The Effect of Solar Systems on Home Values

May 2020

Introduction

In recent years in the United States, the number of homes with solar photovoltaic (PV) systems has increased substantially, reaching more than half a million systems in 2014. The U.S. Department of Energy estimates that up to 108 GW of residential rooftop PV will be installed by 2050, in up to 30 million homes [1]. As PV systems proliferate, the ability to value these homes accurately becomes more important.

Property appraisers and real estate professionals have made strides toward evaluating the effect of PV systems on home values; however, significant gaps remain in understanding these effects, particularly in the case of PV systems that are leased.

The Orange County Property Appraiser's Office (OCPA) has examined home values for homes with PV systems and compared the sale values of such homes from before and after the PV systems were installed. Additionally, numerous studies have attempted to bridge the data gaps that exist. Some of these studies are discussed in this study.

Property Appraiser Study

Summary
OCPA studied the effects of solar systems on home values to determine if there is a value impact on a residential property after installing solar equipment. The data sources for the analysis included a solar PV interconnection database provided by the Orlando Utilities Commission (OUC) containing more than 1,000 homes noting the installation date, size and reported cost of PV systems. An additional source of residential information and data utilized was OCPA's 400,000+ residential real property records.

OCPA applied accepted appraisal practices using two approaches to value to determine the effects of solar systems on home values. OCPA also recognized the co-author's contribution of an income approach perspective as referenced below in the Solar PV System Valuation.

- The most commonly used and preferred appraisal technique used is the *sales comparison approach*. When using this approach, appraisers estimate a subject property value by analyzing recently sold properties and adjusting the comparable property for physical and economic characteristic differences.
- The second and most scientific appraisal technique Used by OCPA is known as *multiple regression analysis,* which uses statistical modeling to measure characteristic variable effects. Multiple regression analysis is used to identify the impact of significant variables on value of sold properties within a sample data population. In this case, the variable to be measured is a PV system and its effect on value as a result of installation.
- A third approach to value considered is the income approach known as the *Solar PV System Valuation* and is applied to appraisals within the utilities industry. This is done by determining the net present value of savings that would be realized from ownership of the system.

Sales Comparison

The sales comparison approach examined 1,064 solar permits issued in Orange County during the time period of January 2014 and July 2019. There were 67 homes sold with solar installations that took place either immediately before or immediately after the sale. Of these sales, only 13 were considered in the study and only nine qualified for the study. Paired sales analysis requires property to be relatively similar except for the component being measured. The dissimilarities of sales after installation required four of the 13 sales be excluded, and a 5th excluded due to the timeliness of a 2015 resale date.

It was important to identify only PV-equipped properties that sold both before the installation and after installation to measure the contribution of value of this equipment to the total market value of the real estate. This is known as a resale analysis, and often provides contributory value. This study used raw data and did not adjust for market value fluctuations, cost of sale, cost of living, PV panels, whether owned or leased, installer estimate of value submitted on permit applications, tax incentives, or the consumer price index. The resales used did, however, display a considerable time difference between sale date prior to installation and sale date after installation that averaged 3.5 years. Although a trend of positive contributory value is observed, sample size is very small, and specific value contributions are not conclusive due to overall market value increase during the period studied.

The sales comparison approach is the most commonly used appraisal technique using market data to determine values of properties. By using recently sold properties and adjusting for physical and economic characteristics, an appraiser can develop estimates of value for subject properties. From this very heterogeneous group of previously sold properties, the appraiser finds the ones that are most like the subject property in terms of physical features, location, neighborhood features, time of sale, property rights, and conditions of sale. The ideal situation for this study would be the subject property sold, PV installed, and property resold again within a one-year period. This ideal scenario did not occur in the qualified sample. The power of a study is its ability to identify any effect on value in terms of a contributable value. This depends on the size of the effect because large effects are easier to notice and increase the power of the study. Our study of 9 sales implied a 6% increase in value. *See Exhibit 1*

