

1) ELECTRICAL CONSUMPTION

Summary:

Total annual electricity consumption: 4,618,168 kWh

Total annual electricity consumption after 10% savings from efficiency: 4,156,351 kWh

Total annual electricity cost: \$737,918

Total annual electricity cost after 10% savings from efficiency: \$664,126

Explanation:

Figure 1 represents a baseline of electricity consumption at ProvPort, Inc. beginning in July 2008 through June 2009. The baseline is a sum of electricity consumption by ProvPort and its seven tenants: Univar USA, NEPT, The Hudson Companies, Metals Recycling, Three Flags Holdings, TEPCO, and Lehigh Cement (Figure 2). Consumption peaks in the winter season from November 2008 to February 2009 and reaches a high of 465,000 kWh. Figure 3 illustrates electricity cost based upon this consumption.

Both Figure 1 and 3 also illustrate a potential minimum reduction of 10% in electricity consumption and cost that can be achieved through low- or no-cost energy conservation practices such as lighting retrofits, occupancy sensors, proper HVAC maintenance, conservation behaviors, etc.

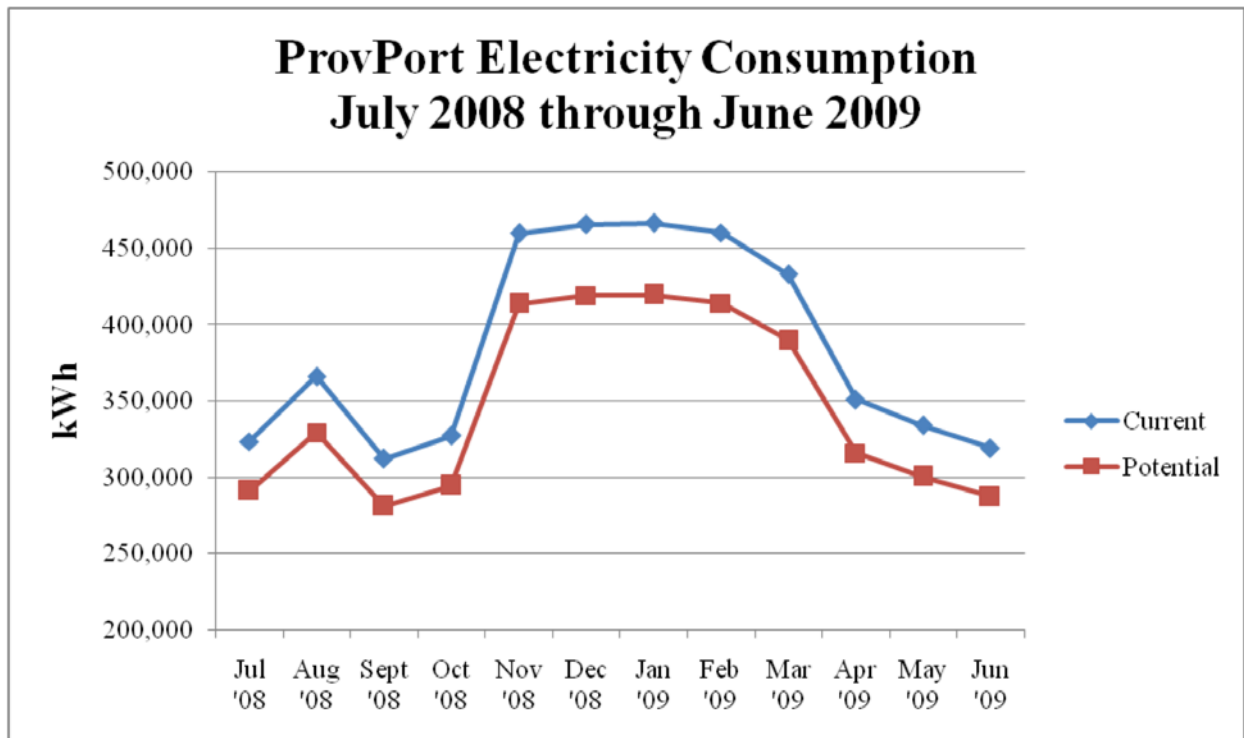


Figure 1. Baseline of electricity consumption from July '08-June '09 with a 10% potential reduction from energy efficiency measures.

