Green TRIP Connect beta
Creating affordable, low-traffic and healthy communities

Methodology: The Parking Model

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May 2016

GreenTRIP Connect incorporates a parking model to show the Low Impact Parking Estimate for all projects located on parcels within the 9 county Bay Area. The data used is from GreenTRIP's Parking Database, which is a free, searchable database available since 2014. Users can also enter their own parking for the project described using Connect. The Parking Model methodology describes the impacts of variables on the output "Parking Spaces predicted use" column of the Dashboard.

The data collected across 71 buildings were used to develop a model of Parking Utilization (observed parked cars per occupied housing unit in the building) at the parcel level. The independent variables were chosen to optimize both the model's goodness of fit and predictability. The tested variables were grouped into two major categories, variables that describe the building and those that describe the surrounding neighborhood. Variables that describe the building include:

- Parking Supply – Number of stalls provided divided by the total number of units in the building (parking ratio)
- Average Rent – Average rent for all units in the building
- Parking Price – The average price charged for parking one car in the building's parking facility
- Average Bedrooms per Unit – Average number of bedrooms per unit for all units in the building
- Transit Pass – Variable equals 1 if transit pass is provided for building tenants
- Fraction of Affordable Units for Extremely Low Income (ELI) – Fraction of units set aside for affordable housing in the building for households with incomes that meet the HUD definition of ELI (below 30% AMI or Area Median Income)
- Fraction of Affordable Units for Very Low Income (VLI) – Fraction of units set aside for affordable housing in the building for households with incomes that meet the HUD definition of VLI (30-50% AMI)
- Carshare Membership – Variable equals 1 if carshare membership is provided for building tenants

Variables that describe the neighborhood include:

- Block size (walkability measure) – Average size of all blocks that intersect a ¼ mile buffer around each parcel
- TAS Job Density – The number of jobs per acre within a 30 minute transit trip with one transfer
- TCI Transit Connectivity Index – A weighted average of frequency of service for all transit lines within ¾ of a mile.

An ordinary least square regression was performed on the data with the dependent variable being the number of observed parked cars per occupied housing unit in the building; the final model is presented in the table below:

Independent Variable	Function	Coefficient Value	Elasticity*	Individual R^2	Incremental R^2
Parking Supply Stalls/Unit	1/(1+x)	-1.6	0.438%	78.4%	78.4%
Average Rent per Unit	sqrt(x)	0.007	0.152%	34.6%	80.1%
Parking Price	x	-0.0007	-0.004%	0%	81.4%
Average Bedrooms per Unit	ln(1+x)	0.5	0.317%	27%	82.4%
Block Size	ln(1+x)	0.05	0.054%	16.4%	83%
Transit Pass	x	-0.10	-0.041%	0.1%	84%
Percent ELI Units	sqrt(x)	-0.12	-0.031%	19.4%	84.3%
TAS Job Density	x	-0.003	-0.032%	10.4%	84.4%
TCI	x	-0.001	-0.036%	17.8%	84.5%
Percent VLI Units	sqrt(x)	-0.02	-0.007%	8.8%	84.5%
Carshare Provided	x	-0.02	-0.004%	3.3%	84.5%
Intercept		0.9			

*Point elasticity for the average building in the data sample is the percent parking use will increase with a one percent increase in the independent variable.

Generally, as parking supply, average unit size, average number of bedrooms, average rent, and block size increases (or walkability decreases), then parking utilization increases. Where there is provision of transit passes, carsharing membership, greater access to transit, greater transit access to jobs, and higher fractn of affordable units, then parking utilization decreases.