



June 20, 2013

Mr. Michael Judge  
Department of Energy Resources  
100 Cambridge Street, Suite 1020  
Boston, MA 02114

Dear Mr. Judge,

American Solar Partners has been participating in the Massachusetts solar market for a number of years, as well as in many other states. Overall, we think Massachusetts has been doing a good job of supporting solar power, particularly in comparison to other states. Nonetheless, we agree that DOER should explore new policies for the next stage of the growth of the Massachusetts solar market. Further, we appreciate DOER's recognition of the advantages of customer ownership of residential solar power systems, as reflected in its recent presentation to the stakeholders meeting. In fact, as we show in the attached analysis, ownership provides much greater economic benefit than leasing to the homeowner. Just as importantly, ownership more effectively utilizes the incentives financed by the taxpayers and ratepayers.

Our analysis compared a typical size – 4.8 kW - residential system purchased at a cost of \$4.50 per watt to a lease at with a 35% discount. Here are the major findings:

1. **Ownership delivers 4X the utility cost savings to Massachusetts (ratepayers & taxpayers) compared to leasing.** A homeowner will save approximately \$48k (net after cost of system) over the useful life of a system they own compared to saving \$12k from a lease, assuming a 35% discount off the price of grid power.
2. **Ownership produces a 50% lower cost of energy for the homeowner.** Over 30 years, the cost of energy is \$.07/kWh if the system is owned; it is \$0.15 if it is leased. (Net cost of the system or the lease divided by the lifetime output (kWh) = average cost of solar power)
3. **Tax expenditures to support ownership by homeowner are 50% lower than tax expenditures to support ownership by leasing company.** It costs taxpayers \$6256 to support ownership of a typical size system by a homeowner; it costs taxpayers \$12,420 to support ownership by the leasing company.

**4. Individually owned systems add renewable capacity for 50% less tax expenditures than third party owned systems.** It costs \$1303 in tax expenditures to add 1 kW of capacity owned by the homeowner (ratepayer-taxpayer); it costs \$2588 in tax expenditures to add 1kW of capacity for a leasing company.

In light of these findings, which would not change appreciably under different lease and cost assumptions, continuing the current policies that support residential leasing would be an inequitable and inefficient use of ratepayer and taxpayer funds. To restore greater fairness and equity for the ratepayers and taxpayers DOER needs to adopt policies that fully reflect the superior value ownership provides compared to leasing. Towards that end, we support efforts by DOER to formulate proposals to encourage ownership and offer a few suggestions for new policies.

First, we support the policy adjustments outlined in the stakeholder presentation on June 7, 2013 that support direct ownership:

- We endorse providing a higher SREC Adjustment Factor to direct ownership installations. Leasing and PPA providers serving the residential market should be treated the same as those serving the large project and utility scale market. The fact they are installing less than 10 kW at a time does not change the fact they own a large system, although in aggregated locations, not centralized. They should not be confused with or treated the same as a homeowner that owns one system.
- We support the concept of forward minting of residential customer generated SRECs. The upfront payment of the value of 10 years of SRECs would effectively overcome the financing challenge for homeowners. A loan program that takes the SRECs as payment could accomplish a similar result, similar to the loan program PSEG has implemented in New Jersey.

Second, DOER should establish an on-bill financing program to reduce the access to capital barrier many homeowners face. As a result of the slow economic recovery and the still relatively depressed housing market, many homeowners lack easy access to cash in amounts sufficient to finance the project cost. Ideally, the homeowner ideally would have access to a term loan whose monthly payments, once the incentives have been paid and the loan re-amortized, are less than the utility savings. On bill financing with an interest rate similar to mortgage loans, is perhaps the most cost-effective way to address this need. The program could be capitalized in a variety of ways, including state funds, a taxable bond issue, and utility funding.

Third, it would be helpful if there were more flexibility in the payment of the incentives. For example, it would be helpful to allow direct assignment of the rebate to a lender. Right now the rebate cannot be assigned to a lender. Similarly, the state tax credit should be made assignable to a lender or installer.

Fourth, leasing and ppa providers, whether serving the residential market or the commercial or utility markets, should be treated the same as those serving the large project and utility scale market. They should not have access to incentives designed for homeowners.