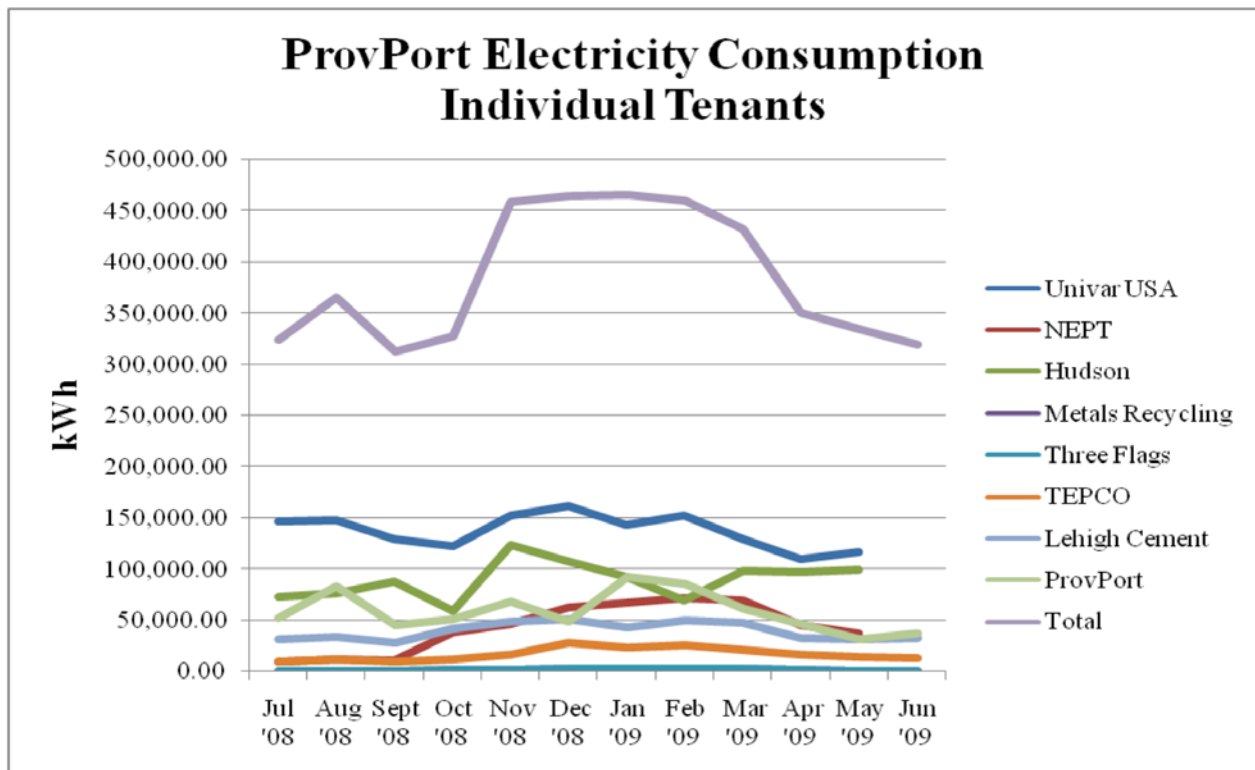


Figure 2. Electricity consumption by individual tenants of ProvPort from July '08-June '09 (For Metals Recycling and Three Flags, Hudson meter 24624 was used because the facilities are comparable. For TEPCO, NEPT South meter 70012 was used. This causes the Metals Recycling trend line to be hidden under Three Flags.)