Multiple Regression Analysis

Multiple regression analysis provides a statistical technique used to analyze data to predict the value of one variable. The dependent variable to be estimated is the contributory value of PV systems installed on single family residential properties. This multiple regression analysis study examines sale transactions that span the years form January 2014 through July 2019 and focuses on residential properties (*see Table 2 below*). During this period, 53 PV (**Figure 1**) homes were sold after installation which resulted in 59 sale transactions (some properties sold multiple times). The PV sample is observed in 34 OCPA neighborhoods (**Figure 2**) or 35 census block groups (**Figure 3**). The comparable non-PV sample is selected based on the criteria of being in the same neighborhood/block group and being sold in the same year. When the OCPA neighborhood is employed in the analysis, as shown in *Table 1* below, the final dataset includes 3,001 transactions, consisting of 59 PV transactions (1.97%) and 2,942 non-PV transactions (98.03%). When the census block group is employed in the analysis, the final dataset includes

5,418 transactions, consisting of 59 PV transactions (1.09%) and 5,359 non-PV transactions (98.91%).

Most studies for PV homes only provide evidence of contributory value in California. A study conducted by Lawrence Berkeley National Laboratory in 2015 did not find significant differences of added values (premiums) between PV homes in California and outside of California, in which house qualities were characterized by living area, size of parcel, and age of home at the time of sale. The OCPA study concentrating in Orange County, Florida, not only provides evidences outside of California but also further controls the influences of garage area, the number of beds, the number of baths, and the presence of swimming pools. By using hedonic regression models, OCPA's study breaks down the item being researched into its constituent characteristics and obtains estimates of the contributory value of each characteristic. *Exhibit 2* illustrates these models.

As for the variable of interest, the models indicate that the size of the PV system is found to be a significant factor that contributes to the increase of sale price while neither the gross cost estimate nor the number of years after PV installation significantly contribute to the sale price. Specifically, when the OCPA neighborhood is employed in the analysis (*see Table 3*), for each kilowatt (kW) of installed PV, sale prices increase by 0.71-0.84% with a significant level of 0.1. The percentage estimate can be converted into $2.06-$2.44 per watt, which corresponds to the median sale price of $ 289,900 for non-PV homes.

When the block group is employed in the analysis, for each kW of installed PV (*see Table 4*), sale prices increase by 0.71-0.81% with a significant level of 0.05. As the median sale price of non-PV homes is $295,000, the percentage is approximately converted to $2.09-$2.39 per watt. At the same time, the median size of PV system is 6.16 kW. The regression analysis also implies that the homes with PV system installed probably enjoy an added value of 4.38%-5.18% as a percentage of house prices within the same OCPA neighborhoods. Within the same census block groups, an added value of 4.35-4.99% is observed for homes with PV system installed. Although a trend of positive contributory value for PV homes is observed in the study, when compared to gross cost, it can include the added value of PV system or not dependent on the need to offset the cost of PV installation (see *Table 5* and *Table 6*).

Solar PV System Valuation

Another method of valuing solar PV systems is by determining the present value of savings that would be realized from ownership of the system. Based on the average solar PV system size of interconnected single-family residential customers in 2018 of 8.3 kW and an average system cost of $3,000 per kW, the average cost of a solar installation in Orlando was about $24,900 in 2018 according to permits obtained during installation. A homeowner who purchased that type of solar PV system would have realized a net present value of $3,300 over the life of the system. The net present value is based on all the energy savings that the homeowner would have received from paying less on their utility bill, less the capital and maintenance costs of the system, discounted over a 25-year period based on the homeowner's cost of financing. Currently, utilities that serve Orange County, Orlando Utilities Commission and Duke Energy,

allow customers to sell excess electricity from their solar PV systems and credit that electricity at the same rate that they consume electricity. Another factor that is important in the valuation of solar PV systems is the federal solar investment tax credit (ITC). Until 2020, the ITC allowed owners to deduct 30% of the cost of the solar PV system from their federal taxes.[1] This has a great impact on the value of solar PV systems. Without the ITC, the net present value of the average solar PV system in Orlando would have been -$3,142, representing a negative return on investment since the homeowner would forego over $7,000 in tax credits.

