting from impacts of capacity expansion on speed as well as development patterns. Distributed lag models were used in several studies to estimate long-term elasticities (Noland and Cowart, 2000; Noland, 2001; Hansen and Huang, 1997). In this approach, VMT per capita lagged by one year is included in the model as an independent variable; the coefficient for lagged VMT is then used to adjust the short-term elasticity (as represented by coefficient for unlagged VMT) to get a long-term elasticity. Hansen and Huang (1997) tested several different lag periods and found that a two-year lag was appropriate for counties, while a four-year lag was appropriate at the metropolitan level.

Notable aspects of specific studies (starting with the most recent study) are as follows:

Duranton and Turner (2011): This study uses data for metropolitan regions in the U.S. at three points in time. Similar to other studies, this study used two-stage least squares regression with instrumental variables, but the use of the three instrumental variables described above overcomes problems with those used by other researchers, according to the authors. Through a multitude of analyses, this study provides estimates of the effect of increasing capacity for one road type on other road types and examines the relationship between vehicle travel and public transit service. The analysis controls for population, physical geography, and census division indicators.

Cervero (2003): This study focuses on freeway expansion projects that occurred in small- to medium-size cities in suburban settings in California. The analysis uses a path model structured according to a proposed conceptual model that accounts for the mechanisms by which capacity expansion leads to increased VMT: increases in speed, and changes in development patterns. The estimated elasticity in the short term (0.10) is the product of the change in speed relative to the change in lane miles (0.42) and the change in VMT relative to the change in speed (0.24). The estimated elasticity in the long term (0.39) is the sum of the effect from lane miles to speed to VMT (0.25), the effect from lane miles to speed to development to VMT (0.07) and the effect from lane miles to development to VMT (0.07). The author argues that the estimated elasticities

are smaller than estimates in other studies because not all speed improvements are attributable to capacity expansion.

Cervero and Hansen (2002): This study used 22 years of observations for 34 urban counties in California. The analysis employed simultaneous equation modeling with both induced travel demand (VMT) and induced road investment (i.e. supply, measured as lane-miles) as endogenous variables in order to account for their reciprocal relationship. The analysis examined different lagged structures to account for the fact that effects are not instantaneous for either supply or demand. The analysis controlled for operating cost and gas prices, county population, population by race, population and employment density, personal income, average fuel efficiency, geography/weather, air quality, and political party affiliations. Fixed-effects for time were not included in the model, as the inclusion of population, which increased steadily over the study period in California, serves a similar role, according to the authors. The findings showed strong reciprocal relationships between road investment and travel demand, but the elasticity estimates were similar to those from previous single-equation studies.

Noland (2001): This study is unique in analyzing effects at the state level. As a measure of capacity, this study used lane-miles per capita rather than lane-miles, to account for the wide variation in population by state. In addition to a fixed-effects ordinary least squares model, the study employed distributed lag models, in which one-year lagged VMT per capita was included as an independent variable in the model. The study also disaggregated the analysis by road type, e.g. whether interstate, arterial, or collector, and whether urban or rural. The seemingly unrelated regression method was used to account for the interrelationships between VMT on various road types, including urban versus rural roadways. The study controlled for state population, per capita income, and cost per energy unit of gasoline.

Noland and Cowart (2000): This study analyzed VMT per capita as a function of lane miles per capita, the latter a proxy for traffic congestion and thus travel time. In calculating the elasticity (the ratio of the change in VMT per capita to the change in lane miles per capita) based on this model, the "per capita" element cancels out, leaving an elasticity equivalent to those of other studies. The elasticities reported in the brief are from the distributed lag model. The study also estimated two-stage least squares regression models with urbanized area and population density as instrumental variables, but the authors concluded that these instruments were less than ideal. The study controlled for population density, income per capita, and fuel cost.

Hansen and Huang (1997): This study focused on counties and on metropolitan areas in California but examined VMT on state highways only. The study estimated fixed-

effects models using ordinary least squares regression as well as the Prais and Winsten method. In addition, distributed lag models with fixed effects were estimated, and several different lag periods were tested. The study did not use two-stage regression with instrumental variables, as the researchers could not identify appropriate instruments for which data were available. The analysis controlled for population and personal income per capita.

A seventh study was considered for inclusion in the brief. Fulton, et al. (2000) used an approach similar to Noland and Cowart (2000) and Duranton and Turner (2011) in a study of the induced travel effect in counties in the mid-Atlantic region. However, this study used growth in lane miles over two or three years as the instrument for current (one-year) growth in lane-miles, arguing that "this variable is both highly correlated with the growth in lane miles and not correlated with the growth in VMT." Given the tenuousness of this assumption, this study was excluded from the brief. The effect size estimated in this study falls within the range of estimates from the other studies, however.

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The SCAG discussion about BRT (Bus Rapid Transit Technology) and LRV (Light Rail Vehicle Technology) is not accurate. Light rail technology was developed prior to pavement and rubber tires, only steel on steel was an existing option. Since the implementation of efficient paving methods, development of rubber tires, development of the internal combustion engine, and increases in vehicle ownership, LRV lost much of its benefit and became obsolete.

"True" BRT is a technology that replaces LRV at about one third the cost. It is faster, safer, more nimble, higher capacity, with less noise and vibration, and avoids the costly maintenance of rail and catenary systems. Please include along with my comment, the attached photos with examples of "true" BRT as a competitive replacement to LRV at about 1/3 the cost.