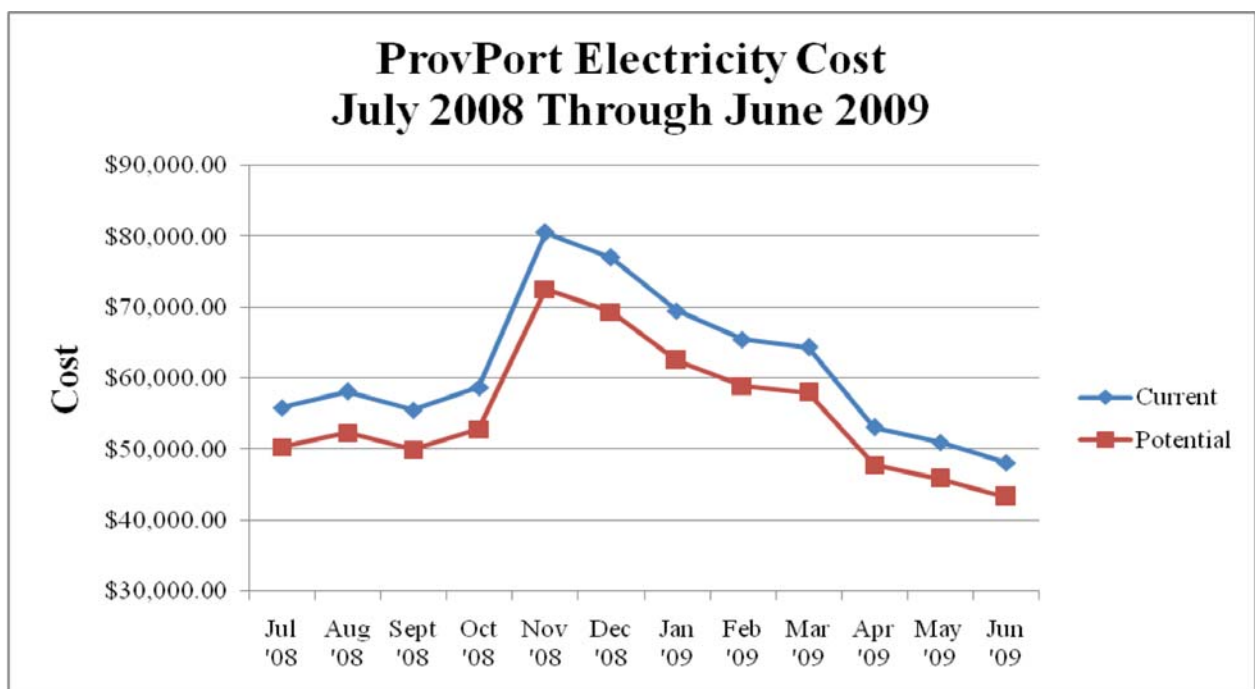


Figure 3. Baseline of electricity cost from July '08 - June '09 with a 10% potential reduction.

2) TRUCKS VS. SHIPS

Summary:

Tons Per Year	Nitrous Oxide	Particulate Matter	Hydrocarbons	Carbon Monoxide	Carbon Dioxide
Trucks	116.35	2.73	6.51	29.78	17,316.00
Boats	53.22	1.56	0.68	12.51	8,888.88
Percent Reduction	54.26%	42.73%	89.89%	57.99%	48.66%

Explanation:

TRUCK DATA

Figure 4 below represents the amount of emissions from a truck or several similar trucks traveling to Providence from Newark or Edison New Jersey. This is one year worth of emissions from these trucks at a rate of 1000 containers or 1000 truck trips to Providence from NJ each week. It does not include the emissions from the return trips as I could only run the program with the loaded trucks and containers in mind. The results of the Environmental Protection Agency’s emission quantifier are shown in Figure 4 and the simplified results are below.

Annual emissions when moving 1000 containers by truck each week:

- 116.35 tons of Nitrous Oxide per year
- 2.73 tons of Particulate matter per year
- 6.51 tons of Hydro carbons per year
- 29.78 tons of Carbon Monoxide per year
- 17,316 tons of Carbon Dioxide per year

