

California Climate Change Policies

Donald Shoup

Some background for thinking about American transportation policies

American motor vehicles consume one-eighth of the world's total oil production.

We import 60% of this oil.

We pay for these imports with borrowed money.

U.S. has 18 percent more vehicles than licensed drivers.

American drivers park free at the end of 99% of their vehicle trips.

Anything that is unsustainable will eventually stop.

Global Warming Solutions Act of 2006

Reduce statewide GHG emissions to 1990 levels by 2020

Ensure reductions are “real, permanent, quantifiable, verifiable, and enforceable”

Climate Action Registry

Transportation accounts for 40 percent of California's GHG emissions

California's GHG emissions per capita about the same as in Germany or the Netherlands.



Three main transportation strategies

Increase vehicles' fuel efficiency: the national standard has been set at 15 km per liter in 2016

Reduce carbon content of fuels: the carbon content of fuels will be reduced by 10 percent by 2020

Reduce vehicle travel



Eliminate 700,000 metric tons of greenhouse gas emissions a year;
Reduce the state's fuel consumption by 75 million gallons a year;
Extend the average tire's useful life by 4,700 miles;
Save the average Californian \$12 a year.

Pay-as-you-drive insurance

- Pay-as-you-drive (PAYD) insurance converts some of the fixed cost of owning a car to a variable cost of driving it.
- Also called distance-based, per-mile, or cents-per-mile insurance.
- Premiums are directly related to annual mileage driven or the total time spent driving

Congestion Pricing

High Occupancy/Toll (HOT) Lanes
Dynamic pricing in San Diego
Finely-tuned schedule of congestion tolls in Orange County

[View Toll Policy](#) [View Holiday Toll Schedules](#)

91 Express Lanes Toll Schedule

Effective October 1, 2008
SB Highway 520

	Sun	Mon	Tue	Wed	Thurs	Fri	Sat
Midnight	1.15	1.15	1.15	1.15	1.15	1.15	1.15
1:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
2:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
3:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
4:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
5:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
6:00 am	1.15	1.85	1.85	1.85	1.85	1.85	1.15
7:00 am	1.15	1.85	1.85	1.85	1.85	1.85	1.15
8:00 am	1.50	1.85	1.85	1.85	1.85	1.85	1.15
9:00 am	1.50	1.85	1.85	1.85	1.85	1.85	1.15
10:00 am	2.50	1.85	1.85	1.85	1.85	1.85	2.50
11:00 am	2.50	1.85	1.85	1.85	1.85	1.85	2.50
Noon	2.70	1.85	1.85	1.85	1.85	2.80	2.70
1:00 pm	2.70	2.50	2.50	2.50	2.80	4.95	2.70
2:00 pm	2.70	3.70	3.70	3.70	3.80	4.35	2.70
3:00 pm	2.50	3.95	3.95	4.00	4.20	4.50	2.50
4:00 pm	2.50	3.65	3.65	3.75	3.50	3.50	2.70
5:00 pm	2.50	3.55	3.75	3.50	3.50	3.50	2.70
6:00 pm	2.50	3.55	4.70	4.20	5.00	4.75	2.50
7:00 pm	2.50	2.50	2.50	2.50	4.00	4.40	1.85
8:00 pm	2.50	1.85	1.85	1.85	2.55	4.00	1.85
9:00 pm	1.85	1.85	1.85	1.85	1.85	2.55	1.85
10:00 pm	1.15	1.15	1.15	1.15	1.15	1.85	1.15
11:00 pm	1.15	1.15	1.15	1.15	1.15	1.15	1.15