Please also include the following links to provide accurate information about BRT (Bus Rapid Transit) Technology - Social Environmental Economic Impacts, People Oriented Sustainable Urban Mobility, Best Practices.

WHAT IS BRT? - INSTITUTE FOR TRANSPORTATION & DEVELOPMENT POLICY
https://www.itdp.org/library/standards-and-guides/the-bus-rapid-transit-standard/what-is-brt/

NATURAL RESOURCES DEFENSE COUNCIL - SWITCHBOARD
http://switchboard.nrdc.org/blogs/kbenfield/how_bus_rapid_transit_is_clean.html

WORLD RESOURCES INSTITUTE - ROSS CENTER -
http://www.wricities.org/media/video/bus-rapid-transit-social-environmental-and-economic-impacts


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TRANSOESTE


BUS ONLY
ONLY

LRV COST BENEFIT ANALYSIS

Regarding the LRV systems that SCAG discusses in the RTP, I am concerned that these systems are incurring cost without a comparative benefit. The "benefit", as described in the attached FTA and FHWA documents is what attracts ridership (primarily discretionary) and additional associated economic development to transportation facilities. Without this "benefit", the LRV discussed in the SCAG document imposes investment and operational costs on the public without a mobility or economic advantage.

Specifically with the Expo Line LRV discussed in the attachments, the local agency, METRO, turned down a $2.5 billion %50 federal match and developed the project without a "benefit". The ridership of existing LRV lines without this "benefit", is equal to what prior bus service provided.

I suggest that future transportation improvement projects provide a verifiable calculated "benefit", as is the industry standard, in order to obtain and leverage significant federal matching funds and meet economic development goals.

As an additional note, "true" BRT (Bus Rapid Transit Technology) developed correctly, provides a higher mobility "benefit" than LRV (Light Rail Vehicle Technology) at one third the cost. It is my understanding that a benefit is a "calculated" improvement in travel time, cost, and convenience, as compared to alternatives.

Bus Rapid Transit Spurs Development Better Than Light Rail Or Streetcars: Study - Forbes

A Greater Cleveland RTA HealthLine BRT vehicle at Public Square in downtown Cleveland, Ohio (Photo credit: Wikipedia)

Bus rapid transit, in which buses in dedicated lanes perform like rail lines, can not only spur development, but can do so far more efficiently than light rail and streetcars, according to a study due out later this month from the Institute for Transportation and Development Policy.

“Both BRT and LRT can leverage many times more development investment than they cost. Now we can say that for sure,” according to the institute’s director for the U.S. and Africa, Annie Weinstock, who previewed the findings at a Metropolitan Planning Council Roundtable in Chicago last week.

“Per dollar of transit investment, and under similar conditions, BRT can leverage more (development) investment than LRT or streetcars.”

For example, Cleveland’s Healthline, a BRT project completed on Cleveland’s Euclid Avenue in 2008, has generated $5.8 billion in development —$114 for each transit dollar invested. Portland’s Blue Line, a light rail project completed in 1986, generated $3.74 per dollar invested.

BRT’s efficiency makes sense—bus rapid transit lines are generally cheaper to develop than rail lines

(though some transportation experts balk at the comparison)—but the difference has never before been documented, Weinstock said.

“The first conclusion we’re able to draw here is that actually BRT is able to leverage development. This is the first time we have an analysis to say that definitively,” she said.

“And it can leverage a lot of development. Three of the corridors (studied) leveraged more than a billion dollars in development.”

BRT buses run in dedicated lanes, and stop at stations where riders pay before boarding the bus. Buses running on BRT lines may also receive traffic signal priority to speed them along. Though many projects in the United States have been described as BRT, many have only one or two features of BRT, and really are only enhanced bus lines, Weinstock said.

The U.S. has seven authentic BRT lines in Cleveland, Las Vegas, Los Angeles, Eugene Ore., and several in Pittsburgh. None achieve the internationally recognized “gold standard” of BRT like Bogota’s TransMilenio line. But one planned for Chicago’s Ashland Avenue might.

“There’s no gold standard BRT in the U.S. yet,” Weinstock said, “but if we continue with the Ashland project on the current trajectory, Ashland could be the first gold in the U.S.”

Jeff Schreiber from the Chicago Department of Transportation asked Schreiber what share of the development documented in the report can be said to have occurred because of BRT or LRT.

“I don’t think we are attributing the development 100 percent to the transit investment,” she said. “It’s part of the package of all of the importance given to the corridor. It’s possible that in a really strong corridor with a lot of goverment support and no transit you might get a lot of development. Probably if you add in transit you would do even better. But importantly in those situations you still need transit in order to create that kind of dense urban environment.”

The institute’s report is scheduled to be available Sept. 27 here.

More Development for Your Transit Dollar: An Analysis of 21 North American Transit Corridors - Institute for Transportation and Development Policy

November 13, 2013

Increasingly, cities in the US, finding themselves short of funds, are wondering whether BRT, a lower cost mass transit solution initially developed in Latin America and a relatively new form of mass transit in the US, could also be used here to leverage transit-oriented development investments. This report provides an answer.
In the wake of the 2008 economic downturn, Cleveland, Ohio, along with other former industrial US cites, faced severe financial difficulties. While a tough regional economy and shrinking population forced many of the surrounding cities to cut public services and reduce jobs in the public and private sectors, Cleveland managed to transform a modest $50 million investment in bus rapid transit into $5.8 billion in new transit- oriented development. By putting bus rapid transit (BRT) along a strategic corridor and concentrating government redevelopment efforts there, Cleveland managed to leverage $114.54 dollars of new transit-oriented investment for every dollar it invested into the BRT system, adding jobs and revitalizing the city center.