Emissions Results: Trucks

Annual	NOx (tons/year)	PM (tons/year)	HC (tons/year)	CO (tons/year)	CO2 (tons/year)	Diesel-Equivalent (gallons/year)
Baseline of Entire Fleet	116.3502	2.7298	6.5094	29.7774	17,316.0000	1,560,000.0000
Baseline of Vehicles Retrofitted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Percent Reduced (%)	0.0%	0.0%	0.0%	0.0%	0	0
Amount Reduced Per Year	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Daily	NOx (kg/day)	PM (kg/day)	HC (kg/day)	CO (kg/day)	CO2 (kg/day)	Fuel (gal/day)
Kilograms Reduced Per Day (kg/day)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lifetime	NOx (tons)	PM (tons)	HC (tons)	CO (tons)	CO2 (tons)	Diesel-Equivalent (gallons)
Baseline of Entire Fleet	2,124.5538	49.8464	118.8617	543.7354	316,190.1600	28,485,600.0000
Baseline of Vehicles Retrofitted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Percent Reduced (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Amount Reduced	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Amount Emitted After Retrofit, Retrofitted Vehicles	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Amount Emitted After Retrofit, Entire Fleet	2,124.5538	49.8464	118.8617	543.7354	316,190.1600	28,485,600.0000
Total Cost Effectiveness (\$/ton), Retrofitted Vehicles	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Note: The lifetime results are dependent on each vehicle group's remaining life. To determine the remaining life for each vehicle group, divide the lifetime results by the annual results using the Detailed Results tables below.

Figure 4. Annual emissions when moving 1000 containers by truck each week to Providence from Newark or Edison New Jersey

SHIP DATA

Figure 5 represents the amount of Emissions from a ship or several similar ships traveling to Providence from Newark Bay or Edison Bay New Jersey. This is one year worth of emissions from these ships at a rate of 1000 containers or 10 ship trips to Providence from NJ each week. It does not include the emissions from the return trips as I could only run the program with the loaded trucks and container ships in mind. The results of the Environmental Protection Agency's emission quantifier are in Figure 5 and the simplified results are below.

Annual emissions when moving 1000 containers by boat each week:

- 53.22 tons of Nitrous Oxide per year
- 1.56 tons of Particulate matter per year
- 0.68 tons of Hydro carbons per year
- 12.51 tons of Carbon Monoxide per year
- 8,889 tons of Carbon Dioxide per year

Emissions Results: Ships

Annual	NOx (tons/year)	PM (tons/year)	HC (tons/year)	CO (tons/year)	CO2 (tons/year)	Diesel-Equivalent (gallons/year)
Baseline of Entire Fleet	53.2155	1.5637	0.6759	12.5094	8,888.8800	800,800.0000
Baseline of Engines Retrofitted	53.2155	1.5637	0.6759	12.5094	8,888.8800	800,800.0000
Percent Reduced (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Amount Reduced Per Year	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Daily	NOx (kg/day)	PM (kg/day)	HC (kg/day)	CO (kg/day)	CO2 (kg/day)	Fuel (gal/day)
Kilograms Reduced Per Day (kg/day)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lifetime	NOx (tons)	PM (tons)	HC (tons)	CO (tons)	CO2 (tons)	Diesel-Equivalent (gallons)
Baseline of Entire Fleet	1,140.8412	33.5223	14.4903	268.1788	190,560.9655	17,167,654.5480
Baseline of Engines Retrofitted	1,140.8412	33.5223	14.4903	268.1788	190,560.9655	17,167,654.5480
Percent Reduced(%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Amount Reduced	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Amount Emitted After Retrofit, Retrofitted Engines	1,140.8412	33.5223	14.4903	268.1788	190,560.9655	17,167,654.5480
Amount Emitted After Retrofit, Entire Fleet	1,140.8412	33.5223	14.4903	268.1788	190,560.9655	17,167,654.5480
Capital Cost Effectiveness (\$/ton), Retrofitted Engines	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Total Cost Effectiveness (\$/ton), Retrofitted Engines	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00

Note: The lifetime results are dependent on each marine vessel's remaining life. To determine the remaining life for each vehicle group,

Figure 5. Annual emissions when moving 1000 containers by ship each week to Providence from Newark or Edison New Jersey.