91 Express Lanes Toll Schedule

Effective October 1, 2008
Northbound Highway 520

	Sun	Mon	Tue	Wed	Thurs	Fri	Sat
Midnight	1.15	1.15	1.15	1.15	1.15	1.15	1.15
1:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
2:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
3:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
4:00 am	1.15	2.20	2.20	2.20	2.20	1.15	1.15
5:00 am	1.15	3.80	3.80	3.80	3.80	3.45	1.15
6:00 am	1.15	3.70	3.70	3.70	3.70	3.60	1.15
7:00 am	1.15	4.60	4.60	4.60	4.60	3.90	1.80
8:00 am	1.80	3.70	3.70	3.70	3.70	3.60	1.85
9:00 am	1.80	2.80	2.80	2.80	2.80	2.90	2.30
10:00 am	2.30	1.85	1.85	1.85	1.85	1.85	2.30
11:00 am	2.30	1.85	1.85	1.85	1.85	1.85	2.60
Noon	2.30	1.85	1.85	1.85	1.85	1.85	2.60
1:00 pm	2.60	1.85	1.85	1.85	1.85	1.85	2.60
2:00 pm	2.60	1.85	1.85	1.85	1.85	1.85	2.60
3:00 pm	2.50	1.85	1.85	1.85	1.85	2.30	2.50
4:00 pm	2.75	1.85	1.85	1.85	1.85	2.30	2.75
5:00 pm	2.75	1.85	1.85	1.85	1.85	2.30	2.75
6:00 pm	2.75	1.85	1.85	1.85	1.85	2.70	2.30
7:00 pm	2.30	1.15	1.15	1.15	1.15	1.85	1.85
8:00 pm	2.30	1.15	1.15	1.15	1.15	1.15	1.15
9:00 pm	2.30	1.15	1.15	1.15	1.15	1.15	1.15
10:00 pm	1.15	1.15	1.15	1.15	1.15	1.15	1.15
11:00 pm	1.15	1.15	1.15	1.15	1.15	1.15	1.15

Toll Schedules

Effective July 3, 2007

Go back, relax, and enjoy a Virtual Drive.
What our customers tell us the 91 Express Lanes has changed their life!

[View Toll Policy](#) [View Holiday Toll Schedules](#)

91 Express Lanes Toll Schedule

Effective July 3, 2007
SB Highway 520

	Sun	Mon	Tue	Wed	Thurs	Fri	Sat
Midnight	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
1:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
2:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
3:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
4:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
5:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
6:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
7:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
8:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
9:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
10:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
11:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
Noon	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
1:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
2:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
3:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
4:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
5:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
6:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
7:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
8:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
9:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
10:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
11:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20

91 Express Lanes Toll Schedule

Effective July 3, 2007
Northbound Highway 520

	Sun	Mon	Tue	Wed	Thurs	Fri	Sat
Midnight	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
1:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
2:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
3:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
4:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
5:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
6:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
7:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
8:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
9:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
10:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
11:00 am	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
Noon	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
1:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
2:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
3:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
4:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
5:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
6:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
7:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
8:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
9:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
10:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20
11:00 pm	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20

Effects of congestion pricing on GHG emissions

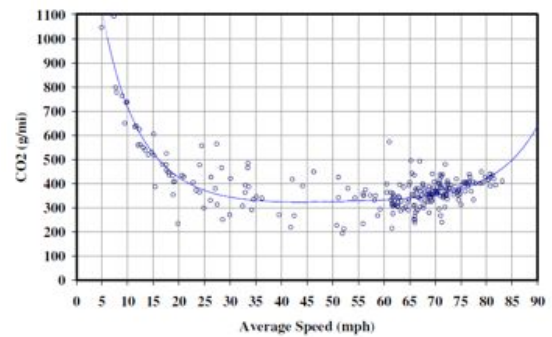
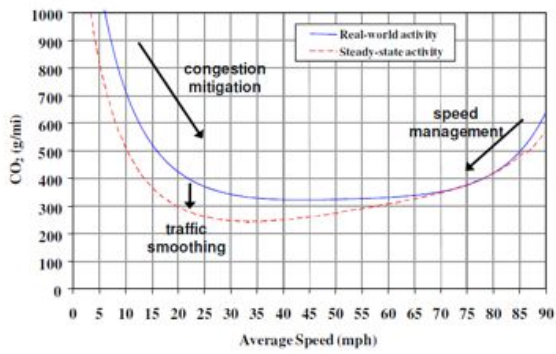