Pittsburgh's Martin Luther King, Jr. East Busway BRT is quickly becoming a second success. While it has so far leveraged less overall investment than some of the other transit corridors we studied, the development is new and is happening rapidly. This BRT has been operational since 1983 and yet only in the last few years has development really taken off. It is a testament to the need for a strong planning effort but shows that this effort does not have to be initiated by the city. Most of the development that has occurred in the East Liberty neighborhood, adjacent to East Liberty BRT Station, has been the result of a concerted effort by East Liberty Development, Inc. (ELDI) and the local philanthropic community.

Cities in the US still have a way to go in transforming existing auto-oriented suburbs or blighted inner urban areas into vibrant, high quality transit-oriented communities. This report provides start-to-finish guidance on what it takes to make Transit-oriented Development happen.

If you are a member of the press and would like more information or to schedule an interview with an author, contact us at DKlotz@burnesscommunications.com

Un mayor desarrollo gracias a cada dólar invertido en transporte público

Cada vez más, las ciudades en los Estados Unidos que se encuentren cortas de fondos, se preguntan si un BRT, una solución de transporte masivo de bajo costo desarrollada inicialmente en América Latina y una forma relativamente nueva de transporte masivo en los Estados Unidos, también se podría utilizar para apalancar inversiones dirigidas al Desarrollo Orientado al Transporte. Este informe proporciona una respuesta.

A raíz de la crisis económica de 2008, Cleveland, Ohio, junto con otras ciudades ex industriales de Estados Unidos enfrentaron graves dificultades financieras. Mientras que una economía regional difícil y una disminución de la población obligaron muchas de las ciudades de los alrededores a recortar los servicios públicos y a reducir los puestos de trabajo en los sectores público y privado, Cleveland logró transformar una modesta inversión de $50 millones de dólares en BRT en $5,8 mil millones de dólares en un nuevo Desarrollo Orientado al Transporte. Al poner Buses de Tránsito Rápido (BRT) a lo largo de un corredor estratégico y concentrando los esfuerzos de reconstrucción del gobierno allí, Cleveland logró apalancar $114.54 dólares de nueva inversión orientada al transporte por cada dólar que invertido en el sistema BRT, añadiendo empleos y revitalizar el centro de la ciudad.

El corredor Este de BRT, Martin Luther King, Jr. De Pittsburgh se está convirtiendo rápidamente en un segundo éxito. Si bien se ha aprovechado hasta ahora la inversión menos en general que algunos de los otros corredores de tránsito que estudiamos, el desarrollo es nuevo y está pasando rápidamente. Este BRT ha estado en funcionamiento desde 1983 y, sin embargo, sólo en los últimos años ha despegado el desarrollo. Es un testimonio de la necesidad de un fuerte esfuerzo de planificación sino que muestra que este esfuerzo no tiene que ser iniciado por la ciudad. La mayor parte del desarrollo que ha ocurrido en el barrio de East Liberty, junto a la estación de BRT East Liberty, ha sido el resultado de un esfuerzo concertado de East Liberty Desarrollo, Inc. (ELDI) y la comunidad filantrópica local.

Las ciudades en los Estados Unidos todavía tienen mucho camino por recorrer en la transformación de los suburbios orientados al automóvil existentes o en áreas urbanas interiores deterioradas en comunidades orientadas al transporte público, vibrantes y de alta calidad. Este informe proporciona una guía de inicio a fin, en lo que se necesita para hacer que suceda Desarrollo Orientado al Transporte.

U.S. Department of Transportation
Federal Transit Administration

Administrator

400 Seventh St., S.W.
Washington, D.C. 20590

FEB - 2 2007

Mr. Harry Berezin
Office of Senator Dianne Feinstein
One Post Street, Suite 2450
San Francisco, CA 94104

Re: Questions from Mr. Mark Jolles pertaining to the Los Angeles Exposition Light Rail Line

Dear Mr. Berezin:

This letter is in response to Senator Dianne Feinstein's letter to Mr. Wes Irvin, Associate Administrator, for Office of Communications and Congressional Affairs for the Federal Transit Administration (FTA), seeking to respond to questions from Mark Jolles regarding the Los Angeles County Metropolitan Transportation Authority (LACMTA) Exposition Corridor Light Rail Line. FTA representatives have had numerous meetings and phone conversations with Mr. Jolles prior to this correspondence. Based upon his January 10, 2007, letter to your office, he feels that FTA has not previously provided sufficient responses to his questions. Below are specific responses to his questions:

1) We would like specific information that was provided by FTA to the LACMTA regarding project modeling and failure to meet the New Starts project justification criteria.

FTA Response: In the Fall of 2004, FTA notified LACMTA that it appeared the majority of the project's forecasted travel time savings resulted from: 1) increases in bus speeds and timed transfers from feeder buses, and 2) the use of an asserted travel time benefit (modal constant) for high-income transit riders that did not benefit other transit riders. As a result of these assumptions, FTA believed that a large proportion of the project's benefits did not reflect the benefits of the proposed project, but resulted from the impacts of an improved feeder bus network for the light rail system. FTA requested that LACMTA correct these issues so that the travel forecasts would better reflect the benefits of the proposed light rail extension, and not the impact of feeder bus service and modal constant that benefits high-income transit riders.