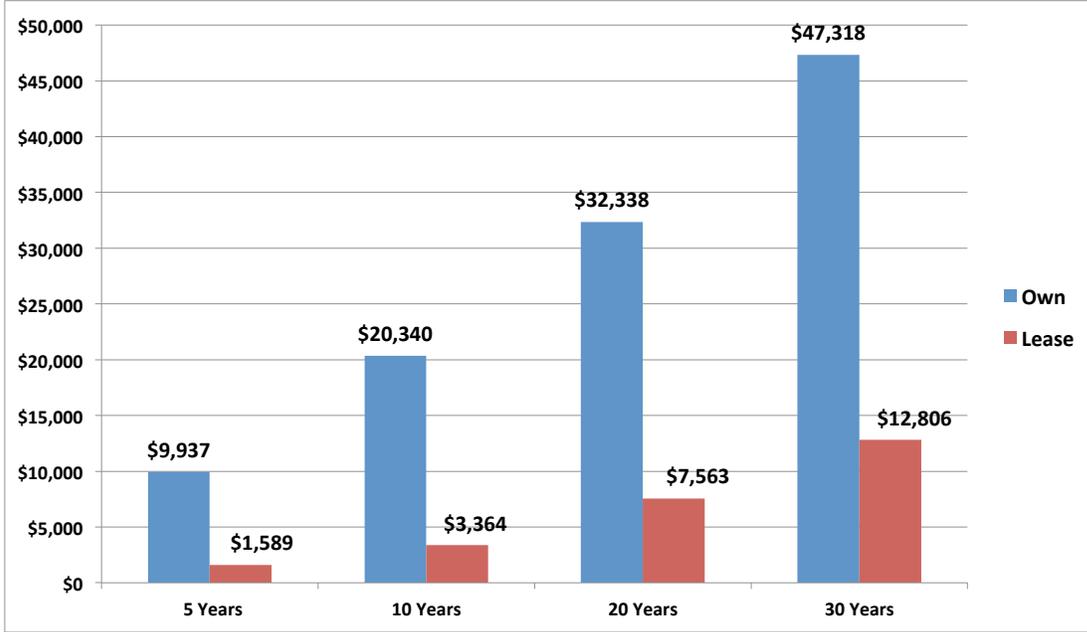
In closing, we like the direction DOER seems to be going in with its policies for the next stage of solar power in Massachusetts. We welcome an opportunity to further discuss both our analysis comparing ownership to leasing and our recommendations. Thank you for your consideration.

Sincerely,

Lee Smith  
Managing Member  
American Solar Partners

1. Ownership Delivers 4X The \$ Savings to Massachusetts (Ratepayers & Taxpayers) Compared to Leasing

A homeowner will save approximately \$48k (net after cost of system) over the useful life of a system they own compared to saving \$12k from a lease, assuming a 35% discount off the price of grid power.



Years	Own	Lease
5 Yrs	\$9,937	\$1,589
10 Yrs	\$20,340	\$3,364
20 Yrs	\$32,338	\$7,563
30 Yrs	\$47,318	\$12,806

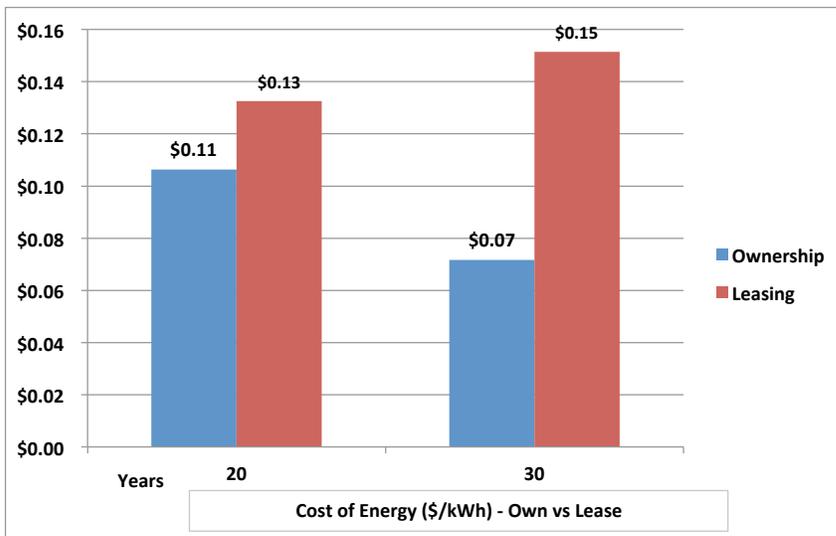
Year	Annual utility Savings	Annual SRECs	Cumulative Savings and SRECs
1	\$868	\$1,085	\$1,953
2	\$887	\$1,082	\$3,923
3	\$907	\$1,080	\$5,910
4	\$928	\$1,077	\$7,914
5	\$949	\$1,074	\$9,937
6	\$970	\$1,072	\$11,978
7	\$992	\$1,069	\$14,039
8	\$1,014	\$1,066	\$16,119
9	\$1,037	\$1,063	\$18,219
10	\$1,060	\$1,061	\$20,340
<b>Total 1-10</b>	<b>\$9,611</b>	<b>\$10,729</b>	<b>\$20,340</b>
<b>Total 11-20</b>	<b>\$11,999</b>		<b>\$32,338</b>
<b>Total 21-30</b>	<b>\$14,980</b>		<b>\$47,318</b>