This clearly shows that the use of ships rather than trucks will decrease massively the amount of emissions per year. The produced emissions by this movement of materials and goods between northern New Jersey and Providence could be cut almost in half. This does not even take into account the amount of emissions saved in total as it only represents trips to Providence from Northern New Jersey and not the return trips. It also does not consider the fact that Rt. 95 is a high traffic corridor and this operation would reduce the number of trucks running through NYC and up 95 by 1000 trucks per week. This would lower traffic, reduce commuter travel time, save lives, and prolong the life of the road as it would be used less.

3) SOLAR AND WIND PROJECTS

Summary:

Total annual electricity consumption: 4,618,168 kWh

Total annual electricity consumption after solar installation: 2,692,559 kWh

Total annual electricity consumption after solar and wind installation: - 567,445 kWh

Total annual electricity cost: \$737,918

Total annual electricity cost after solar installation: \$267,116

(Not inclusive of efficiency savings)

Total annual electricity cost after solar and wind installation: - \$139,202

(Not inclusive of efficiency savings)

Explanation:

Figure 6 illustrates a potential reduction in electricity consumption at ProvPort Inc. after the installation of the GroSolar panel project. By implementing the solar project, ProvPort will produce more than half of its current electricity consumption, resulting in a **decrease in grid consumption of 58%**.

Figure 7 represents electricity cost based upon current consumption as well as the potential cost of electricity after solar installation. The installation of solar would result in a **64% reduction in electricity costs**.

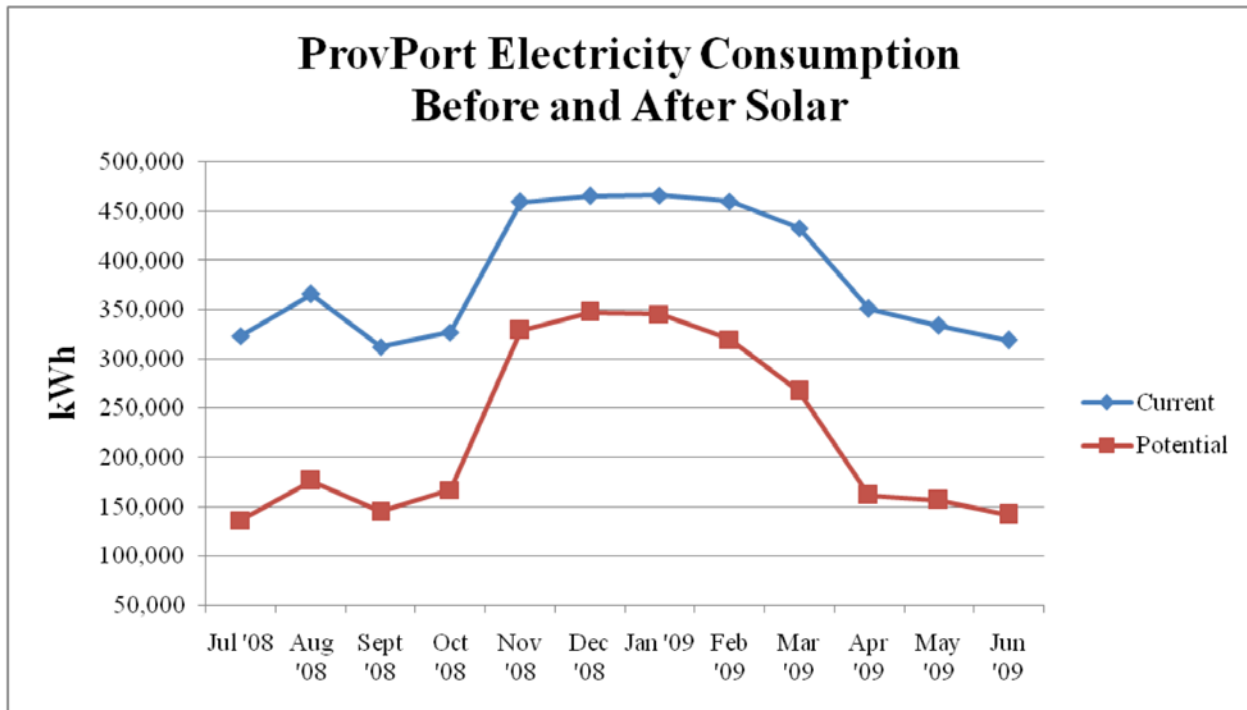


Figure 6. Baseline of electricity consumption from July '08 – June '09 with a potential reduction from solar installation (not inclusive of 10% savings from energy efficiency measures).