At that time, LACMTA believed it would be too time consuming to recalibrate the regional model and re-code the bus feeder network. LACMTA decided to pursue the project without Section 5309 New Starts funding for the project, to expedite project implementation. FTA has not received revised forecasts for the Exposition Corridor project. Because LACMTA is not seeking Section 5309 New Starts funds for construction, the calculation of transportation system user benefits is not required because a rating for project justification is not required.

YAHOO! MAIL

Print - Close Window

Subject: RE: Exposition Light Rail Line - forecast modeling

Date: Tue, 23 Jan 2007 13:47:36 -0500

From: Dwayne.Weeks@dot.gov

To: [redacted]

CC: Raymond.Tellis@dot.gov

Mark,

In fall of 2004, FTA notified the LACMTA that it appeared that the majority of the projects forecasted travel time savings resulted from: 1) increases in bus speeds and timed transfers from feeder buses for the build alternative compared to the baseline alternative, and 2) the use of an asserted travel time benefit (modal constant) for high-income transit riders that did not benefit other transit riders. As a result of these assumptions, FTA felt that a large proportion of the projects benefits did not reflect the benefits of the proposed LRT project, but resulted from the impacts of differences in the feeder bus network for the LRT project. During a conference call, FTA requested that the LACMTA correct these issues so that the travel forecasts better reflect the benefits of the proposed light extension, and not the impact of improved feeder bus service and modal constant that benefits high-income transit riders. FTA communicates is findings of technical reviews of travel forecasts via meetings and conference calls, and does not send written correspondence for routine technical matters.

At that time, the LACMTA felt it would be time consuming to recalibrate the regional model and re-code the bus feeder network. The LACMTA decided to pursue the project without Section 5309 New Starts funding for the project, to expedite project implementation. FTA has not received revised forecasts for the Exposition Corridor project. Because the LACMTA is not seeking Section 5309 New Starts funds for construction, the calculation of transportation system user benefits is not required because a rating for project justification is not required.

Finally, FTA has identified similar issues with travel demand models used by numerous projects throughout the U.S., and the LACMTA did not employ measures that are unusual in the development of regional travel forecasts. However, for those projects seeking New Starts funds, FTA requires the forecasts to representative of only the benefits of the project.

Dwayne Weeks, AICP
ph. 202-493-0316
dwayne.weeks@fta.dot.gov

-----Original Message-----
From: Mark Jolles [mailto:artmarket2c@yahoo.com]
Sent: Monday, January 22, 2007 6:12 PM
To: Weeks, Dwayne <FTA>
Subject: Exposition Light Rail Line - forecast modeling

Dwayne Weeks

CONSTRAINED / UNCONSTRAINED FORECASTS

I think that the SCAG RTP uses constrained forecasts that are obscuring a significant amount of forecasted regional travel demand. This seems to be most apparent as a capacity shortage in the region's core. The result I think is congestion being pushed outward toward suburban communities and economic development going elsewhere.

While it may be a bit embarrassing, I strongly urge the SCAG staff to provide local decisionmakers both constrained and unconstrained forecasts in the RTP. In the planning performed by other MPO's the two forecasts are often compared. This makes it possible for decisionmakers to measure the effectiveness of varying constrained plans to meet long range need. Moreover, this approach provides local governments the ability to strategically capture more economic growth and the resultant tax base benefits region wide can be significant.

FINANCIAL CONSTRAINTS -
CARPOOL LANE COST/BENEFIT ANALYSIS

The continued regional investment in additional carpool lane capacity is of concern. Firstly, this program diverts huge resources from competitive alternatives. Second, it is adding to the number of single vehicle (SOV) trips being taken.

When carpoolers shift to additional lanes, this increases the capacity for single occupancy vehicles (SOV) in the main lanes. These lanes quickly fill. When the system overall exceeds capacity, as in the SCAG region, these additional single occupancy vehicles overload connecting roads. Congestion is simply moved and increases system wide. It appears to be relieved in one area only to migrate to adjoining streets. Relieving one bottleneck simply moves it down the road to the next bottleneck. A thorough "system" analysis of road capacity changes reveals this.

A more effective objective is to improve mobility on the highway system without adding traffic or congestion elsewhere. I suggest using existing lanes for carpool lanes rather than adding new lanes and redirecting the saved resources to develop competitive transit alternatives. Also, I suggest referring local agencies to the Victoria Transport Policy Institute, http://www.vtpi.org/ for resources to facilitate modeshift from SOV to other alternatives.

The average pedestrian on transit utilizes three square meters of public space. The average SOV vehicle occupies 115 square meters of public space. This is forty times more space for the same trip. Imposing this extra infrastructure cost on the taxbase and local business makes the region uncompetitive against other regions where the percentage of SOV trips is much less.

The best example of resources ill spent on carpool lanes may be the $4.2 billion I-405 widening from I-105 to Highway 101. The multi-project 12 year traffic delay from the construction was several times the benefit calculated. The delay is greater now than before the project and traffic is increased on connecting surface streets. Overall mobility in the corridor has declined. The $4.2 billion would have been better spent making higher capacity improvements. An extensive "true" BRT (Bus Rapid Transit) system is one example.