Year	Utility Bill Savings	Cumulative Savings
1	\$304	\$304
2	\$311	\$614
3	\$318	\$932
4	\$325	\$1,257
5	\$332	\$1,589
10	\$371	\$3,364
20	\$463	\$7,563
30	\$578	\$12,806

2. Ownership produces a 50% lower cost of energy for the homeowner.

Over 30 years, the cost of energy is \$.07/kWh if the system is owned; it is \$0.15 if it is leased.  
 (Net cost of the system or the lease divided by the lifetime output (kWh) = average cost of solar power)

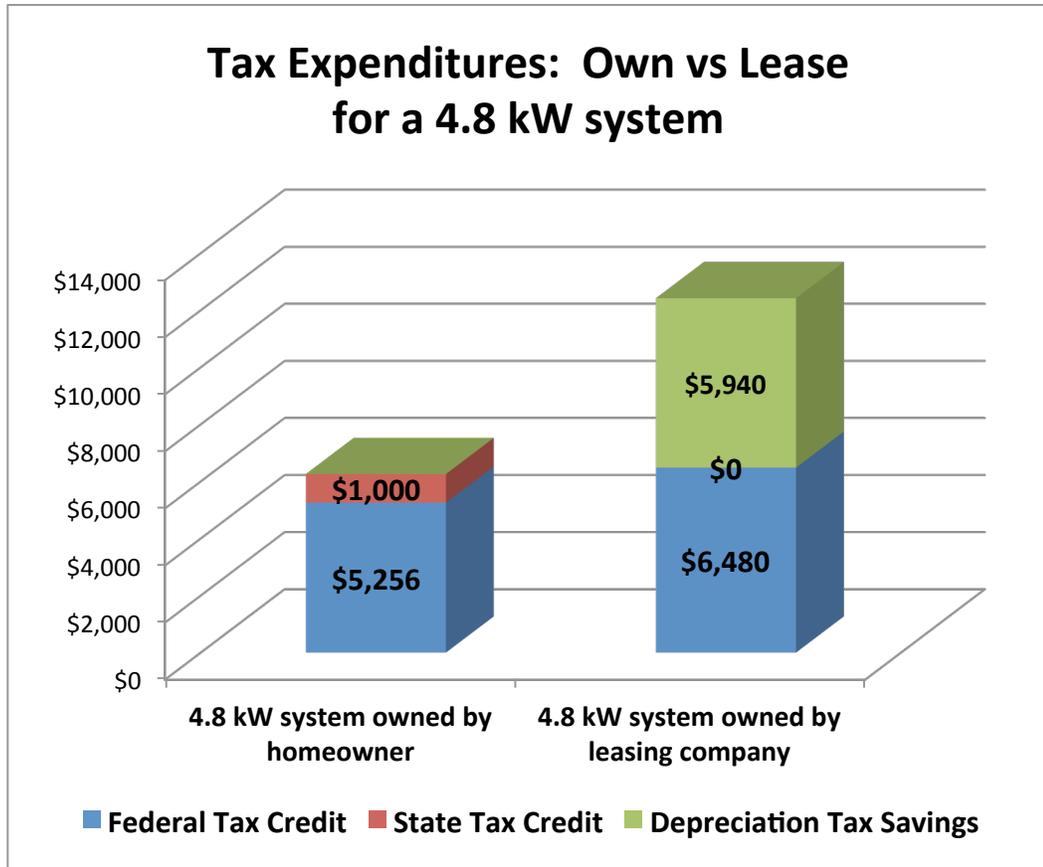
Cost of Energy (\$/kWh)		
	Ownership	Solar Lease
(\$/kWh, 20 years)	\$0.11/kWh	\$0.13/kWh
(\$/kWh, 30 years)	\$0.07/kWh	\$0.15/kWh