Zillow Study

In a study conducted by Zillow Economic Research (Zillow) [2], it was determined that the extent to which the value of homes increases due to the installation of PV systems is approximately 4.1% nationwide. Zillow examined homes in the metropolitan areas of Los Angeles; San Francisco; New York City; Riverside (California); and Orlando between March 1, 2018 and February 28, 2019.

The study found that the value of homes increased by 4.6% in Orlando, which translates to a dollar value increase of $10,994. This increase exceeds the national average of 4.1% and $9,274. The increase in home value was observed to be greatest in New York City percentage-wise at 5.4%, and greatest dollar-wise in San Francisco at $41,658. The discrepancy may be due to higher overall home prices in San Francisco. The article does not indicate the sample size of homes surveyed.

The study cites two reasons why homes with solar systems sell for more than homes without solar systems. The first reason provided is the savings in future energy costs. Home buyers are investing more capital up front with the expectation that they will save money on electricity from the grid in the future. The other possible reason cited is that homes with solar systems are more likely to have other desirable features such as heated floors.

Zillow indicates that they controlled for observable attributes of the homes, including bedrooms, bathrooms, square footage, age, and location; however, there is no mention of controlling for non-observable factors such as energy efficiency, insulation, maintenance condition, or upgraded internal fixtures.

LBNL Study

Lawrence Berkeley National Labs (LBNL) conducted a study that contrasted over 18,000 homes without solar against over 3,000 homes with solar in eight states [3]. LBNL found that overall home prices to be higher in homes with PV systems when compared to homes without PV systems, according to two of the models LBNL tested. The price difference caused by the presence of a PV system is referred to as a “premium.”

PV home premiums in California were found to be greater than PV home premiums in other states. Premiums were found to be $3/watt in states other than California, and over $4/watt in

[1] In 2020, the Federal ITC dropped to 26%

California. This difference is not likely of statistical significance, due to a high degree of uncertainty for premiums in states other than California. LBNL postulates that premiums are higher in California due to the higher cost of solar to begin with.

The average new home solar PV premiums of $3.58/watt were lower than the premium for existing homes of $4.51/watt; however, this was found to be statistically insignificant. The market appears to depreciate the value of PV systems in their first 10 years at a rate exceeding the rate of PV efficiency losses and the rate of straight-line depreciation over the asset's useful life.

A diminishing return in terms of premium-per-watt was observed in relation to PV system size. This is likely due to the presence of a fixed component of the solar system that exists regardless of size.

Elevate Energy Study

One of the biggest challenges associated with evaluating the extent to which a PV system will alter the value of a home is the lack of data. Elevate Energy identified three credible ways to value solar in the absence of data [4]:

1. The sales comparison approach (comparing solar homes to non-solar homes). This is the most intuitive approach; however, the biggest weakness is that if there is no sale, there is no value.
2. Income approach (present value of stream of energy cost savings). This reflects the thought processes of buyers and sellers in purchasing PV systems, and reflects the methods used by solar companies, but requires more data points and knowledge of discounting a cash flow.
3. Installed costs of solar systems at time of sale. This method reflects the thought processes of buyers and sellers and is easy to establish but limited solar penetration in some markets may weaken depreciation from all forms of loss.

Forbes Article

In 2011, *Forbes* reported on a study that examined the extent to which PV systems boost home sale prices [5] [6] . A group of economists who studied homes sold in San Diego and Sacramento, found that homeowners can recover nearly all their PV system investment costs if they sell a home that has a PV system installed. On average, PV systems added $20,194 to the sale price of a home based on repeat sales data. This exceeds the average PV system price (less subsidies including the federal tax credit) of $20,892. Such houses studied were valued more than $500,000. The PV system premium was found to be greater in politically liberal communities, communities that had a higher percentage of college graduates, and those that have a high ownership of hybrid vehicles.

In 2018, *Forbes* identified five potential obstacles to selling a home that has a PV system [7]. Three of these obstacles pertain to issues with the seller, buyer, or real estate agent; however, the additional two pertain to valuation issues and leased solar.

The multiple listing service (MLS) often includes "green fields" for real estate agents to fill out to help determine a home's marketable value. The green fields list a home's environmental-friendly features, including but not limited to PV systems. Many appraisers may not understand the mechanism by which PV systems add value to a home.