2016 RTP/SCS

From: Robert Newman <[redacted]>
Sent: Monday, February 1, 2016 4:13 PM
To: 2016 RTP/SCS
Subject: Draft comments

PUBLIC HEALTH: With the proposed crowding into the cities, contagious diseased are rapidly transmitted. Urban crowding leads to interpersonal conflict in our culture.

NATURAL/FARM LAND: Do not get in the way of farming and ranching in California. We need food that is domestically produced, thus preserving the sovereignty of America.

I submit: Robert C. Newman, II, Ph.D.

2016 PEIR

From: I. Sandler <[redacted]>
Sent: Sunday, January 31, 2016 10:49 PM
To: 2016 PEIR
Subject: 2016 SCAG PEIR Comments

Attn: Lijin Sun RE: (2016 Draft PEIR)
Southern California Association of Governments
818 W. 7th Street, 12th Floor
Los Angeles, Ca. 90017

Attn: Courtney Aguirre (RE: 2016 Draft RTP/SCS)
Southern California Association of Governments
818 W. 7th St, Floor12
Los Angeles, Ca. 90017

January 31, 2016

RE: Draft 2016 RTP/SCS PEIR and Draft 2016/SCS
Comments in Opposition to the RTP ID LA 996425 (Sepulveda Reversible Lane)
PEIR Appendix B, Table 1, page 18
RTP/SCS Project Appendix List Table 2, Page 124

I have lived in the community of Bel Air Crest for over 13 years. I served on the Sepulveda Reversible Lane Community Advisory Committee from 2003-2005. I am familiar with the original plans, the revisions, and the completed portions of the project. I drive on Sepulveda almost daily, as it the means of ingress and egress for the Bel AIr Crest Community.

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The Sepulveda Reversible Lane and Improvement Project came into existence in 1998 as an Los Angeles Dept. of Transportation project. For many years It has been a component of the SCAG RTIP's and SCAG RTP's. LA 996425 can be found in both the SCAG 2016 PEIR and the 2016 SCAG RTP/SCS documents. Funding has been set aside for this Project for about 18 years. The project scope has been modified over time, and it is now substantially complete. However, It is still part of both the Draft 2016 PEIR Impact Report and the Draft 2016 RTP/SCS Plans .The one component that is not completed is the unnecessary Sepulveda Reversible Lane in the Mulholland Tunnel on Sepulveda Blvd in CD 5 and 11, and Metro District 7.

The I-405 Sepulveda Pass Improvement Project, (funded by Federal, State, County, and City governments), added new Skirball ramps to the I-405 and an additional northbound lane on Sepulveda Blvd itself, leading from the new I-405 Skirball northbound exit ramp northward to the Skirball Bridge. Northbound Sepulveda traffic flows well. Northbound traffic going toward/through the Mulholland Tunnel does not present a traffic problem. The Reversible Lane Project in the Mulholland Tunnel is not needed.

Irene Sandler
Bel Air Crest Resident

Los Angeles, Ca. 90077.

2016 PEIR

From: Gary Tarkington <[redacted]>
Sent: Monday, February 01, 2016 12:52 PM
To: 2016 PEIR
Subject: PEIR

To whom this concerns,
NO MORE HIGH DENSITY!!! I live in Huntington Beach, CA. and it is NOW A NIGHTMARE!!! No one really does substantial planning for anything!!! I only found the info for this this afternoon. I only have a few hours to respond!! The majority of people have had it with HD!! It has to STOP NOW!!
Ann Tarkington
Huntington Beach, CA.

Hon. Mark Ridley-Thomas, Chair
Board of Directors
Los Angeles County Metropolitan Transportation Authority
1 Gateway Plaza
Los Angeles, CA 90012

January 22, 2016

Is Metro going to do the right thing for the people of Los Angeles as they consider the 710 north tunnel?

The preponderance of evidence from scientific sources addresses great concern about the significant negative impact of the 710 tunnel on our air quality and human health. I highlight health concerns as you continue to deliberate on the future of the tunnel proposal. More detailed health comments and scientific literature can be seen in my DEIR comments.

I wanted to bring to your attention two recent articles authored by leading researchers in the field of environmental health. The first is by Dr. Scott Fruin from the University of Southern California entitled "LA Metro/CalTran's 710 tunnel plan will take your breath away. Literally." (http://www.wpra.net/files/public/WPRA%20News%20PDFs/WPRA2016winNL.pdf).[1] According to the article, the tunnel will result in concentrated pollution for many nearby residents, visitors, and sensitive receptors. The author points out valid critiques of the model used in the EIR and points to the omission of critical traffic related pollutants in the studies done by the transportation agency.

According to Civil Engineer Gregory M. Rowangould's analyses, models, and maps, one can see very clearly near roadway pollution gradients based on specific transportation pollution sources.[2] These findings, based on detailed data, are very relevant to an examination of health impacts. Metro/Caltrans maps seem to show overall regional pollution at a much lower resolution and lower specificity and predictive models on air quality seem to rely heavily on general pollution reduction measures which is a deficit in their model. For transparency and for adequate consideration of health effects, a comparison of the data and reconciliation should be performed by independent scientists.

The second article by Dr. Andrea Hricko, faculty from the Environmental Health Department in Preventive Medicine from the University of Southern California, reports on her team's National Institute of Environmental Health Sciences research showing the important negative impact of diesel pollution on health.