Years		Ownership	Leasing
20	Output (kWh)	105961	105961
	Net Cost	\$11,264	\$14,046
	Average Cost	\$0.11	\$0.13

**3. Tax Expenditures To Support Ownership By Homeowner Are 50% Lower Than Tax Expenditures to Support Ownership by Leasing Company**

It costs taxpayers \$6256 to support ownership of a typical size system by homeowner; It costs taxpayers \$12,420 to support ownership by the leasing company.



**Table 4 - Tax Incentives**

Tax Incentive	4.8 kW system owned by homeowner	4.8 kW system owned by leasing company
Federal Tax Credit	\$5,256	\$6,480
State Tax Credit	\$1,000	\$0
Depreciation Tax Savings	N/A	\$5,940
<b>TOTAL</b>	<b>\$6,256</b>	<b>\$12,420</b>

(1) Assumes Leasing Company treats the rebate as taxable income and takes tax credit against full project cost.

4. It costs \$1303 in tax expenditures to add 1 kW of capacity if it is owned by the homeowner (ratepayer-taxpayer); it costs \$2588 in tax expenditures to add 1kW of capacity for a leasing company.

Tax Incentive	System owned by homeowner	System owned by leasing company
Federal Tax Credit (1)	\$5,256	\$6,480
State Tax Credit	\$1,000	
Depreciation Tax Savings (estimate)	N/A	\$5,940
<b>TOTAL</b>	<b>\$6,256</b>	<b>\$12,420</b>
Capacity Added	4.8 kW	4.8 kW
Tax Expenditures per kW of Capacity	\$1,303	\$2,588

<b>ASSUMPTIONS USED IN OWNERSHIP v. LEASING ANALYSIS</b>		
<b>MA Base Case - System Specifications:</b>		
System's Capacity (kW)	4.8 kW	
Estimated Solar Output (kWh/Yr.)	5425	
Percentage of Usage Met by SPS	70.00%	
Estimated electricity price inflation	2.5% (2)	
Current price of utility supplied grid power	\$.16/kWh	
<b>Estimated Cost and Incentives - Residential</b>		
<b>System Cost (gross)</b>	<b>\$21,600 (\$4.50 per watt)</b>	<b>% of System Cost</b>
State Grant Incentive	\$4,080 (\$0.85 per watt)	19%
Federal Tax Incentive	\$5,256 (30% of gross cost minus grant)	24%
State Tax Incentive	\$1,000 (15% of net cost, up to \$1,000)	5%
Amount Incentives Paid Yr. 1	\$10,336	48%
Net Cost After Yr. 1 Incentives	\$11,264	52%
Inverter Replaced Yr 21	\$2,500	
Solar Renewable Energy Credits	\$200/SREC (estimate) For 40 quarters of operation	
<b>Lease Assumptions</b>		
Discount	35%	
Escalation	2.50%	
Term	20	
Extended Term - Same Discount	30	
<a href="#">[1] Estimated using NREL's PV Watts calculator (version 2)</a>		
2) Average 2001 - 2012 EIA data		