While leased PV systems generate utility savings for homeowners the same way owned PV systems do, the panels remain the property of the solar installer (even though the home itself is owned by the resident). Thus, leased PV systems add no real value to the home, and some home buyers may be reluctant to continue the PV system lease. The monthly rent from the lease may even disqualify some home buyers by raising their debt-to-income ratio. Unless the lease is transferred to the buyer in a timely fashion, it can also delay or cancel a home closing.

Leased Solar Systems

The OCPA data, *Forbes* article, Elevate Energy approaches, and the Zillow study pertain to homes where the owners also owned the PV systems, and not for homes where the solar system has been leased. In April, 2018, the Florida Public Service Commission (FPSC) clarified its interpretation on existing solar energy laws in Florida to support the leasing of solar systems from third parties [8]. A company must be a regulated utility to sell power to consumers in Florida. FPSC recently declared that leased PV systems do not fall into this category because third parties are charging customers for the use of the solar PV systems – not for the power itself. As a result, homeowners have the option to lease a PV system, instead of purchasing one.

For leased PV systems, the process of getting the system interconnected to the grid is the same as if the system were owned; however, the relationship between the homeowner and the third-party installer will be different. If the PV system is leased, the homeowner pays a monthly rent for the PV system and will obtain all the power that the system produces. In this case, while the homeowner owns the house, the installer owns the PV system. Such lease terms are often as many as 20 years. Customers are often drawn in by the lack of up-front costs or maintenance costs, as well as monthly production guarantees provided by the installer.

A consumer report from June 2016 [9] suggests that leased PV systems may have a detrimental value on home values for several reasons. First, overall financial savings may be more modest than if the system was owned. Solar leases often contain escalator clauses that may increase lease payments faster than the increase in the cost of electricity from the grid. Additionally, leases have the potential to deter home buyers if the house gets put on the market before the solar lease expires. The home seller would either need to buy out the solar lease, or have the home buyer assume the lease, which some home buyers may be reluctant to do. It may be possible to have the panels moved to the seller's new home for a fee, however this assumes that the seller's new home is compatible with the existing PV system that was customized to the previous home.

It is unclear what impact leased PV systems have on home values for homes within Central Florida. OUC has up to 12 solar leases within its service territory, almost all of which were interconnected in 2019. Thus, the sample size is too small, and the leased systems have been interconnected too recently to ascertain the impact in property values.

References

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[8] M. Carollo and E. Mahoney, "State Regulators Give Major Residential Solar Company Good News in the Sunshine State," *Miami Herald,* 20 April 2018.

[9] J. Garskof, "The Real Cost of Leasing vs. Buying Solar Panels," Consumer Reports, 2016.