"Two decades of NIEHS-funded research (http://www.ncbi.nlm.nih.gov/pubmed/8179653)[3] have clearly linked serious health risks with exposure to elevated levels of fine particulate matter and other components of diesel exhaust, especially for those who live close to highways and roads (http://www.ncbi.nlm.nih.gov/pubmed/17307103"[4]

Importantly, children's lungs improved as pollution dropped. We must think of the health of our children, all our region's children, as we consider this massive infrastructure proposal.
Metro/Caltrans needs to be transparent about how port traffic would use this 710 north tunnel route. Otherwise their impact assessments are wrong and misleading.

As citizens, we are apalled when we see large corporations and government agencies flagrantly disregarding the legally binding agreements, such as the clean port mitigation standards and looking to overturn them. ("Port of Los Angeles has failed to meet pollution-cutting measures" *Los Angeles Times.*)[5] Trust in government and transportation agencies evaporates with this kind of illegal maneuvering.

Increasing scientific evidence is being published about increased mortality with noise at certain decibel levels and the physiologic impacts of noise on sleep, stress hormones and blood pressure. (The risks of noisy roads LA Times Jan 9, 2016)[6]

PLEASE RESTORE FAITH IN THE REGION'S TRANSPORTATION DECISION MAKING BODIES BY REMOVING THE 710-NORTH TUNNEL FROM ALL PROJECT LISTS FOREVER. BUILD US A STRONG MULTIMODAL TRANSIT PLAN THAT WILL BE USED BY ALL TO IMPROVE THE ECONOMIC STRENGTH OF THE REGION, AND TRULY IMPROVE OUR AIR QUALITY AND PROTECT OUR HEALTH.

PLEASE ENTER THESE COMMENTS IN THE ADMINISTRATIVE RECORD.
PLEASE CONFIRM RECEIPT cbteutsch@comcast.net

Carol Teutsch, M.D.
[redacted]

Jan SooHoo PhD
[redacted]

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1. Fruin, Dr. Scott "LA Metro/CalTran's 710 tunnel plan will take your breath away. Literally." West Pasadena Residents Association, The News. Winter 2016. Pages 1 and 13(retrieved January 9th 2016) (http://www.wpra.net/files/public/WPRA%20News%20PDFs/WPRA2016winNL.pdf)

2 Rowangould, Gregory M. "A new approach for evaluating regional exposure to particulate matter emissions from motor vehicles" Transportation Research Part D: Transport and Environment. Volume 34, January 2015, Pages 307–317. 17 December 2014 (retrieved May 6, 2015) <http://www.sciencedirect.com/science/ article/pii/S1361920914001837>

3. Dockery DW et al."An association between air pollution and mortality in six U.S. cities." N Engl J Med. 1993 Dec 9;329(24):1753-9. (retrieved January 19, 2016) <http://www.nejm.org/doi/full/10.1056/NEJM199312093292401>

4. Gauderman, WJ., et al. "Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study," The Lancet, Volume 368, February 2007. (retrieved March 15, 2011) <http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(07)60037-3/abstract>

5. Barboza, Tony. "Port of Los Angeles has failed to meet pollution-cutting measures" Los Angeles Times. October 14, 2015 (retrieved January 19, 2016) <http://touch.latimes.com/#section/-1/article/p2p-85520723/>

6. Mulcahy , Lisa. "You can't ignore all that road noise: It could shorten your life" LA Times. Jan 9, 2016 (retrieved January 19, 2016) <http://touch.latimes.com/#section/-1/article/p2p-85520723/>

West Pasadena Residents' Association

THE NEWS

Pasadena, California

Celebrating 53 years of community service

Winter 2016

LAND USE / PLANNING | EDUCATION | OPEN SPACE / CONSERVATION | NEIGHBORHOOD SAFETY | GOVERNMENT | PARKS / RECREATION

LA Metro/Caltran's 710 tunnel plan will take your breath away. Literally.

By Dr. Scott Fruin
Assistant Professor,
Environmental Health Division
USC Department of Preventive Medicine

As a University of Southern California professor and air quality researcher engaged in the landmark Children's Health Studies on Los Angeles air pollution, my colleagues and I are frequently called upon to evaluate and testify about the health effects of LA traffic emissions.

I've also been closely studying LA Metro's and Caltrans' proposal to connect — by a nearly five mile tunnel — the 710 between El Sereno and Pasadena. As many have already indicated, the proposed tunnel raises troubling safety, economic and engineering concerns. No less troubling, however, is that air quality analysis clearly finds as unacceptable the health risks from the traffic-related air pollution exposure alone.

Air quality in Los Angeles and the surrounding counties remains the worst in the nation, and traffic-related pollution continues to be the largest contributor. It's a sad fact that many thousands of LA residents live, work or go to school too close to traffic and, consequently, have unacceptably high exposure. However, even when too close to traffic, normal dilution in the open air is relatively rapid.

Contrast this with emissions from the proposed tunnel. Tunnel emissions will not be rapidly diluted. Rather, they will be collected from nearly five miles of heavy traffic and released from two or more towers in Old Pasadena. The result? Two or more new air pollution hotspots — likely to be among LA's worst.