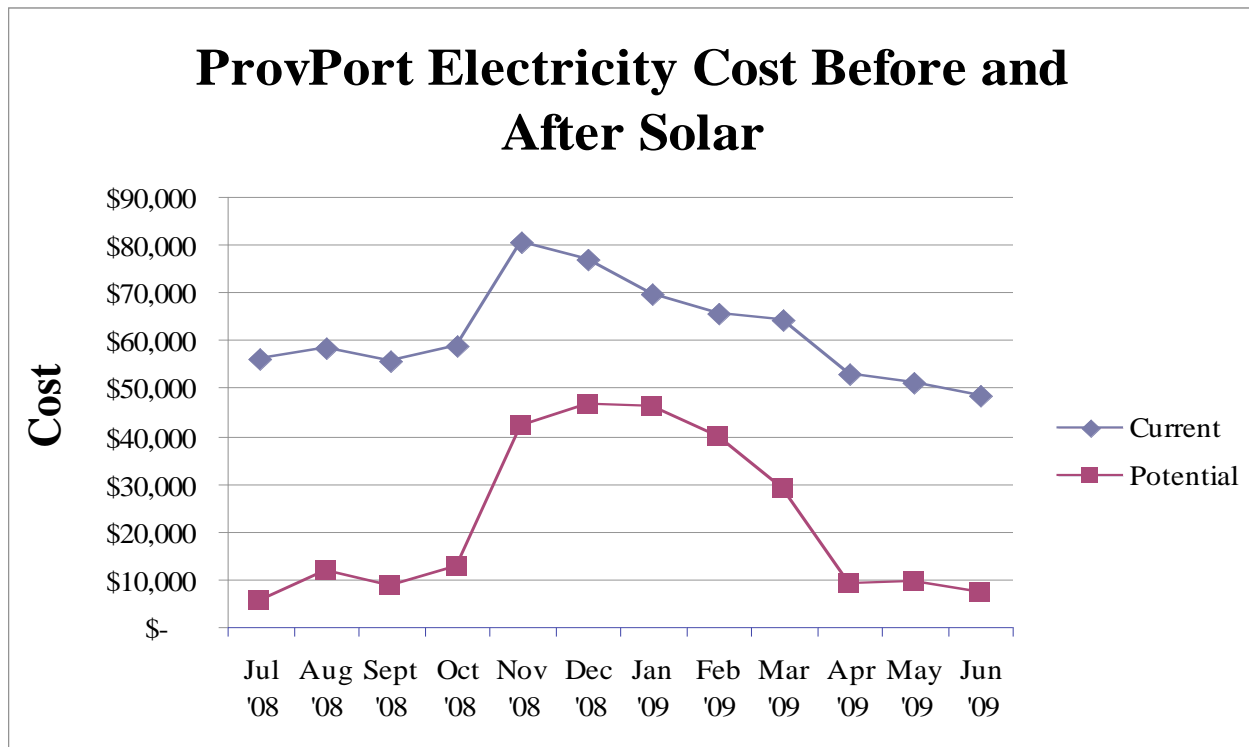


Figure 7. Baseline of electricity cost from July '08 – June '09 with a potential reduction after solar installation (not inclusive of 10% savings from energy efficiency measures).

Figure 8 illustrates a potential reduction in electricity consumption on site after the installation of both the solar panel project and two DW900 wind turbines. **Consumption decreases by 112%** leading to an excess of produced electricity being sold back to the grid.

Figure 9 illustrates the decrease in cost with respect to this potential decrease in consumption. Throughout the year ProvPort Inc would produce enough electricity from solar and wind to sell the excess back to the grid and make a net profit. This net profit takes into consideration cost avoidance (what ProvPort would have been paying the grid for electricity), renewable energy certificates (RECs) being sold on the market and the cost of the standby fee. The installation of solar and wind would result in a **119% reduction in electricity costs**.