Exhibits

Exhibit 1 – Sales Comparison

Subject	Display Parcel	Address	Install Date	PV Cost	KW Size	KW/Cost	Heat(SQFT)	Sale Date (Prior Install)	Sale Amt (Prior Install)	Sale Date 1 (After Install)	Sale Amt 1 (After Install)	PCT Increase	Comp Sale	Sale Difference	Value Increase	$/SF-Increase	P/KW
1	14-22-29-0160-20-060	2516 HARRISON AVE	5/1/18	$23,250	7.50	$3,100	980	6/7/17	~~$247,000~~	3/28/19	$304,500	19%				$0.00	$0
2	06-23-32-1007-02-640	2836 WILD TAMARIND BLVD	11/1/17	$18,270	5.22	$3,500	2,451	2/27/15	$272,000	3/1/19	$333,000	18%	$320,000	$13,000	4.1%	$5.30	$2,490
3	32-23-31-1952-01-030	8549 LOVETT AVE	9/1/17	$43,578	9.60	$4,539	2,077	8/12/15	$325,100	4/2/18	$357,500	9%	$320,000	$37,500	11.7%	$18.05	$3,906
4	19-22-30-2360-02-070	1010 N FOREST AVE	9/1/17	$25,000	6.18	$4,049	853	8/22/14	$170,000	5/3/18	$245,000	31%	$223,000	$22,000	9.9%	$25.79	$3,563
5	30-22-30-0000-00-085	509 MERIDALE AVE	2/1/17	$28,800	5.03	$5,731	1,329	6/27/16	$269,000	8/4/18	$314,700	15%	$305,000	$9,700	3.2%	$7.30	$1,930
6	32-23-31-1949-00-850	8655 RANDAL PARK BLVD	1/1/17	$31,567	10.36	$3,047	2,915	9/1/15	~~$479,900~~	11/5/18	$486,900	1%	~~$410,000~~	$76,900	~~18.8%~~	~~$26.38~~	$7,423
7	06-24-31-5201-07-900	10179 LELAND DR	12/1/16	$31,746	9.62	$3,300	2,825	6/27/14	$328,000	11/30/18	$350,000	6%	$344,000	$6,000	1.7%	$2.12	$624
8	07-23-32-1035-02-140	14109 MAILER BLVD	7/1/16	$18,900	7.00	$2,700	2,057	7/31/14	$225,000	5/31/18	$305,000	26%	$304,000	$1,000	0.3%	$0.49	$143
9	08-22-29-7752-02-050	3728 ROSE OF SHARON DR	2/1/16	$18,000	6.00	$3,000	1,699	10/21/14	$140,000	6/15/18	$224,900	38%	$191,000	$33,900	17.7%	$19.95	$5,650
10	25-24-30-4945-01-990	8087 MISTRAL DR	9/1/15	$28,800	10.20	$2,824	2,963	5/17/13	$459,700	8/11/17	$500,000	8%	$471,000	$29,000	6.2%	$9.79	$2,843
11	06-23-30-0321-00-070	1812 BURCHSTONE DR	6/1/15	$10,500	~~1.25~~	~~$8,400~~	1,852	10/16/13	~~$260,000~~	6/22/15	$310,000	16%	~~$307,000~~	$3,000	~~1.0%~~	~~$1.62~~	$2,400
12	10-23-32-1184-20-040	19326 OAKLEAF ST	3/1/15	$33,096	7.98	$4,150	4,013	7/31/14	$460,000	7/31/14	$460,000	0%	~~$466,000~~	-$6,000	~~-1.3%~~	~~-$1.50~~	-$752
	-----	19326 OAKLEAF ST	3/1/15				4,013		$520,000	3/11/19	$520,000	0%	~~$530,000~~	-$10,000	~~-1.9%~~	~~-$2.49~~	
13	32-24-31-2800-00-570	19352 PUMMELO DR	2/1/14	$22,750	7.10	$3,204	5,351	3/28/13	$502,000	9/18/15	$575,000	13%	$503,000	$72,000	14.3%	$13.46	$10,141
				AVG/Mean	**7.65**	**$3,595**			**$326,040**			**24.6%**		**$24,900**	**7.68%**	**$11.36**	**$3,477**
				Median	**7.30**	**$3,252**			**$325,100**			**20%**	**$307,000**	**$13,000**	**6.2%**	**$10**	**$2,490**
				Average Permit Cost P/KW		**$23,740**											

Summary: Average Solar Installation Cost $23,000. Installation for solar adds +/- $13,000 in value, or sale price increase of 6%, or $10 per square foot.
Notes:

- Comparable #1- Had significant changes to home of 980 SF (Electric, plumbing, floor, kitchen & bath). Vacant land sales equal to total value of property.
- Comparable #6- Sold 2015 $479,900 solar installed 2017 Cost $31,567 sold 2018 $486,900.2015-2018 sale: $7,000 profit (minus solar install) for $24,567 loss.
    - Assume subject had many interior upgrades as comparable sales do not support value in 2015 or 2018
    - Assume Federal/State Tax write off of 100% green energy on taxes
- Comparable #11- KW size is equal to only hot water installation for apartments/townhomes. See permit comparison from OUC.
- Comparable #12 Solar installed before sale date: no true comparables in 2015 or 2019 due to size of heated area, size of garage, pool and sale amount range
- Comparable #13 Subject has not sold since installation date, used 2015 market sales, not adjusted for appreciation of 4 years (2018-2015)