Homes, schools and even a hospital are within coughing distance of these new hotspots. Our analysis indicates that this exposure will result in up to 15 times the limits set for new sources by the South Coast Air Quality Monitoring District (SCAQMD) — and result in new or worsening cases of asthma. It will also accelerate progression of inflammatory-related cardiovascular and metabolic diseases — health effects already shown among LA residents who live too close to traffic.

Nearby residents, however, are not the only ones who will suffer. Based on stated tunnel ventilation rates, a one-way trip through the tunnel will likely double or triple daily pollution exposure for tunnel motorists. A recent study of a similarly long tunnel, which bypasses central Stockholm, concluded that the health benefits to urban Stockholm residents were offset by the adverse health impacts to tunnel users. With the proposed 710 tunnel, however, vehicle emissions would not bypass the urban area. Rather, they'd be concentrated and released in Old Pasadena.

Continued on page 13

LA Metro/Caltran's 710 tunnel plan

Continued from page 1

As volunteers from the West Pasadena Residents' Association and others, including SCAQMD and the federal Environmental Protection Agency, have detailed in their responses to the Metro/Caltrans draft environmental impact report/statement (EIR/EIS), the report has many shortcomings and, in summary, is woefully inadequate. For example, the EIR/EIS:

- Deceptively attributes to the tunnel major air quality improvements, when, in fact, it merely combines tunnel emission impact with the possibility that federal vehicle emission standards will be tightened in the future;
- Omits important traffic-related pollutants such as ultrafine particles, black carbon and polycyclic aromatic hydrocarbons (PAHs);
- Excludes health outcomes besides cancer (as listed above) and, worse, is based on outdated cancer methodologies;
- Models tunnel and tower emissions without including critical receptor locations, unfiltered releases at bore openings, critical details about tower air filtering, and the worst-case conditions during windless periods.

These issues, along with dozens of others documented elsewhere, represent obvious violations of the California Environmental Quality Act requirements and show a lack of good faith and transparency.

All of us who breathe deserve better.

Transportation Research Part D: Transport and Environment

Volume 34, January 2015, Pages 307–317

A new approach for evaluating regional exposure to particulate matter emissions from motor vehicles

Gregory M. Rowangould ,

University of New Mexico, Civil Engineering Department, MSC01 1070, 1 University of New Mexico, Albuquerque, NM 87131, United States

Available online 17 December 2014

doi:10.1016/j.trd.2014.11.020

Highlights

- Fast, high resolution modeling of regional vehicle emission exposure with AERMOD.
- Approach applies AERMOD to regional travel demand model output in Los Angeles.
- Strong diurnal, seasonal and spatial concentration patterns are found.
- Concentration versus traffic volume and distance curves are estimated.
- Exposure is highest for lower income and minority populations in Los Angeles.

Abstract

Exposure to fine particulate matter from vehicle exhaust is associated with increased health risk. This study develops a new approach for creating spatially detailed regional maps of fine particulate matter concentration from vehicle exhaust using a dispersion model to better evaluate these risks. The spatial extent, diurnal, and seasonal patterns of concentration fields across Los Angeles County, California are evaluated and population exposure and exposure equity by race and income are investigated. The results demonstrate how this modeling approach can create new knowledge about vehicle emissions exposure. This approach also provides a method for proactively screening out regional plans, or specific projects within these plans, that are likely to cause air quality concerns. A proactive and regional air quality assessment can identify potential problems earlier in the planning process and a wider range of solutions, saving time, money and protecting public health. The detailed concentration maps can also be used

to improve the siting of regulatory air quality monitors and provide more accurate exposure data for epidemiology studies.

Graphical abstract

Keywords

Dispersion modeling; AERMOD; Particulate matter; Transportation planning; Environmental justice; Mobile source emissions

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A new approach for evaluating regional exposure to particulate matter emissions from motor vehicles

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ARTICLE INFO

Keywords:
Dispersion modeling
AERMOD
Particulate matter
Transportation planning
Environmental justice
Mobile source emissions

ABSTRACT

Exposure to fine particulate matter from vehicle exhaust is associated with increased health risk. This study develops a new approach for creating spatially detailed regional maps of fine particulate matter concentration from vehicle exhaust using a dispersion model to better evaluate these risks. The spatial extent, diurnal, and seasonal patterns of concentration fields across Los Angeles County, California are evaluated and population exposure and exposure equity by race and income are investigated. The results demonstrate how this modeling approach can create new knowledge about vehicle emissions exposure. This approach also provides a method for proactively screening out regional plans, or specific projects within these plans, that are likely to cause air quality concerns. A proactive and regional air quality assessment can identify potential problems earlier in the planning process and a wider range of solutions, saving time, money and protecting public health. The detailed concentration maps can also be used to improve the siting of regulatory air quality monitors and provide more accurate exposure data for epidemiology studies.

Introduction

Exposure to directly emitted particulate matter (PM) from vehicle exhaust is associated with a wide range of adverse health outcomes including heart disease, respiratory illness, and cancer (Allen et al., 2009; Brugge et al., 2007; Garshick et al., 2004; Health Effects Institute, 2010; Suglia et al., 2008). Studies using roadway proximity or traffic density exposure surrogates find similar negative health outcomes (Gan et al., 2010; Gauderman et al., 2007; McConnell et al., 2006; Peters et al., 2004; Wilhelm and Ritz, 2003). Vehicle traffic contributes to PM pollution in several ways. There are directly emitted particles from vehicle exhaust (combustion), tire wear, brake wear, and re-suspended roadway dust and secondary particle formation involving volatile organic compounds, nitrous oxides and sulfur dioxide emissions from vehicles and other sources. The concentration of directly emitted (or primary) particle pollution is elevated along roadways, resulting in a heterogeneous concentration surface across urban areas (Karner et al., 2010; Matte et al., 2013; Zhou and Levy, 2007). In contrast, secondary particles form over time after primary air pollutants have become more well mixed into the regional atmosphere and have reacted with other chemical species and sunlight, creating a more homogenous concentration surface (Finlayson-Pitts, 1997; Seinfeld, 1989).