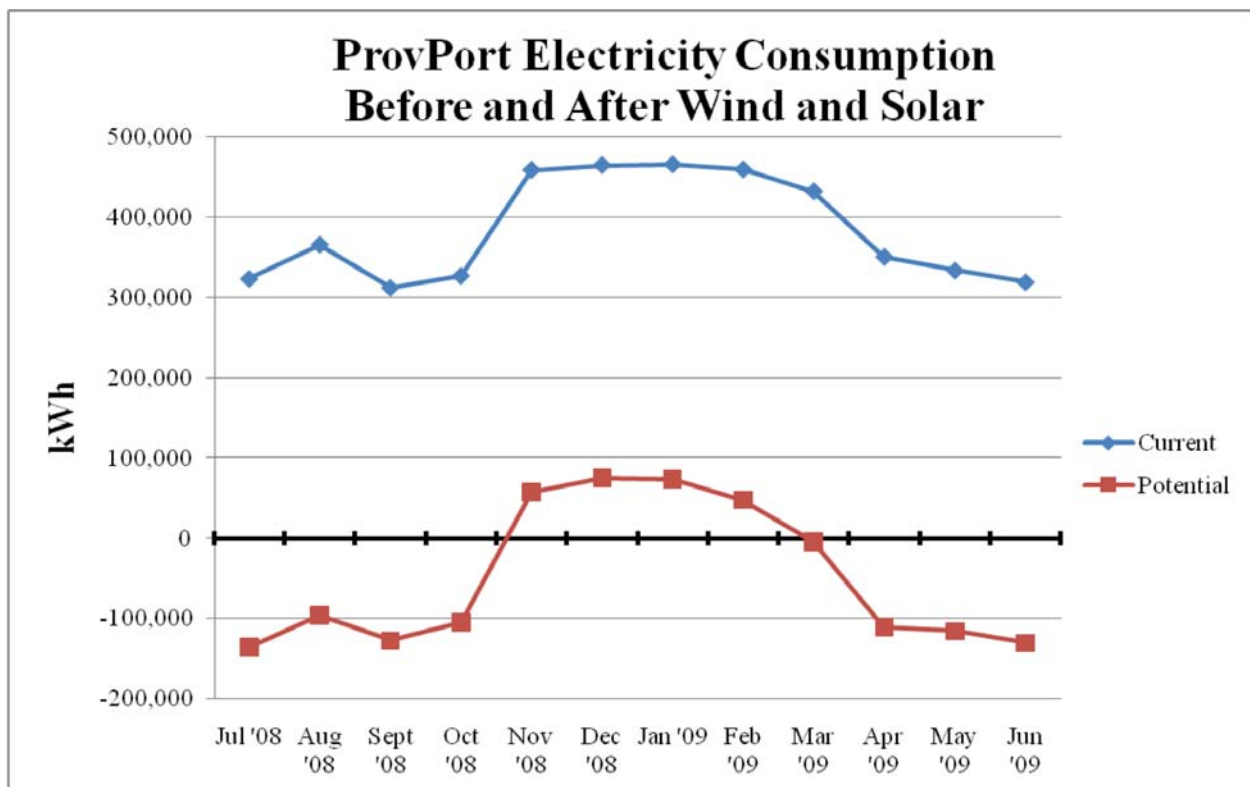


Figure 8. Baseline of electricity consumption from July '08 – June '09 with a potential reduction after solar and wind installation (not inclusive of 10% savings from energy efficiency measures).