Exhibit 2 - Multiple Regression Analysis

Table 1 - *Summary Statistics for PV Home*

	PV	Block Group All	PV/All Block Group	NBHD All	PV/All NBHD
TOTAL DATASET	67	30,302	0.22%	23,296	0.29%
NO MISSING DATA	67	22,225	0.30%	18,529	0.36%
EXCLUDED:					
LAND AREA>50,000	4	703		389	
HEATED_AREA>5000	3	185		167	
BATHS_SUM>6	1	43		57	
SALE_YEAR<2014	1	8,148		6,759	
Within same spatial unit	59	13,637	0.43%	11,441	0.52%
Within same spatial unit (COST)	54	13,632	0.40%	11,436	0.47%
Within same spatial unit and same year	59	5,418	1.09%	3,001	1.97%
Within same spatial unit and same year (COST)	54	5,413	1.00%	2,996	1.80%

Table 2 - *Frequency summary of PV and non-PV homes by sale year*

		Block group		NBHD	
Sale Year	**PV Homes**	**Non-PV Homes**	**Total**	**Non-PV Homes**	**Total**
2014	2	186	188	127	129
2015	6	1104	1110	408	414
2016	2	388	390	36	38
2017	10	692	702	540	550
2018	21	1989	2010	1259	1280
2019	18	1000	1018	572	590
Total	59	5359	5418	2942	3001

Table 3 - *Model Results with OCPA neighborhood*

	Description	Model 1	Model 2	Model 3	Model 7	Lawrence 1	Lawrence 2
SALE_AGE	Age of home at sale time	-0.4328***	-0.4385***	-0.433***	-0.4366***	-0.470***	-98.662***
poly(SALE_AGE, 2)2	Age of home square						67.058.
HEATED_AREA	Living area (square feet)	0.029***	0.029***	0.029***	0.0292***	0.035***	0.035***
LANDAREA	Area of parcel (square feet)	0.0008***	0.0008***	0.0008***	0.0008***	0.001***	0.001***
GARAGE_AREA	Garage Area (square feet)	0.0214***	0.0212***	0.0214***	0.0215***		
BEDS_SUM	Number of bedrooms	3.1986***	3.1194***	3.1922***	3.3037***		
BATHS_SUM	Number of bathrooms	0.4608	0.5466	0.4654			
POOL	Whether has pool	11.5151***	11.7214***	11.5073***	11.5379***		
PV_KW_SIZE	PV size (kw)	0.7103.	1.0789	0.6308	0.7007.	0.8401.	0.8433*
PV_COST_UNIT	PV gross cost ($/kw)		-0.0012				
YEAR_AFTER_INSTALL	Number of years after installation			0.2046			
N		3001	2996	3001	3001	3001	3001
R-squared		0.789	0.79	0.789	0.787	0.777	0.777
AIC		-605.829	-617.049	-603.877	-589.176	-442.941	-444.403

*Significance: *** < 0.001; ** < 0.01; * 0.05; . < 0.1*

Table 4 - *Model Result with Census Block Group*

	Description	Model 1	Model 2	Model 3	Model 7	Lawrence 1	Lawrence 2
SALE_AGE	Age of home at sale time	-0.6928***	-0.6896***	-0.6909***	-0.6989***	-0.6627***	-99.7728***
Poly (SALE_AGE, 2)2	Age of home square						-35.3399.
HEATED_AREA	Living area (square feet)	0.0267***	0.0267***	0.0267***	0.027***	0.0336***	0.0336***
LANDAREA	Area of parcel (square feet)	0.0009***	0.0009***	0.0009***	0.0009***	0.0013***	0.0013***
GARAGE_AREA	Garage Area (square feet)	0.0473***	0.0469***	0.0473***	0.0475***		
BEDS_SUM	Number of bedrooms	-0.0664	-0.1956	-0.1009			
BATHS_SUM	Number of bathrooms	0.5559	0.6612	0.5759			
POOL	Whether has pool	13.129***	13.2357***	13.0978***	13.1568***		
PV_KW_SIZE	PV size (kw)	0.7058.	0.6538	0.0899	0.6933.	0.8106*	0.8035*
PV_COST_UNIT	PV gross cost ($/kw)		-0.0008				
YEAR_AFTER_INSTALL	Number of years after installation			1.6145.			
N		5418	5413	5418	5418	5418	5418
R-squared		0.797	0.798	0.797	0.797	0.765	0.765
AIC		-2258.523	-2295.93	-2260.106	-2261.598	-1487.65	-1488.589