Figure 8. Emission-speed plot of individual trips or trip segments



California's Parking Cash-Out Law

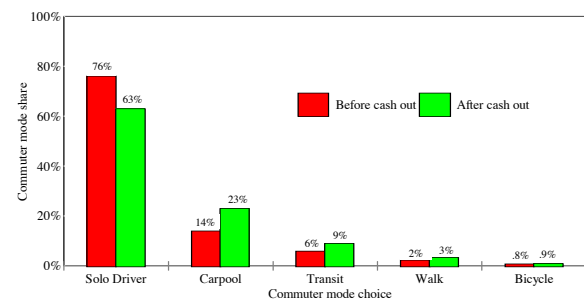
Employers must offer commuters the cash equivalent to any parking subsidy offered
 Only for parking spaces the employer rents
 Only for firms with more than 50 employees

Free parking has an opportunity cost

The foregone cash is a new price for taking the free parking, and this price increases the cost of solo driving.

Some commuters cash out and begin to ride public transit, carpool, walk, or bike to work.

Commuter Mode Share Before and After Parking Cash Out





Three Reforms in Parking Policy

1. Charge the right price for curb parking.
The lowest price that will leave one or two vacant spaces on each block—performance-based pricing
2. Return the meter revenue to the neighborhoods that generate it.
Revenue return will make performance-based prices for curb parking politically popular.
3. Reduce or remove off-street parking requirements. Do not require additional parking when a building's use changes.
Freedom from parking requirements will allow higher density and new uses for old buildings.

Examples of pricing options

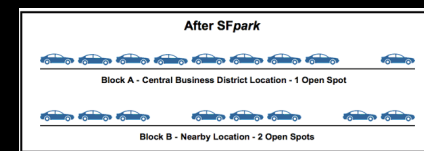
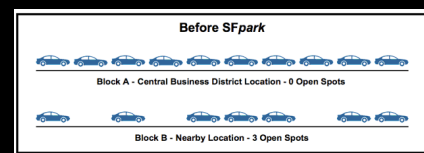
As the use of demand-responsive pricing for both on- and off-street parking is the primary tool for reducing congestion, the pricing models the SFMTA intends to test and evaluate merit special illustration. The following tables use hypothetical values to illustrate these pricing structures.

Vary price by time of day

Time when parked	Price per hour
8am-10am	\$3.50
10am-4pm	\$2.00
4pm-7pm	\$3.00
7pm-9pm	\$1.00

Vary price by length of stay

Hour of parking	Price for that hour
1 st	\$1.00
2 nd	\$1.50
3 rd	\$2.00
4 th (and successive hours)	\$2.50



Redwood City parking ordinance

To accomplish the goal of managing the supply of parking and to make it reasonably available when and where needed, a target occupancy rate of eighty-five percent (85%) is hereby established.

The Parking Manager shall survey the average occupancy for each parking area in the Downtown Meter Zone that has parking meters. Based on the survey results, the Parking Manager shall adjust the rates up or down in twenty-five cent (\$0.25) intervals to seek to achieve the target occupancy rate.

Revenues generated from on-street and off-street parking within the Downtown Meter Zone boundaries shall be accounted for separately from other City funds and may be used only . . . within or for the benefit of the Downtown Core Meter Zone.

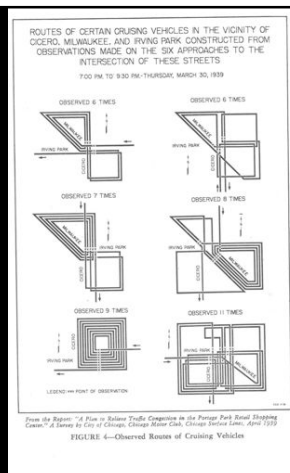
Performance-based prices

Performance-based prices adjust over time to maintain a few vacant spaces.