Calculations Supporting Ownership Compared to Leasing Analysis								
Years	Current Household Usage - kWh	Cost of Grid Power	Inflation	Current Household Cost - kWh	Solar Output	Derate	Adjusted Solar Output	kWh Purchase from Grid
1	7750	\$0.160	2.50%	\$1,240	5425	0	5425	2325
2	7750	\$0.164	2.50%	\$1,271		0.25%	5411.4	2339
3	7750	\$0.168	2.50%	\$1,303		0.25%	5397.9	2352
4	7750	\$0.172	2.50%	\$1,335		0.25%	5384.4	2366
5	7750	\$0.177	2.50%	\$1,369		0.25%	5371.0	2379
6	7750	\$0.181	2.50%	\$1,403		0.25%	5357.5	2392
7	7750	\$0.186	2.50%	\$1,438		0.25%	5344.1	2406
8	7750	\$0.190	2.50%	\$1,474		0.25%	5330.8	2419
9	7750	\$0.195	2.50%	\$1,511		0.25%	5317.4	2433
10	7750	\$0.200	2.50%	\$1,549		0.25%	5304.2	2446
11	7750	\$0.205	2.50%	\$1,587		0.25%	5290.9	2459
12	7750	\$0.210	2.50%	\$1,627		0.25%	5277.7	2472
13	7750	\$0.215	2.50%	\$1,668		0.25%	5264.5	2486
14	7750	\$0.221	2.50%	\$1,709		0.25%	5251.3	2499
15	7750	\$0.226	2.50%	\$1,752		0.25%	5238.2	2512
16	7750	\$0.232	2.50%	\$1,796		0.25%	5225.1	2525
17	7750	\$0.238	2.50%	\$1,841		0.25%	5212.0	2538
18	7750	\$0.243	2.50%	\$1,887		0.25%	5199.0	2551
19	7750	\$0.250	2.50%	\$1,934		0.25%	5186.0	2564
20	7750	\$0.256	2.50%	\$1,982		0.25%	5173.0	2577
21	7750	\$0.262	2.50%	\$2,032		0.25%	5160.1	2590
22	7750	\$0.269	2.50%	\$2,083		0.25%	5147.2	2603
23	7750	\$0.275	2.50%	\$2,135		0.25%	5134.3	2616
24	7750	\$0.282	2.50%	\$2,188		0.25%	5121.5	2629
25	7750	\$0.289	2.50%	\$2,243		0.25%	5108.7	2641
26	7750	\$0.297	2.50%	\$2,299		0.25%	5095.9	2654
27	7750	\$0.304	2.50%	\$2,356		0.25%	5083.2	2667
28	7750	\$0.312	2.50%	\$2,415		0.25%	5070.5	2680
29	7750	\$0.319	2.50%	\$2,476		0.25%	5057.8	2692
30	7750	\$0.327	2.50%	\$2,538		0.25%	5045.1	2705
							156985.7	
						10 Yrs	53643.7	23856.3
						20 Yrs	105961.4	49038.6
						30 Yrs	156985.7	75514.3

Savings From Solar Output	Purchased From Grid	Total Household kWh Costs/Savings	SREC- #	SREC Value \$	SREC Income	Inverter Replaced	Total Savings
(\$868)	\$372.00	(\$496.00)	5.43	\$200	\$1,085		(\$1,953)
(\$887)	\$383.52	(\$503.95)	5.41	\$200	\$1,082		(\$1,970)
(\$907)	\$395.39	(\$512.00)	5.40	\$200	\$1,080		(\$1,987)
(\$928)	\$407.60	(\$520.15)	5.38	\$200	\$1,077		(\$2,005)
(\$949)	\$420.16	(\$528.40)	5.37	\$200	\$1,074		(\$2,023)
(\$970)	\$433.10	(\$536.75)	5.36	\$200	\$1,072		(\$2,041)
(\$992)	\$446.41	(\$545.20)	5.34	\$200	\$1,069		(\$2,060)
(\$1,014)	\$460.11	(\$553.75)	5.33	\$200	\$1,066		(\$2,080)
(\$1,037)	\$474.21	(\$562.39)	5.32	\$200	\$1,063		(\$2,100)
(\$1,060)	\$488.72	(\$571.14)	5.30	\$200	\$1,061		(\$2,121)
(\$1,084)	\$503.66	(\$579.99)		\$200	\$0		(\$1,084)
(\$1,108)	\$519.03	(\$588.93)		\$200	\$0		(\$1,108)
(\$1,133)	\$534.84	(\$597.98)		\$200	\$0		(\$1,133)
(\$1,158)	\$551.12	(\$607.12)		\$200	\$0		(\$1,158)
(\$1,184)	\$567.86	(\$616.36)		\$200	\$0		(\$1,184)
(\$1,211)	\$585.09	(\$625.70)		\$200	\$0		(\$1,211)
(\$1,238)	\$602.82	(\$635.14)		\$200	\$0		(\$1,238)
(\$1,266)	\$621.07	(\$644.68)		\$200	\$0		(\$1,266)
(\$1,294)	\$639.84	(\$654.31)		\$200	\$0		(\$1,294)
(\$1,323)	\$659.15	(\$664.03)		\$200	\$0		(\$1,323)
(\$1,353)	\$679.02	(\$673.85)		\$200	\$0	\$2,500	\$1,147
(\$1,383)	\$699.46	(\$683.76)		\$200	\$0		(\$1,383)
(\$1,414)	\$720.49	(\$693.77)		\$200	\$0		(\$1,414)
(\$1,446)	\$742.13	(\$703.86)		\$200	\$0		(\$1,446)
(\$1,478)	\$764.39	(\$714.05)		\$200	\$0		(\$1,478)
(\$1,512)	\$787.28	(\$724.32)		\$200	\$0		(\$1,512)
(\$1,546)	\$810.84	(\$734.68)		\$200	\$0		(\$1,546)
(\$1,580)	\$835.07	(\$745.13)		\$200	\$0		(\$1,580)
(\$1,616)	\$860.00	(\$755.66)		\$200	\$0		(\$1,616)
(\$1,652)	\$885.64	(\$766.27)		\$200	\$0		(\$1,652)
-36589.3	\$17,850	-18739.3			\$10,729		(\$44,818)
(\$9,611)	\$4,281	(\$5,330)					(\$20,340)
(\$21,610)	\$10,066	(\$11,544)					(\$32,338)
(\$36,589)	\$17,850	(\$18,739)					(\$44,818)