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This research focuses on developing a refined method for evaluating the more complex spatial and temporal patterns of primary particulate matter from vehicle exhaust with the aim of evaluating exposure more accurately. The focus is on fine particulate matter (PM2.5) since smaller particles are thought to pose greater health risks (EPA, 2009). While the present study focuses on PM, the methods developed here could also be applied to any relatively non-reactive primary air pollutant found in vehicle exhaust.

Policy and regulatory context

The ability to accurately model concentrations of vehicle emissions across large urban areas is an important step for developing more sustainable regional transportation plans that increase mobility and accessibility while minimizing exposure to dangerous air pollutants. The U.S. Environmental Protection Agency (US EPA) regulates PM2.5 under the Clean Air Act which establishes health protective National Ambient Air Quality Standards (NAAQS) defining the maximum allowable concentration of PM2.5 in the outside air. Transportation planning agencies in regions where PM2.5 concentrations regularly exceed the NAAQS (nonattainment areas) must ensure that transportation plans and projects will not cause additional violations of the NAAQS or prolong the timeframe established to meet the NAAQS. In these regions two types of modeling are regularly used to determine continued compliance: regional emission inventories and "hotspot" analysis. However, these methods used alone are not well suited to ensure that all areas, or even most, are (or will) be in compliance with the PM2.5 NAAQS.

Regional emission inventories are used to determine the likelihood of a region's long range transportation plan causing additional or prolonged NAAQS violations. An emission inventory that adds up the total estimated quantity of PM2.5 emitted within a region is compared to a regional emission budget approved by the US EPA. If the inventory falls within the budget then the plan is generally considered to be "conforming", meaning that it fits with the region's overall air quality improvement plan. This framework works well for regional air pollutants such as ozone, carbon dioxide, and secondary PM2.5; however, it is unable to identify localized NAAQS exceedances, where those exceedances may occur, and what strategies could minimize them.

Given the limitation of emission inventories, the US EPA also requires PM2.5 "hotspot" analyses for transportation projects in nonattainment areas that have the potential to increase PM2.5 emission rates (US EPA, 2010). The hotspot analysis generates a spatially detailed map of PM2.5 concentrations around a proposed transportation project and its alternatives using an air pollutant dispersion model. The hotspot analysis adds the incremental PM2.5 concentrations from the project to estimates of the existing background PM2.5 concentration in the area measured at nearby air quality monitors. The combined PM2.5 concentrations are then used to identify potential NAAQS exceedances.

The hotspot analysis occurs after a transportation project has been proposed for construction and during the preparation of required environmental review documents (e.g., environmental impact statement). During the environmental review several alternatives are compared including a no-build alternative and several others which typically represent alternative roadway alignments or various levels of additional roadway capacity. If the hotspot analysis indicates that the build alternatives will cause NAAQS exceedances the project may be abandoned or various mitigation strategies may be implemented.

While the current hotspot analysis framework provides a good check on air quality concerns before construction of a roadway begins, there are several weaknesses that limit its effectiveness at protecting public health. The current hotspot analysis framework is only required for transportation improvement projects, and therefore does not consider that there may be regions along existing roadways exceeding the NAAQS. Similarly, the current framework does not consider how changes in traffic volume along individual roadways due to population or employment growth and spillover effects from other regional transportation projects may cause localized NAAQS exceedances. Furthermore, because the hotspot analysis takes place during a project's implementation phase, the range of alternatives available for reducing the concentration of PM2.5 are constrained. For example, during the typical environmental review for a highway expansion project aimed at reducing congestion, the alternatives are typically no-build and various levels of additional capacity. However, at the regional planning phase, a much larger set of alternatives are available for consideration, such as expanding regional transit service, encouraging land use decisions that reduce travel demand, adopting more stringent emission control standards, and adopting financial incentives to reduce travel demand such as a vehicle miles traveled tax, pay as you go insurance, congestion charging, or higher fuel taxes.

Existing methods

Dispersion modeling can be combined with regional travel demand and vehicle emission models to provide a high spatial resolution concentration map of PM2.5 exhaust emissions across large urban areas; however, there are significant computational limitations which limit the feasibility of this approach in practice. In dispersion modeling, each road segment is modeled as a separate emission source. A large urban transportation network will contain tens to hundreds of thousands of these emission sources. Emissions from each source are traced to user-specified point receptor locations. The dispersion of emissions from each source to each receptor is modeled independently. Therefore, modeling time increases linearly with the addition of each source–receptor pair. The number of source–receptor pairs in a large urban area can quickly exceed feasible computation times (potentially a year or more).

Prior dispersion modeling studies have overcome computational constraints by limiting the number of receptors by placing them at the centroid of travel analysis zones (TAZs) which are usually similar to census tracks (Hatzopoulou