Table 5 - *Added value of homes with PV system as a percentage of sale price*

Median PV size (6.16 kw)	**Added value of homes with PV system (%)**	**-95% CI (%)**	**+95% CI (%)**
NBHD - Lawrence 1	5.18	0.71	9.57
NBHD - Model 1	4.38	0.13	8.65
Block group - Lawrence 1	4.99	0.89	9.13
Block group - Model 1	4.35	0.53	8.19
Zillow (Orlando)[1]	4.60		
Lawrence (U.S.)[2]	2.56		

Notes: [1]03/01/2018-02/28/2019
*[2]Median PV size is 2.8 kilowatts. PV*Size coefficient is 0.0091.*

Table 6 - *Added value of homes with PV system as a dollar amount*

Median Non-PV (NBHD: $289,900; block group: $295,000)	**Added value of homes with PV system ($/watt)**	**-95% CI ($/watt)**	**+95% CI ($/watt)**
NBHD - Lawrence 1	2.44	0.38	4.50
NBHD - Model 1	2.06	0.06	4.17
Block group - Lawrence 1	2.39	0.43	4.37
Block group - Model 1	2.09	0.25	3.92
Lawrence (U.S. outside of California)	3.11		
Lawrence (California)	4.21		

Figure 1 - *Spatial distribution of PV samples (59)*

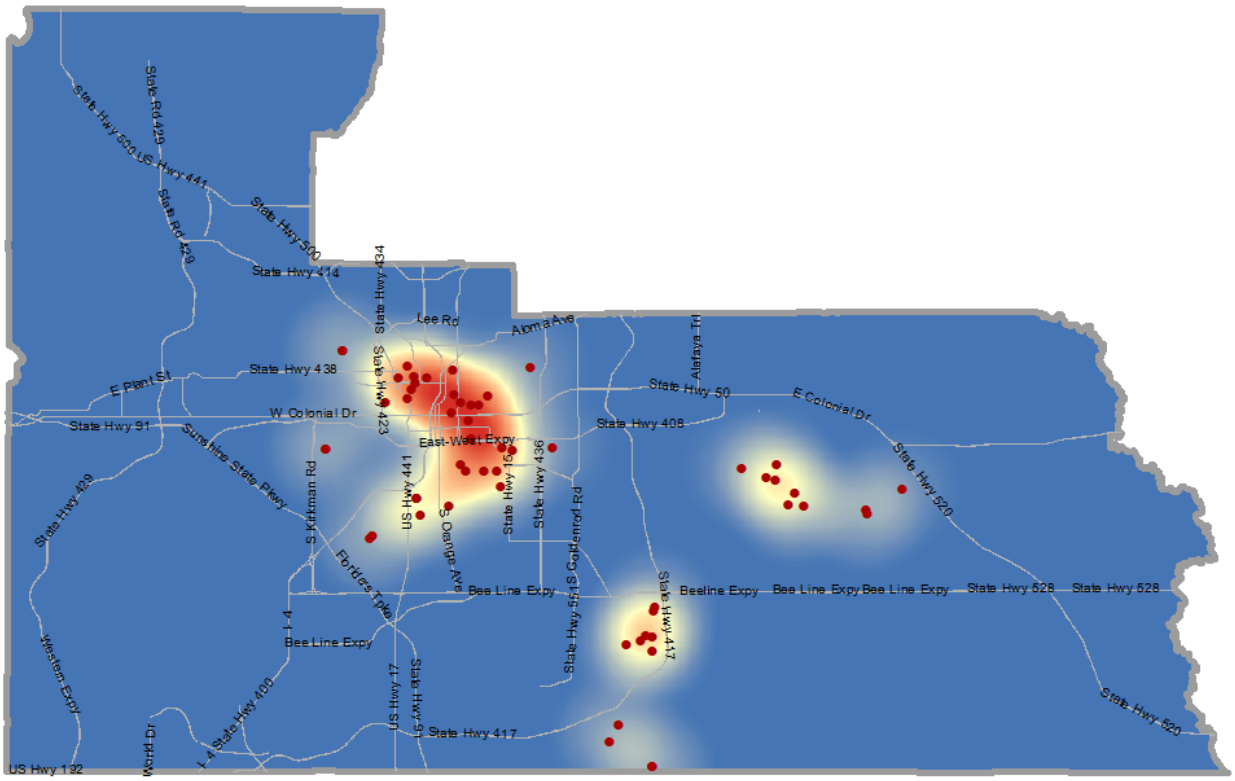

Figure 2 - *Spatial distribution of OCPA neighborhood (NBHD) sample (34)*

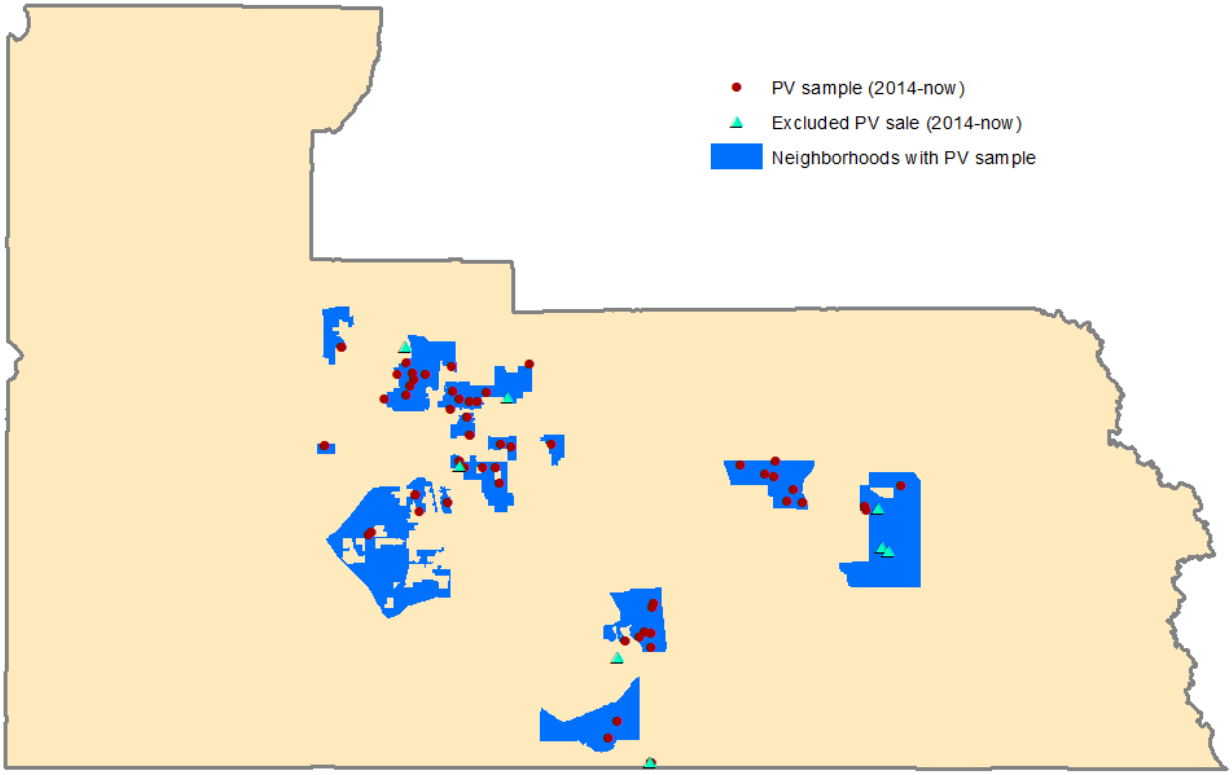

Figure 3 - *Spatial distribution of census block group sample (35)*