Ownership Compared to Leasing

6/19/13

Lease Discount	Lease Escalator	Leased Solar Power Cost	Purchased From Grid	Total Bill	Difference Solar vs Lease	Lease Savings
35%	0.0%	\$564	\$372	\$936	\$1,432	\$304
35%	2.5%	\$577	\$384	\$960	\$1,464	\$311
35%	2.5%	\$590	\$395	\$985	\$1,497	\$318
35%	2.5%	\$603	\$408	\$1,011	\$1,531	\$325
35%	2.5%	\$617	\$420	\$1,037	\$1,565	\$332
35%	2.5%	\$630	\$433	\$1,063	\$1,600	\$339
35%	2.5%	\$645	\$446	\$1,091	\$1,636	\$347
35%	2.5%	\$659	\$460	\$1,119	\$1,673	\$355
35%	2.5%	\$674	\$474	\$1,148	\$1,710	\$363
35%	2.5%	\$689	\$489	\$1,178	\$1,749	\$371
35%	2.5%	\$704	\$504	\$1,208	\$1,788	\$379
35%	2.5%	\$720	\$519	\$1,239	\$1,828	\$388
35%	2.5%	\$736	\$535	\$1,271	\$1,869	\$396
35%	2.5%	\$753	\$551	\$1,304	\$1,911	\$405
35%	2.5%	\$770	\$568	\$1,338	\$1,954	\$414
35%	2.5%	\$787	\$585	\$1,372	\$1,998	\$424
35%	2.5%	\$805	\$603	\$1,407	\$2,043	\$433
35%	2.5%	\$823	\$621	\$1,444	\$2,088	\$443
35%	2.5%	\$841	\$640	\$1,481	\$2,135	\$453
35%	2.5%	\$860	\$659	\$1,519	\$2,183	\$463
35%	2.5%	\$879	\$679	\$1,558	\$2,232	\$474
35%	2.5%	\$899	\$699	\$1,599	\$2,282	\$484
35%	2.5%	\$919	\$720	\$1,640	\$2,334	\$495
35%	2.5%	\$940	\$742	\$1,682	\$2,386	\$506
35%	2.5%	\$961	\$764	\$1,725	\$2,439	\$517
35%	2.5%	\$983	\$787	\$1,770	\$2,494	\$529
35%	2.5%	\$1,005	\$811	\$1,815	\$2,550	\$541
35%	2.5%	\$1,027	\$835	\$1,862	\$2,607	\$553
35%	2.5%	\$1,050	\$860	\$1,910	\$2,666	\$565
35%	2.5%	\$1,074	\$886	\$1,959	\$2,726	\$578
		23783.1	17850.0	41633.1	60372.4	12806.3
	10 Yrs	\$6,247	\$4,281	\$10,528	\$15,858	\$3,364
	20 Yrs	\$14,046	\$10,066	\$24,112	\$35,656	\$7,563
	30 Yrs	\$23,783	\$17,850	\$41,633	\$60,372	\$12,806