The goal is to keep about 85 percent of the parking spaces occupied all the time.

About one curb space is vacant on each side of each block so that everyone can see that convenient parking is available everywhere.

Year	City	Share of traffic cruising (percent)	Average search time (minutes)
1927	Detroit	19%	
1927	Detroit	34%	
1933	Washington		8.0
1960	New Haven	17%	
1965	London		6.1
1965	London		3.5
1965	London		3.6
1977	Freiburg	74%	6.0
1984	Jerusalem		9.0
1985	Cambridge	30%	11.5
1993	Cape Town		12.2
1993	New York	8%	7.9
1993	New York		10.2
1993	New York		13.9
1997	San Francisco		6.5
2001	Sydney		6.5
2007	New York	28%	
2007	New York	45%	
2008	New York		3.8
Average		32%	7.8



gratuit les samedis, dimanches, jours fériés et mois d'août

Résidents*

*Réservé aux titulaires d'une vignette résidentiel valable dans la zone

du lundi au vendredi
de 9h00 à 19h00

forfait

0,50 € / jour ou
2,50 € / semaine

5J

gratuit les samedis, dimanches, jours fériés et mois d'août

Pour toute information

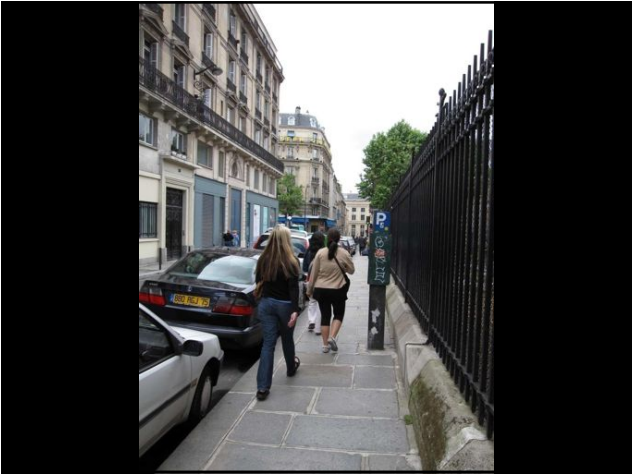


TABLE 14-2 A DAY OF CRUISING IN WESTWOOD VILLAGE							
Hour	Average search time (minutes)	Parking turnover per meter (cars)	Search time per meter (minutes)	Total search time (hours)	Cruising distance per parking (VMT)	Cruising distance per meter (VMT)	Total cruising distance (VMT)
(1)	(2)	(3)	(4)=(2)x(3)	(5)	(6)	(7)=(3)x(6)	(8)=(7)x(47)
8am-9am	0.0	1.9	0.0	0	0.0	0.0	0
9am-10am	0.0	2.3	0.0	0	0.0	0.0	0
10am-11am	0.9	1.2	1.1	8	0.2	0.2	113
11am-noon	2.0	2.1	4.2	33	0.3	0.6	296
noon-1pm	4.4	1.5	6.6	52	0.6	0.9	423
1pm-2pm	3.5	1.8	6.3	49	0.4	0.7	338
2pm-3pm	4.1	1.4	5.7	45	0.5	0.7	329
3pm-4pm	3.4	1.0	3.4	27	0.5	0.5	235
4pm-5pm	6.2	1.2	7.4	58	0.9	1.1	508
5pm-6pm	7.7	1.3	10.0	78	1.2	1.6	733
6pm-7pm	9.4	0.3	2.8	22	1.4	0.4	197
7pm-8pm	9.7	0.7	6.8	53	1.4	1.0	461
Average	3.3	1.4	4.5	35	0.5	0.6	303
Total	--	17	54	426	--	7.7	3,633