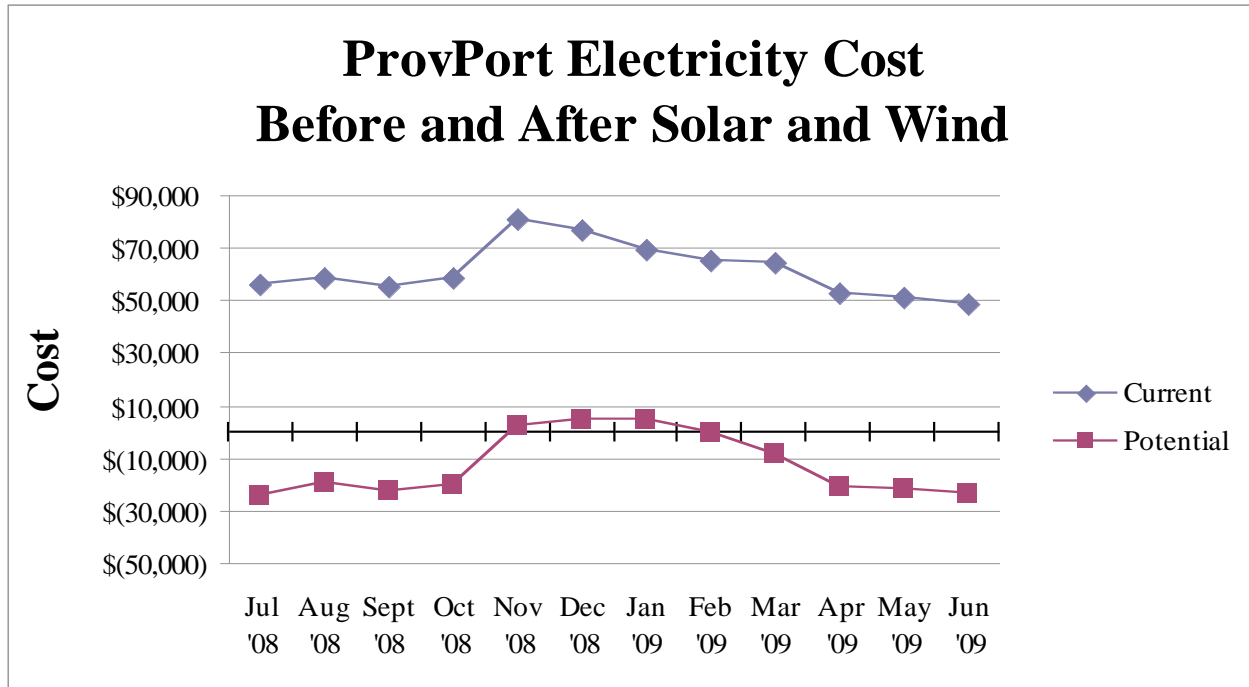


Figure 9. Baseline of electricity cost from July '08 – June '09 with a potential reduction after solar and wind installation (not inclusive of 10% savings from energy efficiency measures).

CURRENT ELECTRICITY CONSUMPTION			
Month	kWh Consumed	Cost	Cost/kWh
Jul '08	323,490	\$ 55,906	\$ 0.17
Aug '08	366,154	\$ 58,188	\$ 0.16
Sept '08	312,339	\$ 55,594	\$ 0.18
Oct '08	327,326	\$ 58,756	\$ 0.18
Nov '08	459,658	\$ 80,629	\$ 0.18
Dec '08	465,631	\$ 77,082	\$ 0.17
Jan '09	466,447	\$ 69,540	\$ 0.15
Feb '09	460,150	\$ 65,517	\$ 0.14
Mar '09	432,902	\$ 64,422	\$ 0.15
Apr '09	351,065	\$ 53,111	\$ 0.15
May '09	333,844	\$ 51,003	\$ 0.15
Jun '09	319,163	\$ 48,170	\$ 0.15
TOTAL/AVG	4,618,168	\$ 737,918	\$ 0.16

POTENTIAL ELECTRICITY PRODUCTION			
Month	kWh Produced from Wind	kWh Produced from Solar	kWh Produced from Solar + Wind
Jul	271,667	187,383	459,050
Aug	271,667	189,849	461,516
Sept	271,667	167,659	439,326
Oct	271,667	160,262	431,929
Nov	271,667	130,675	402,342
Dec	271,667	118,347	390,014
Jan	271,667	120,813	392,480
Feb	271,667	140,537	412,204
Mar	271,667	165,193	436,860
Apr	271,667	189,849	461,516
May	271,667	177,521	449,188
Jun	271,667	177,521	449,188
TOTAL	3,260,004	1,925,609	5,185,613