Curb parking prices and cruising

UNDERPRICED CURB PARKING

ALL CURB SPACES OCCUPIED

CRUISING FOR PARKING

AVERAGE SEARCH TIME = 3.3 MINUTES

RIGHT-PRICED CURB PARKING

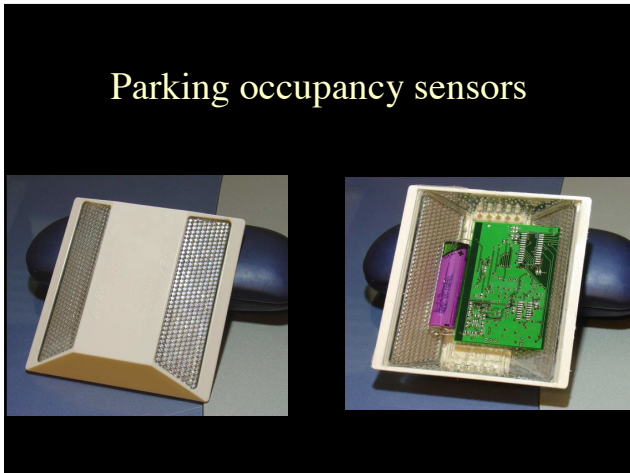
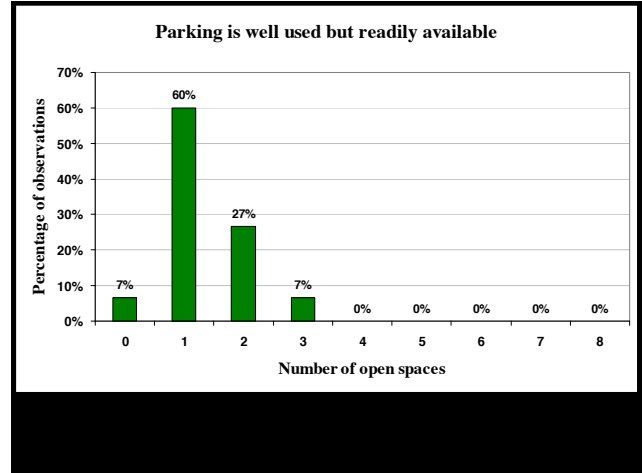
1 OF EVERY 8 SPACES VACANT

NO CRUISING

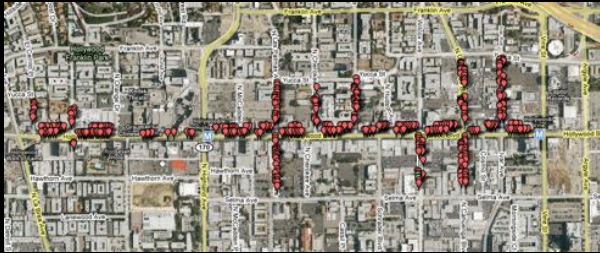
AVERAGE SEARCH TIME = 0

Get the prices right



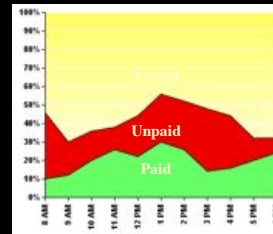


Parking occupancy sensors in Hollywood

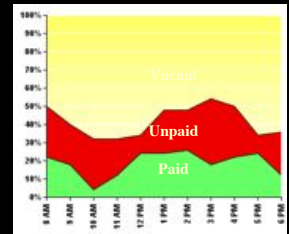


6300 block of Hollywood Boulevard

\$1 per hour

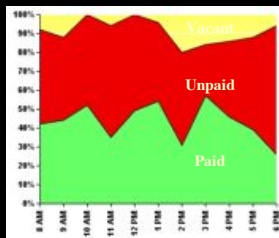


\$2 per hour

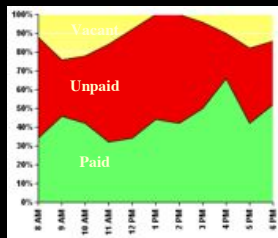


6700 block of Hollywood Boulevard

\$1 per hour



\$2 per hour







As our case is new, so must we think anew,
and act anew.

Abraham Lincoln